



Angela Ifunanya Okeke

**On the Relationship Between Fiscal Consolidation (Austerity) and
Income Inequality. Novel Empirical Evidence**

School of Management
PhD in Economics and Finance

PhD
Academic Year: 2020 - 2023

Supervisor: Professor Constantinos Alexiou
Associate Supervisor: Professor Joe Nellis
February 2023



School of Management
PhD in Economics and Finance

PhD

Academic Year 2020 - 2023

Angela Ifunanya Okeke

**On the Relationship Between Fiscal Consolidation (Austerity) and
Income Inequality. Novel Empirical Evidence**

Supervisor: Professor Constantinos Alexiou

Associate Supervisor: Professor Joe Nellis

February 2023

© Cranfield University 2023. All rights reserved. No part of this
publication may be reproduced without the written permission of the
copyright owner.

ABSTRACT

Equity concerns regarding increases and persistence of adverse distributional outcomes tend to rear up during instances of austerity consideration since increasing inequality levels tend to have material significances on a people's way of life as well as a nation's economic growth by disproportionately affecting economic opportunities for the lower and median incomes. Motivated by the lack of empirical clarity and conflicting evidence in the extant austerity-inequality nexus literature this thesis enriches our understanding of the effect of fiscal consolidation programmes on output and income inequality. More specifically, by engaging in a systematic literature review, this study explores the relationship between austerity and income inequality. Furthermore, by employing different empirical model specifications¹ for a panel of 16 OECD countries for the period 1980 to 2019, this research work explores the dynamic distributional effects of fiscal consolidation programmes as well the role of public debt in determining distributional outcomes during austerity implementation. The novel evidence obtained suggests that: adverse distributional effects persist for 15 years following adjustment implementation through both revenue and expenditure channels; furthermore – point estimates for the Bottom 40% of the income distribution are higher by the 15th year than previous peak periods; distributional impacts arising from influences of public debt levels are amplified during instances of fiscal adjustment with adverse distributional effects on average, manifesting from medium debt levels.

Keywords: Income Inequality, Disparity, Distribution, Austerity, Fiscal Adjustment, Fiscal Retrenchment, Fiscal Consolidation; Dynamic Effects, Public Debt, Debt Levels, Debt Threshold, Gini, Labour Income Share, Top Income Share.

¹ (i) Deriving impulse response functions from local projections in order to estimate the dynamic distributional effects of fiscal consolidation programmes (ii) estimating a panel threshold model in order to ascertain the role of public debt in exacerbating or attenuating distributional outcomes during instances of fiscal consolidation.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisors, Profs. Constantinos Alexiou and Joe Nellis for their invaluable advice and unequivocal support during my study. The meetings and conversations were critical in guiding me to critically form a comprehensive and objective synthesis of literature and apply gained knowledge to my academic research. I would also like to express my sincere gratitude to the Petroleum Trust Development Fund (PTDF) for their scholarship and opportunity provided for me to undertake this research. I would also like to thank my student and academic support (SAS) team lead – Debbie Bramwell for her immense and invaluable support throughout this academic journey. My gratitude also goes to Mary Betts-Gray, Isobel Mason, Keith Hurley, Dawn Peckham – who were of immense support to me. I would also like to thank Pastors Ben Akabueze and Ernest Esene who supported me with much needed pastoral care. Finally, I would like to express my deepest gratitude to my mum and husband who both encouraged me from the outset of this academic journey; and also my children. Without their support and understanding in the last few years, this intense academic pursuit would have been extremely difficult. I also want to appreciate my brother and sisters for their support and encouragement. Lastly, I am deeply grateful to the Most High God.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	iii
LIST OF FIGURES	vii
LIST OF TABLES	viii
LIST OF EQUATIONS.....	ix
1 INTRODUCTION	1
2 DOES FISCAL AUSTERITY LEAD TO RISING INCOME INEQUALITY?	11
ABSTRACT	11
2.1 Introduction	12
2.1.1 Systematic literature review	14
2.1.2 Review strategy	15
2.1.3 Scoping	16
2.1.4 Income inequality	17
2.1.5 Fiscal austerity	19
2.1.6 Fiscal policy.....	20
2.2 Search strategy.....	21
2.2.1 Database search	22
2.2.2 Other source search	23
2.2.3 Screening and selection	24
2.2.4 Evaluation.....	25
2.3 Data Extraction, Analysis & Synthesis.....	28
2.3.1 Descriptive analysis.....	29
2.3.2 Thematic synthesis	35
2.3.3 Austerity - theoretical premises.....	35
2.3.4 Austerity effect on output.....	39
2.3.5 Austerity effect on income inequality	53
2.4 Key Findings Synthesis	58
2.4.1 Discussion.....	59
2.4.2 Future research agenda	61
2.4.3 Research questions	61
2.4.4 Research design	63
2.4.5 Research limitation.....	64
2.5 Concluding remarks and policy implication.....	65
REFERENCES	66
APPENDIX	78
Appendix A.....	78
Appendix B.....	78
Appendix C Data extraction format.....	79

Appendix D Fiscal austerity effect on output.....	80
Appendix E Fiscal austerity effect on income inequality.....	89
Appendix F Austerity historical origin.....	94
3 LONG TERM AND DYNAMIC DISTRIBUTIONAL EFFECTS OF FISCAL ADJUSTMENT EPISODES: EVIDENCE FROM A PANEL OF 16 OECD COUNTRIES.....	99
ABSTRACT	99
3.1 Introduction	100
3.2 Literature Review	104
3.2.1 Theoretical considerations.....	104
3.2.2 Distributional aspects of fiscal adjustment.....	106
3.3 Econometric Strategy	108
3.3.1 Data.....	109
3.3.2 Income inequality data	110
3.3.3 Fiscal adjustment data	114
3.3.4 Methodologies considered.....	115
3.4 Estimation of Results.....	119
3.4.1 Long-term distributional effects on income inequality	119
3.4.2 Dynamic effects of fiscal consolidations from IRFs of local projections ...	125
3.4.3 Comparison between large adjustment sized and small adjustment sized countries	134
3.4.4 Dynamic effects from IRFs of local projections: large adjustment sized countries vis-à-vis small adjustment sized countries.....	139
3.4.5 Discussion.....	141
3.5 Concluding remarks and policy implication.....	144
REFERENCES	147
Appendix A.....	155
Appendix B – Diagnostics Tests	160
Appendix C – Full Country sample estimation results.....	168
Appendix D – Driscoll Kraay Fixed Effects model results.....	173
Appendix E – Pooled OLS model results.....	176
Appendix B – Large adjustment size countries estimation results.....	183
Appendix C – Large adjustment countries Driscoll Kraay Fixed Effects model results.....	189
Appendix D - Small adjustment size countries estimation results	192
Appendix E – Small adjustment size countries Driscoll Kraay Fixed Effects model results.....	198
Appendix F Impulse Response Function from Local Projections – Full Country Sample	201
Appendix G - Large adjustment countries.....	205
Appendix H - Small adjustment countries.....	207

4 PUBLIC DEBT, FISCAL CONSOLIDATION AND INCOME INEQUALITY. UNRAVELLING THE PUZZLE!	209
ABSTRACT	209
4.1 Introduction	210
4.2 Literature Review	213
4.2.1 Public debt and economic growth	215
4.2.2 Public debt and fiscal adjustment	216
4.2.3 Public debt and inequality	217
4.3 Econometric Strategy	221
4.3.1 Data.....	222
4.3.2 Income inequality data	223
4.3.3 Fiscal adjustment data	225
4.3.4 Public debt data	227
4.3.5 Methodologies considered.....	229
4.4 Estimated Results	232
4.4.1 Does the level of public debt determine whether austerity affects income inequality?	233
4.4.2 Are high indebted countries more affected by adverse distributional consequences vis a vis low indebted countries during instances of fiscal adjustments?	250
4.4.3 Discussion:	257
4.5 Concluding remarks and policy implication.....	264
REFERENCES	267
Appendix A.....	279
Appendix B – Diagnostic Tests	282
Appendix C Full Country estimation results	293
Appendix D Full Country estimation results contd.	295
Appendix E Full Country estimation results contd.	299
Appendix F Highly Indebted Countries estimation results	306
Appendix G Low Indebted Countries estimation results.....	311
5 CONCLUDING REMARKS AND POLICY IMPLICATION	313

LIST OF FIGURES

Figure 2-1 Review Protocol.....	16
Figure 2-2 Mapping the Field.....	17
Figure 2-3 Top 10% Share of Income Across World Regions 1980-2019	19
Figure 2-4 Top 1% Share of Income Across World Regions 1980-2019	19
Figure 2-5 Selection Diagram Process Flow	27
Figure 2-6 Articles by Thematic Areas in %.....	30
Figure 2-7 No of Articles by Source	33
Figure 2-8 Articles by Source in %	33
Figure 2-9 No of Journal + Working Paper Articles by Publication Year	34
Figure 2-10 Studies by Article Type	34
Figure 2-11 Studies by Article Type in %.....	34
Figure 3-1 Gini index of post-disposable income	158
Figure 3-2 Gini index of disposable income	159
Figure 4-1 ‘Average Debt’ by ‘Country’	228
Figure 4-2 ‘Debt’ by ‘Country’ and ‘Year’	228
Figure 4-3 Debt by ‘Country’ and ‘Year’	228
Figure 4-4 ‘Average Debt’ by Country for period 1980 - 2019	229

LIST OF TABLES

Table 2-1 Key Word Search	22
Table 2-2 Electronic Database Search.....	23
Table 2-3 Inclusion and Exclusion Criteria.....	25
Table 2-4 Database + Google Search (Thematic Areas)	30
Table 2-5 Database + Google Search (Journals)	32
Table 2-6 Database + Google Search (Working Papers).....	33
Table 3-1 Model 1. Full country sample – Panel ARDL Model Summary of estimation results	122
Table 3-2 Model 2. Full country sample – Driscoll Kraay Fixed Effects Model Summary of estimation results	124
Table 3-3 Model 1. Large adjustment size countries – Panel ARDL Model Summary of estimation results	137
Table 3-4 Model 1. Small adjustment size countries - Panel ARDL Model Summary of estimation results	138
Table 4-1. Model 1. Dynamic Threshold Panel Regression Summary of estimated results	238
Table 4-2. Driscoll Kraay Fixed Effects Model Summary of estimated results.....	249
Table 4-3. Model 4: Quantile Panel Regression – High indebted countries - Summary of estimated results	256

LIST OF EQUATIONS

(3-1) 116

(3-2) 117

(4-1) 230

(4-2) 231

(4-3) 231

(4-4) 239

(4-5) 250

1 INTRODUCTION

Income inequality is the measure that highlights the gap between different individuals or household disposable income in a particular year and in a population group (IMF). Although some degree of income inequality is inevitable since its causes can historically be attributed to global factors such as technology progress and globalisation, however domestic factors (such as financial integration, labour & product market liberalisation) have further entrenched this culminating to increasing inequality levels in recent decades. Increasing inequality levels have material significances for a people's wellbeing, and social cohesion as well as poses a challenge to a nation's notion of justice and equity (particularly as it pertains to the vulnerable in the society) and can also potentially undermine macroeconomic stability and sustainable growth (Clements et al. 2015). In this regard, there have been emerging views on the role of rising income inequality in precipitating global crisis (van Treeck and Storn 2012; Calcagno 2012) with a strand of the empirical literature (see for example Kumhof and Ranciere 2010; Rajan 2011; van Treeck and Storn 2012) associating rising inequality levels with the 2007/8 global financial crisis. Consequently, since the Great Recession, rising income inequality has been at the fore of global economic policy debate – with the United Nations also weighing in by charging all countries to reduce within and across-country inequalities in its 2015 Target 10 Sustainable Development Goal (SDG). Although there is not a global consensus as to what constitutes an 'acceptable level' of inequality and how it can be tackled, nevertheless the right mix of policies and institutions are crucial to tackling it (wir2022). Fiscal policy plays an important role in this regard and is the government's primary tool for effecting redistribution via its spend and tax instruments.

Post the global financial crisis, debt sustainability concerns which arose as a result of the huge financial bailouts and expansionary policies undertaken to curb the recessive effects of the crisis were further heightened by the 2010 seminal paper by Reinhart and Rogoff associating sub-optimal economic performance with debt levels above 90% of GDP. The subsequent '*expansionary austerity hypothesis*' linking austerity policies with economic growth in the short-term paved the way for the adjudication of debt stabilisation by way of austerity policies – and culminated in a resurgence of the contentious '*austerity vis-à-vis stimulus*' debate and the resultant large body of conflicting empirical findings pertaining to the output and distributional effects of austerity implementation.

Motivated by the lack of empirical clarity and conflicting evidence in the extant austerity-inequality nexus literature, this thesis enriches our understanding of the effect of fiscal consolidation programmes on output and income inequality. By engaging in a systematic review of the literature this research effectively (i) disentangles and summarises the key issues guiding the academic discourse; (ii) sets forth an agenda for future research and; (iii) assists policymakers arrive at a reasonable deduction of the distributional consequences of fiscal austerity in order to support appropriate decision-making. To that effect, the systematic review makes three distinct contributions: first and foremost, to the best of our knowledge, this is the first study in this area to employ a systematic literature review methodology; secondly, it provides a comprehensive analysis of the impact of austerity by identifying germane aspects of its distributional channels and economic effects and thirdly; it proposes directions for future research pertinent to both academic researchers and policymakers.

The systematic literature review also identified several understudied areas regarding distributional impacts from austerity implementation – two of which are

covered in this research effort and pertain to: (i) the long-term distributional effects of fiscal adjustment programmes and (ii) the impact of high (low) public indebtedness on income inequality during adjustment implementation. Evidence from the systematic review of the literature indicates that the academic discourse has mostly focused on the *short-term effects* of the austerity policy. Against this backdrop, literary efforts on the distributional effects have focused along this time frame with Ball et al. (2013), Furceri et al. (2016), Bova et al. (2018) and Heimberger (2020) providing evidence of adverse distributional effects lasting up to the medium term. Specifically while Ball et al. (2013), Furceri et al. (2016) and Bova et al. (2018) show that short- and medium-term inequality increases act more persistently via the unemployment channel with resultant persistent negative effect on labour's share of income, Heimberger (2020) delivers insights detailing how the size of the adjustment, its duration as well as the economy's business cycle position impacts inequality both in the short and medium run – finding specifically that (a) large sized adjustments tend to have larger impact on inequality and manifest in the medium term than small-sized adjustments which have smaller impacts and usually manifest in the short-term (b) adjustments that last longer than 3.5years tend to have a strong adverse effect on inequality in the medium term (c) adjustments during low growth tend to have a persistent adverse effect on inequality both for the short and medium term. Therefore, since the literature only highlights the short-and-medium-term distributional consequences of austerity implementation - exploring the dynamic distributional effects enable us to assess how long these linger into the future. Furthermore, by exploring the channels driving these and also by making use of a wider set of inequality indicators (including bottom income share, middle income share and top/bottom income share ratio) than previously used in the literature, one is able to assess the income distribution points

particularly affected by these decisions since the literature (for instance IMF 2014) shows that those at the lower end of the income distribution tend to be more disproportionately affected during instances of fiscal adjustments. Such evidence would crucially add to the discourse enabling policymakers to balance equity-efficiency trade-offs since the IMF (2017) notably shows that a reduction in inequality might positively impact economic growth since the poor tend to have a higher marginal propensity to consume. By deriving impulse response functions from local projections (Jorda 2005, 2009), this research effort pertaining to the long-term distributional effects of adjustment programmes makes two distinct contributions: firstly, adverse distributional effects arising from adjustment episodes tend to be persistent till the 15th year of adjustment implementation; and secondly by making use of a wider set of inequality indicators, we show that adverse effects tend to be steeper for the Bottom 40 of the income distribution with peak estimates at the 15th period higher than previous peak estimates².

The second stream of literature relevant to our study relates to the impact of high (low) public indebtedness on income inequality during adjustment implementation as seen in Klein and Winkler (2019) and Bartak et al. (2022). Bartak et al. (2022) explore the *public debt-inequality* nexus and show findings regarding a non-causal linear relationship – with increases in inequality driven by increases in unemployment levels (as a result of implementation of austerity policies); while increases in public debt levels occur via the actions of automatic stabilisers. On the other hand, Klein and Winkler (2019) explore the *private debt-austerity-inequality* nexus and show findings indicating income inequality greatly increases during adjustment episodes characterised by private

² Seen at the 7th period.

debt overhang. Moreover, by controlling for public debt levels, they indicatively show findings that inequality increases at low public debt levels compared to instances of high public debt levels. However, they further note that public debt levels appear to have minimal bearing (a minimal role) on whether or not austerity increases inequality. With fiscal authorities faced with weak growth, rising prices and more pressing debt issues than was experienced during the 2007/8 financial crisis, - exploring the *public debt-austerity-income inequality nexus* becomes crucial in assisting policymakers make effective decisions regarding debt stabilisation. Notably, Ghosh et al. (2013) and Ostry et al. (2015) put forward the notion that should fiscal space remain ample, growth enhancing policies be pursued due to the distortionary costs associated with the pursuit of austerity policies. This research effort therefore makes three distinct contributions: firstly influences from public debt levels tend to exacerbate adverse distributional outcomes during adjustment implementation – with adverse distributional outcomes manifesting from medium debt thresholds; secondly, inequality increases from the debt-adjustment nexus is stronger than the effects emitted distinctly from public debt; and thirdly, adverse outcomes arising via the labour share channel tends to be more persistent and prevalent across different debt thresholds.

In the subsequent chapters, a systematic review of the empirical literature is undertaken in *Chapter 2* in order to ascertain the economic *and distributional* effects of austerity policies. Key findings indicate that: (i) the theoretical constructs³ governing austerity largely shape the trajectory of the debate and pertain to the short to medium-term fiscal strategies that should be pursued during recessionary times – with the resulting

³ These are broadly classified into two main strands: demand side theories comprising of the Keynesian and Post-Keynesian views and; supply side theories comprising the Neoclassical and Neoliberal views.

views presenting as: '*austerity vis-à-vis stimulus*' and '*expansionary vis-à-vis contractionary*'.

While the demand side theories (Keynesian and Post-Keynesian views) recommend countercyclical fiscal measures during recessive times and therefore prescribe expansionary fiscal policy during times in which economic resources are extremely underemployed in order to spur output growth in the economy by targeting aggregate demand; austerity policies are seen as deeply contractionary with adverse multiplier effects on aggregate demand and therefore recommended as a policy tool reserved for the top of the business cycle i.e. during boom times in order to prevent the economy from over-heating as a result of rising prices spurred by excess demand.

The supply side theorists (neoclassical and neoliberal views) on the other hand, recommend procyclical policies since they contend that government's discretionary spending tends to crowd out private investment whereas a concerted effort to reduce deficits through austerity measures has concomitant expansionary effects on output in the short-term by boosting investors' confidence and thus spurring private investment. (ii) Critical to the '*expansionary – contractionary*' discourse is the method for identifying the fiscal stance as the two popular methods in the empirical literature - the cyclical adjusted primary balance (CAPB)⁴ and the narrative approach seem to yield contradictory outcomes. While the broad literature (see for instance IMF 2010; Guajardo et al. 2011; Jorda and Taylor 2015; Alexiou and Nellis 2016) seems to offer evidence of contractionary effects of austerity, there is a strand (for example Giavazzi and Pagano

⁴ The CAPB is calculated as the primary balance net the estimated effect arising from business cycle fluctuations on the fiscal accounts (Alesina and Ardagna, 1998, 2010, 2013; Guajardo et al., 2011).

1990; Alesina and Ardagna 2010; Perotti 2011) that suggests a contrasting view of expansionary effects as well as accompanying macroeconomic policies (such as interest rate and exchange rate policies), and economic conditions under which this could occur. However, interest rate and exchange rate policies are not readily available to all countries since the euro zone for example pursues a common monetary policy and so this option is not available to member countries. (iii) In so far as distributional effects are concerned, austerity considerations tend to give rise to equity and distributional concerns; with regards to equity - as it impacts the lower income group which have a higher propensity to consume and tend to be more disproportionately affected during instances of austerity implementation (IMF 2017); with regards to distributional concerns - since findings from the broad literature (see for instance Mulas-Granados 2005; Agnello and Sousa 2011, 2012; Woo et al. 2013; Furceri and Loungani 2013; Clements et al. 2015; Brinca et al. 2017; Bova et al. 2018) suggest that actions on the expenditure side particularly those targeted at social welfare benefits and public wage cuts are drivers for increasing income inequality especially as occurring through the transmission channels of labour income share and employment. Additional findings also suggest that distributional effects are further impacted by the size, composition, pace and duration of the adjustment as well as the prevailing economic condition (Agnello and Sousa 2011, 2012; Woo et al. 2013; IMF 2014; Tovar-Jalles 2017; Bova et al. 2018).

Since the dynamic effects of fiscal adjustment episodes on income inequality is an area comparatively under-researched in the extant literature - seminal work in this area (as seen in Ball et al. 2013) and other subsequent research (*Furceri et al. 2016; Bova et al. 2018; Heimberger 2020*) address this only for the short and medium terms and provide empirical support for dynamic adverse effects - therefore, following on from the

aforementioned studies⁵, the far-reaching effects of fiscal adjustment episodes on income inequality are explored in *Chapter 3*. Furthermore, since the IMF (2017) puts forward evidence showing that those at the lower end of the income distribution tend to be more adversely affected during instances of fiscal adjustments - therefore, a wider selection of inequality indicators (inclusive of the Gini, Labour income share, Top income share *as well as* Bottom & Middle income share, Ratios of top/bottom income share) than previously used in the extant literature is made use of in order to establish the distributional points that are particularly affected by government's fiscal adjustment decisions and also ascertain if these indicators exhibit persistent '*lingering*' distributional effects. Furthermore, since the inequality literature highlights the significance of the composition and the size of adjustment in affecting distributional outcomes, the study additionally explores the impacts from the spend and revenue tools in order to determine the transmission channels (spend or revenue) that drive dynamic distributional effects whilst at the same time assesses and effectively compares the dynamic effects of fiscal adjustments for countries with large sized consolidations vis-à-vis countries with small sized consolidations. By deriving impulse response functions from local projections, the findings suggest that: (i) government's adjustment decisions tend to have persistent adverse effects which last up to the 15th year of adjustment implementation (ii) adverse effects for the Bottom 40 are long-lasting with point estimates for the 15th year higher than previous peak periods (iii) although adverse distributional effects appear to persist via both the tax and spend channels, dynamic effects for spend-based shocks tend to be steeper than tax-based shocks and (iv) adverse dynamic effects tend to be long-lasting up

⁵ Ball et al. (2013), Furceri et al. (2016), Bova et al. (2018) and Heimberger (2020).

to the 15th period albeit at near zero-bound thresholds in small-sized adjustment countries whilst dynamic effects for large-sized adjustment countries tend to be steeper but persist on average till the 6th period.

Chapter 4 explores the role of public debt in affecting distributional outcomes during times of fiscal adjustments. While the inequality literature abounds with evidence showing that distributional outcomes are impacted by the composition, size, duration and pace of the adjustments as well as the business cycle of the economy, the role (*if any*) of public indebtedness has been relatively under-researched. Indicatively, Klein and Winkler (2019) explore the distributional consequences of austerity implementation during episodes characterised by private debt overhang and find that inequality significantly increases when firms and households are heavily indebted. Further by accounting for the effects of public debt levels, they find that inequality is amplified during times of low public debt compared to instances of high public debt. The recent covid 19 pandemic has driven public debt levels to unprecedented heights with global debt in 2020 up by 29% - the largest single surge in 50 years - to 262% of GDP (Kose et al. 2021) as a result of policy responses implemented to combat the pandemic and, the ensuing recession caused by sharp output decline. With the pandemic under control, once more, the costs associated with excessive debt levels have been brought to the forefront of the policy debate and include inter alia: constraints on fiscal space and the government's ability to respond effectively in the event of future adverse shocks (Aiyagari and McGrattan 1998; Gaspar et al. 2019; Yared 2019; Kose et al. 2020) While the long-term benefits of lower public debt levels cannot be discounted, however *post-pandemic*, the challenge of keeping debt sustainable, is made all the more difficult by the pandemic's lingering effects especially on low-income groups (Furceri et al. 2021). If governments

decide to pursue fiscal adjustments again, as was done following the Great Recession, it is critical to investigate whether high public debt during adjustment implementation causes inequality to worsen. In addition, the study explores if the public debt-inequality nexus is driven by the adjustment composition channel and furthermore by grouping countries into two sub-samples of debt category (low and high), the distributional impacts of fiscal adjustments are further assessed. To that end, by estimating a dynamic panel threshold model using a handful of inequality indicators, the evidence appears to suggest that (i) distributional impacts arising from influences of public debt levels are heightened during instances of fiscal adjustment (ii) adverse distributional effects on average, tend to start manifesting from *medium debt levels* (iii) tax-based adjustments are more persistent in delivering adverse outcomes relative to spend-based adjustments and (iv) low indebted countries are more adversely affected by discretionary changes to the fiscal stance relative to high indebted countries. *Chapter 5* brings together a summary of the key threads of the analysis in the previous chapters, the contribution to literature, as well as provides some concluding remarks.

2 DOES FISCAL AUSTERITY LEAD TO RISING INCOME INEQUALITY?

A SYSTEMATIC LITERATURE REVIEW

ABSTRACT

Fiscal sustainability issues over rising national debt concerns and the consequent expansionary fiscal retrenchment hypothesis has fueled the contentious austerity vis-à-vis stimulus debate which has spawned a large empirical literature of conflicting findings on the economic effects of austerity – with particular emphasis revolving around equity and distributional issues. In this paper we attempt to summarise the growing literature on the recent developments regarding the theoretical as well as empirical approaches on national output and distributional aspects of austerity. By exploring the existing evidence in the literature on the effect of consolidation programs, we offer a more holistic overview of the subject matter through a synthesis of the extant literature and, by so doing, propose directions for future research pertinent to both academic researchers and policymakers.

Keywords: fiscal austerity; inequality; income distribution; systematic literature review

2.1 Introduction

In the last three decades, income inequality has increased in almost all the regions of the world albeit at different speed levels. Income inequality, although caused by different dynamics of global and domestic factors can also be influenced by institutions and policies which play a part towards shaping its trajectory. Nevertheless, if left unchecked, rising income inequality, can lead to all manners of political, social and economic malaise (IMF 2017; wir2018). Since the 2007/8 financial crisis, there have been emerging views on the role of rising income inequality in precipitating global crisis (van Treeck and Sturén 2012; Calcagno 2012). Tax and spending policies can alter the distribution of income in the short and medium term since fiscal policy is the primary tool which governments use to affect income distribution and address macroeconomic stability (IMF 2017).

Fiscal sustainability issues over rising debt concerns and the consequent expansionary fiscal retrenchment hypothesis has fueled the contentious austerity vis-à-vis stimulus debate and produced a large empirical literature of conflicting findings on the economic effects of austerity – with particular concerns revolving around equity and distributional issues. Contractionary austerity effects which imply negative contractions on growth have therefore raised concerns for a strand of the literature which associate austerity with a short-run decline in output and employment with attendant consequences for labour income share. Austerity considerations are therefore usually associated with attrition wars between conflicting sides for distributional reasons (Alesina and Drazen 1991) since lower income deciles (whose propensity to consume is higher) are impacted more negatively if adjustment implementation leads to a rise in income inequality levels (IMF 2017).

Since there are conflicting findings of the empirical literature on the effect of consolidation programmes on income inequality, this research aims to clarify some of these issues by presenting a more holistic overview of the subject matter through a synthesis of the extant literature and by so doing, set forth an agenda for future research and help policymakers arrive at a reasonable deduction of the distributional consequences of fiscal austerity to enable appropriate decision-making. The rest of this paper is structured as follows: Section 2 details the methodological approach for the review; Section 3 presents the descriptive overview, thematic analysis and synthesis of the key findings; Section 4 recommends areas for future research and presents study limitations while Section 5 concludes.

2.1.1 Systematic literature review

Systematic Literature Reviews also referred to as SLRs attempt to contribute in providing solutions concerning what works or does not in addressing a clearly specified question or set of questions or hypothesis by comprehensively identifying, appraising and synthesising all relevant extant literature on the subject of interest. They aid in mapping out areas of uncertainty and identify gaps in research (Petticrew and Roberts 2006). The SLR differs from traditional and other forms of review by adhering strictly to a set of established protocol so as to provide an audit trail and eliminate systemic bias that could occur in other types of reviews. They are principally valuable for the following reasons: (i) they present as a tool for evaluating all the available evidence relating to a subject matter especially when there are uncertainties or conflicting findings (ii) enable for transparent decision making since they are evidence based and the process replicable (iii) provide support for practice & professional development (iv) help inform evidence-based decision making particularly for policy makers (Petticrew and Roberts 2006). The origin of systematic (evidence-based) reviews can be traced to the early 1980s when researchers in health care engaged in systematic reviews to determine the effectiveness of intervention programmes. Given the success of these reviews, the process and rigour accompanying these have in recent years been incorporated into other disciplines (Petticrew and Roberts 2006; Denyer and Tranfield 2009).

In reviewing the literature pertinent to this study, research was carried along the following principles (Hart 1998): (i) the origins and definitions guiding the topic (ii) the major issues and debates (iii) key sources (iv) key theories, concepts and ideas (v) epistemology and ontological grounds and (vi) main problems addressed till date. Considering therefore, the intensity and complexity of the austerity debate which has spawn a large empirical literature with conflicting findings, the realist review lens is adopted in critically evaluating the literature. The realist strategy

is mainly adopted for research which is explanatory focused - “it seeks to unpack the mechanism of how complex programmes work (or why they fail) in particular contexts and settings” (Pawson et al. 2005 p.21). This method of review therefore has value in extracting and critically appraising the relevant literature (Petticrew 2001) for an in-depth analysis in order to present policymakers, politicians, think tanks, scholars, etc. with a clear set of results on the distributional consequences of fiscal adjustment programmes; as well as identify research needs and outline useful research possibilities.

2.1.2 Review strategy

SLRs filter a large body of evidence using clearly defined (well-established) protocols. These protocols are painstakingly rigorous and should be transparent, replicable, methodical and unbiased (Tranfield et al. 2003; Siddaway 2019). Accordingly, a review protocol was mapped outlining the process for scoping, searching, screening, selection, evaluation, analysis and synthesis of the literature; a review protocol serves the purpose of defining the scope and boundaries of the review process. The process flow can be seen in Figure 1. A review panel was also available to oversee the review process with the primary purpose of providing expert guidance. Details of the panel members can be seen in Appendix A.

Review Protocol

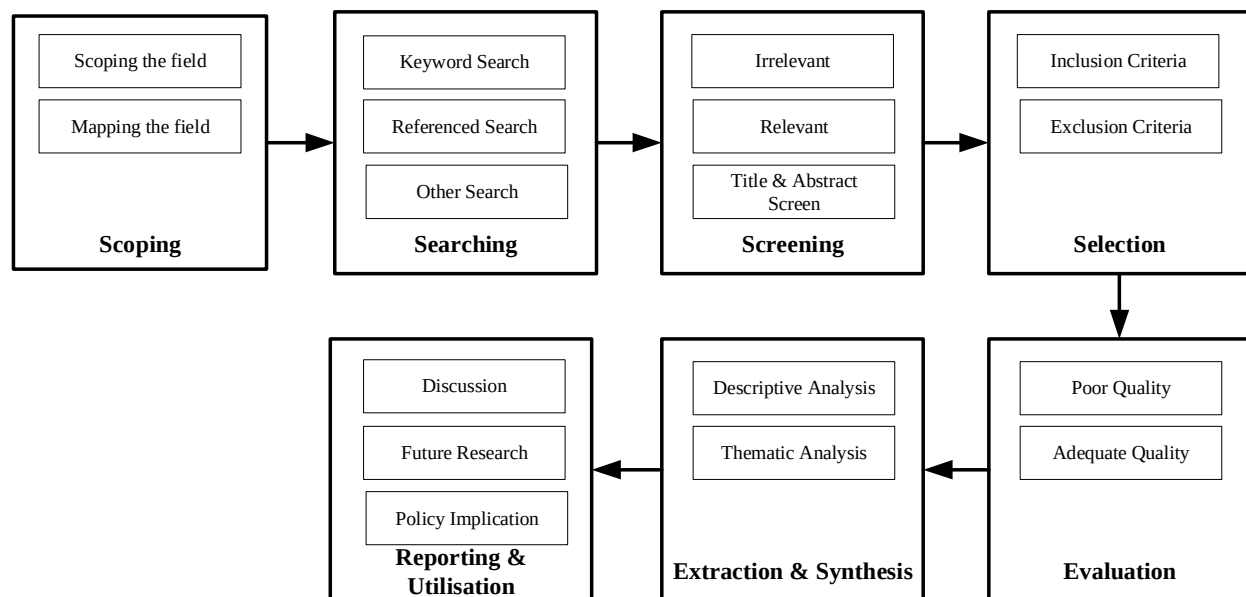


Figure 2-1 Review Protocol

Source: Adapted from Tranfield and Denyer, 2009.

2.1.3 Scoping

A scoping study was carried out based on the identified steps outlined in the review process. The main aim of a scoping study is to familiarise oneself with the broad literature, acquire an understanding of the key issues and debates surrounding it and at the end of the exercise formulate a well thought-out (framed) review question that is narrow and not open-ended, specific and answerable (Counsell 1997). In line with this, Denyer et al. (2008) further specify that well-defined review questions should have the following frame: a context, an intervention mechanism and an outcome (CIMO). The scoping study on the broad phenomenon of interest – *rising income inequality* – was insightful and proved useful in assessing and delimiting the literature and, also in identifying the role of fiscal policy as a tool for redistribution and macroeconomic stability.

Consistent with the purpose of this exercise, an overarching review question consistent with guidelines as elaborated by Counsell (1997) and Denyer et al. (2008) was arrived at: “*Does Fiscal Austerity Lead to Rising Income Inequality?*” Based on this specificity, another round of scoping exercise was undertaken which identified theoretical, key concepts and contributions in the field of interest. The mapping of the field showing the interactions of the main literature domains with the review question at the centre can be seen in Figure 2. To situate the review properly, the three main domains of the literature are briefly explained.

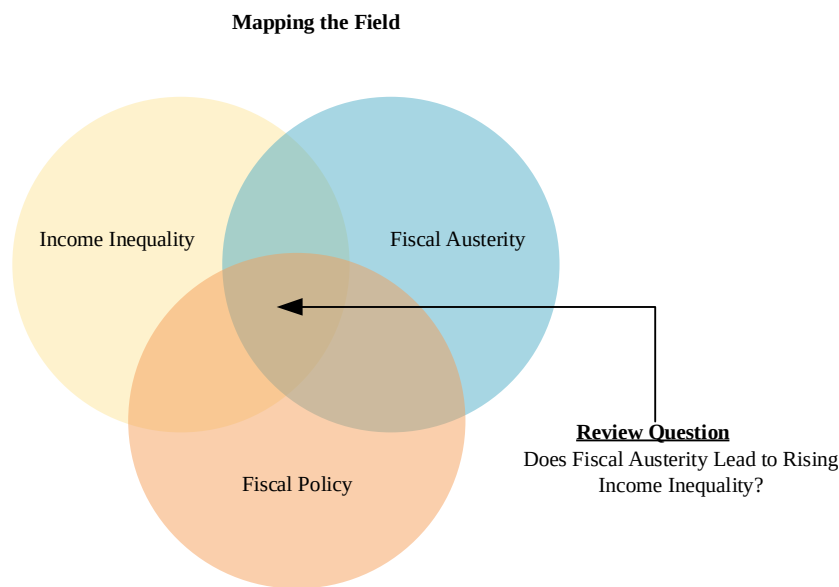


Figure 2-2 Mapping the Field

Source: Author’s elaboration

2.1.4 Income inequality

Income inequality is the measure that highlights the gap between different individuals or households’ disposable income in a particular year and in a population group (IMF). *Causes of income inequality* range from global to domestic factors and include: (i) skill-biased technological change – which occur as a result of digitalisation and information technology increase the productivity of abstract high education tasks; additionally, digitalisation and automation give rise

to the substitution of low-skilled workers (ii) trade liberalisation tends to increase labour skill premium on one hand and hollows out middle-skill jobs in advanced economies on the other hand (iii) financial deepening – increases in financial deregulation tend to lead to increase in top income shares (iv) labour market erosion – this occurs as a result of labour union & wage decline; and the increase in non-standard forms of employment (v) fiscal progressivity decline – excessive progressivity can result in capital flight (vi) increased political power of the wealthy – leads to rent seeking practices at the expense of the poor (Chancel et al. 2017; IMF 2017; wir2018).

Rising income inequality has underlying negative consequences on health & well-being, social cohesion, challenges the moral fabric of society and can undermine macroeconomic stability and sustainable growth (Clements et al. 2015). It is believed by some that rising income inequality was one of the drivers of the global financial crisis (Kumhof and Ranciere 2010; Rajan 2011; van Treeck and Storn 2012).

Since the 1980s, inequality has grown rapidly (although at different speed levels) across nearly all regions of the world. Whilst growth rates in US, China and India have been quite rapid, rates in Continental Europe have been moderate whereas the Middle East, Sub-Saharan Africa and Brazil have remained steady at tremendously high levels. In the US, top 1% income share grew from 10% to 19% between 1980 to 2019 while the bottom 50% decreased from 18% to 13% within the same period. The trajectory of global income inequality growth for the Top 10% and Top 1% between 1980 – 2019 are seen in Figures 2-3 and 2-4.

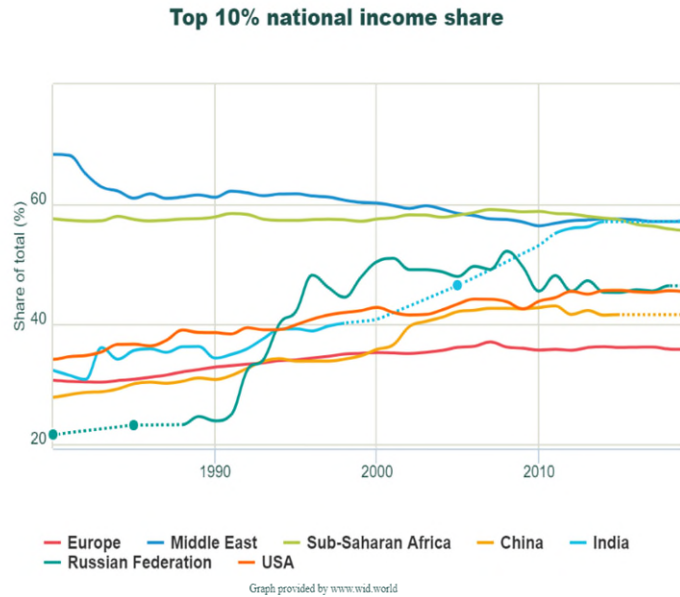


Figure 2-3 Top 10% Share of Income Across World Regions 1980-2019

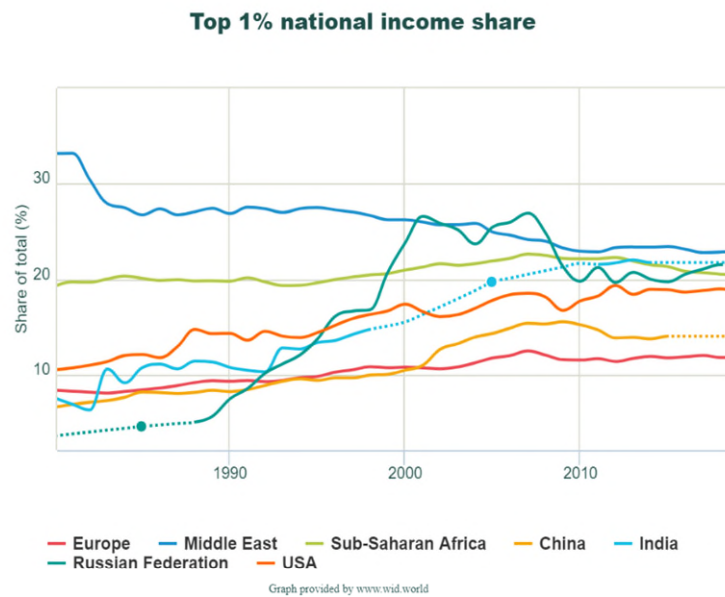


Figure 2-4 Top 1% Share of Income Across World Regions 1980-2019

2.1.5 Fiscal austerity

Fiscal Austerity refers to a set of deficit reduction policies which governments embark on to reduce public deficit and debt levels through expenditure cuts, tax increases or a combination of both (Alesina and Ardagna 1998; Anderson and Minneman 2014). The term austerity fully corresponds

to fiscal austerity, fiscal consolidation, fiscal adjustment, fiscal retrenchment and fiscal tightening. Fiscal Adjustments can be implemented either on the expenditure side (spend-based adjustments) or via the revenue side (tax-based adjustments). Fiscal deficits arise when government revenues are less than expenditures. As expenditures increase and outmatch revenues, governments resort to borrowing to meet spend demands. As deficits rise, this correspondingly leads to increasing debt levels. An unsustainable debt path could lead to higher long-term interest rates, crowding out effects and confidence and stability issues - resulting from growth impediment due to high debt premia - (Cochrane 2011). Relatedly, deficits which arise during boom periods and enlarge during recessions cannot be compensated with surpluses during times of expansion (Alesina et al. 2019). The need, therefore, could arise, for the implementation of fiscal adjustments to tackle the debt and deficit issues to reduce them to sustainable levels. However, despite the need to tackle persistent debt issues, adjustment considerations are usually met with attrition because of equity (distributional) concerns associated with fiscal adjustments (Alesina and Drazen, 1991).

Austerity as a concept has evolved from the 18th – 19th century Classical view (public debt regarded as problematic therefore the focus was on the best way to fund deficits); to the Keynesian view where austerity was prescribed as a policy action for the top of the business cycle; to neo-liberalism views in modern times where austerity is a policy reserved for the bottom of the business cycle (Konzelmann 2012; Blyth 2013). Since the 2007/8 financial crisis, the austerity debate has revolved around the output costs of implementation – expansionary or contractionary.

2.1.6 Fiscal policy

Fiscal policy refers to the use of government expenditure and tax policies to influence the economy. The primary roles of fiscal policy are: (i) macroeconomic stability and correction of market failure (ii) provision of public goods and services (iii) income redistribution (IMF 2014).

The tools which governments use to achieve these are spend and tax-based instruments. *Regarding the area of macroeconomic stability and market failure correction:* governments could choose to employ expansionary measures (increases in expenditure and tax cuts) to increase aggregate demand during recessionary times in order to boost output; while contractionary measures (spend cuts and tax increases) could be employed during expansionary periods to prevent the economy from overheating. *Regarding the area of provision of public goods and services:* this covers areas such as infrastructure, education, defense, etc. *Regarding the area of income redistribution:* redistributive fiscal policies are used to target income inequality and poverty reduction through tax and transfers in order to alter the distribution of income in the short and medium terms. Progressive income taxing - especially at the top – and cash transfers are used for addressing disposable income inequality while in-kind transfers (public spending on education, health, etc.) can directly reduce market income inequality (IMF 2014, 2017; wir2018).

Fiscal policy is primarily centered on the ideas of John Maynard Keynes (1883-1886) who during the Great Depression argued that governments could play a more active role in stabilising the business cycle by influencing aggregate demand. Keynes believed this could be done by adjusting expenditure and tax policies to make up for output losses in the private sector.

2.2 Search strategy

The first stage in the search strategy was to identify the keywords, group these into relevant search strings and then apply the usual search conventions (Denyer and Tranfield 2009). The primary keywords - “fiscal austerity” and “income inequality” - were derived from the review question. In order to make for a thorough and exhaustive search, other keywords (“fiscal consolidation,” “fiscal adjustment,” “fiscal retrenchment,” “disparity,” “gap,” “distribution,” “redistribution”) were informed from existing literature and word synonyms. This can be seen in Table 1. The search

strings were thereafter coined, and Boolean operators (OR, AND) employed for database interrogation. The search strategy can be seen in Figure 5.

Table 2-1 Key Word Search

Keywords	Word Strings
Fiscal Austerity	Fiscal Adjustment OR Fiscal Consolidation OR Fiscal Retrenchment OR Austerity
Income Inequality	Income Disparity OR Income Gap OR Income Distribution OR Redistribution

2.2.1 Database search

The second stage in the search strategy was identifying the appropriate databases. Seven economics publisher databases – Sage Journals, Taylor & Francis, Springer Link, Wiley Online, Science Direct, Emerald Insight – were initially identified for interrogation. However, having discovered that they were indexed to the following databases - EBSCO Host, ABI Inform, SCOPUS and Web of Science – with Science Direct and Emerald Insight being specifically indexed to Scopus and ABI Inform respectively, it would have proved redundant to continue; database search was thereafter restricted to these four platforms. Although, there is some overlap between these four, it was necessary to interrogate all to ensure all-inclusiveness of purpose. ABI/Inform Global covers a broad range of literature with over 2500 publications in business and economics while EBSCO is the leading repository of research database covering over 1000 peer reviewed journals with comprehensive full text reportage for a wide period. Database interrogation was carried out at four different time intervals (several months apart) with the last search in February 2021 – and recorded a sizable search result. Each search produced different number hits, however, the relevant studies remained approximately the same in number; the numbers reported in Table 2 represent the last search; thereafter further streamlining was implemented based on

screening criteria. The selected studies were subsequently exported to Mendeley - a reference manager application – for duplicates removal.

Table 2-2 Electronic Database Search

	EBSCO	ABI	Web of Science	SCOPUS
Search Result	179	588	265	5866

2.2.2 Other source search

The search on the electronic data base yielded limited relevant results, so one had to rely on other sources - expert recommendation, cross referenced from key seminal works and grey literature⁶. This is consonant with the finding by Greenhalgh and Peacock (2005) that depending on the review question, searches on electronic databases might only yield about 30% relevant seminal literature. Expert recommendation was particularly useful for locating theoretical and conceptual articles. The searches for these (expert recommendation and cross referencing) were conducted on Google search engine. Some of the limitations encountered in retrieving some key works found on Google search engine were access related (i.e., accessing the journals). The use of grey literature is quite beneficial when the field being covered is a nascent one since it addresses time lag issues by providing more contemporary and contextually relevant findings (Petticrew and Roberts 2006). In searching the grey literature, the criterion for selection of the specialist sites (IMF, OECD, World Bank) was reputational authority. Snowballing strategy was adopted in the search for key heuristic

⁶ “Grey literature or fugitive literature is often used to refer to literature that is not obtainable through normal publishing channels. It includes reports published by academic and non-academic organisations such as working papers, occasional papers, reports on websites” (Pettigrew and Roberts, 2006 pp90).

working papers. Relevant studies were critically evaluated based on the selection criteria highlighted in the review protocol.

2.2.3 Screening and selection

Initial screening performed after the search results was titular screening. Titles not relevant to the key concepts (themes) were excluded, thereafter abstracts and introductions were scrutinised for relevance followed by full context. For conciseness, studies were restricted to those pertaining to the OECD countries. Publication dates were not considered as a hinderance because of the large historical context of the review background. Searches were also limited to the English language for comprehension reasons. Not accounting for duplicates, the initial hit produced a total of 6898 results, duplicates removed after full text evaluation totalled 42 across the electronic databases and grey literature. Screening was based on the inclusion and exclusion criteria as detailed in Table 3. Although, peer review related factors were not used as an exclusion criterion, these were applied solely to hits emanating from SCOPUS as the total number of initial hits proved unwieldy. Selected studies were thereafter evaluated according to the quality appraisal checklist detailed in the evaluation section.

Table 2-3 Inclusion and Exclusion Criteria

Inclusion Criteria	Rationale
Relevance (studies pertaining to the identified literature domains)	Included studies must relate to any two or three of the literature domains of austerity, fiscal policy and income inequality
Academic & Grey Literature	This is a nascent field; therefore, grey literature particularly from specialist sites provide most current and up to date information
Timeframe	This was not considered as a barrier because of the historical and theoretical framework
Title	Included studies must have titles related to any two of the literature domains of austerity, fiscal policy and income inequality
Exclusion Criteria	Rationale
Publication Language	Non-English journals were excluded for comprehension reasons
Non-OECD Settings	Case Studies were restricted to OECD countries and broader Europe for conciseness reasons
Scientific Field (studies located in natural sciences, health sciences, etc)	Subject of interest is economics, so only studies located in the related subject area such as development studies, political economy, etc. were considered.

Source: Author's Elaboration

2.2.4 Evaluation

In appraising the literature, quality assessment is carried out to establish if selected studies can address the review question. The predominant reason for detailing the quality criteria is to ascertain the extent to which the final selection methodology is free of selection biases and, the literature representative of the wider population. Two essential criteria in quality assessment are relevance and rigour - accordingly, the literature was subjected to a reiterative analysis to ensure its fitness for purpose. The relevance criteria are typically not whether the study covers the literature domains but if it addresses the underlying theory, hypothesis or question while rigour addresses if the methodology employed sufficiently supports the evidence drawn by the researchers (Pawson et al. 2005). Briner et al. (2009) find that it is possible to generate eclectic generic quality criteria

applicable to any kind of study - quantitative, qualitative or theoretical. Drawing from general quality guidelines of the Critical Analytical Skills Programme (CASP), 2008; the Journal of Occupational & Organisational Psychology; and Academy of Management Review, a bespoke quality checklist for the appraisal of the identified studies have been generated for the purpose of this review. This can be seen in *Appendix B* with assigned grading assessment against each criterion ranging from 0 to 4 where 0 indicates absence of the criterion, 1 = low, 2 = medium, 3 = high and 4 = not applicable. At the end of this process, a total number of 91 studies after full body text evaluation were highlighted as relevant for the review. Studies selected fell between the 1 to 3 categories.

Selection Diagram Process Flow

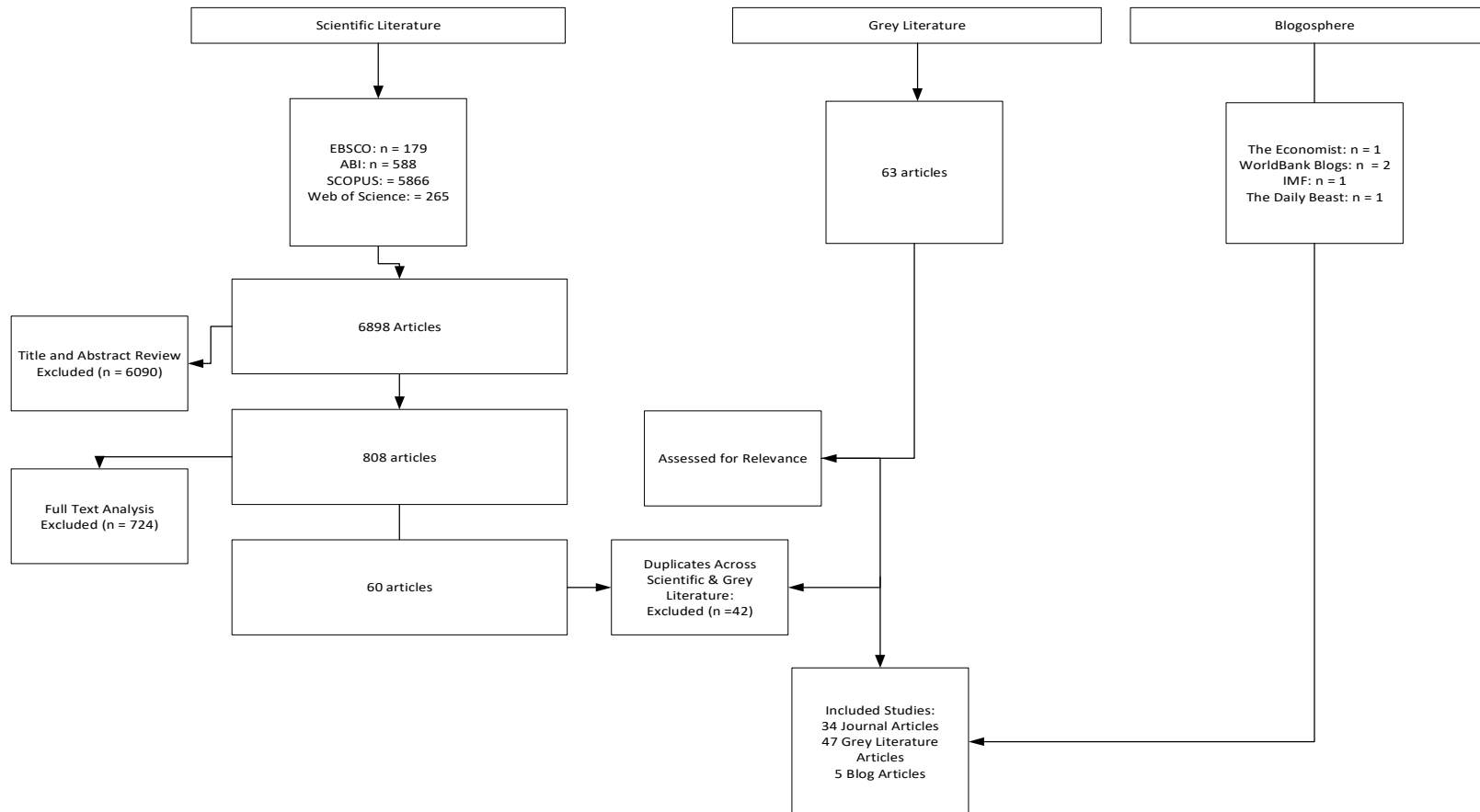


Figure 2-5 Selection Diagram Process Flow

Source: Adapted from Adams, Jeanrenaud, Bessant, Denyer and Overy (2015).

2.3 Data Extraction, Analysis & Synthesis

Once the appropriate data for an SLR is selected, the next step is the data analysis and synthesis. “The aim of analysis is to breakdown individual studies into constituent parts and describe how each relates to the other” (Denyer and Tranfield 2009, p.685); the first step in this process is the data extraction. Data extraction is advantageous in that it aids in the identification of key issues occurring in the literature. Specific information pertinent to each study in this review was extracted and stored for use in the analysis. Relevant information extracted for each study included: (i) citation details (ii) research aim (iii) methodology (iv) summary of the main arguments (v) summary of key findings and (vi) conclusion. These guidelines proved useful for the extraction process irrespective of the type of paper under consideration. A sample of the general extraction information applied in this study is seen in *Appendix C*. Data gathered was stored electronically in an excel format. In addition to this, detailed note taking (according to the extraction guidelines) was undertaken in dedicated journals earmarked for this purpose. This method is in line with the realist review as noted by Pawson et al. (2005, p.10) “realist review assimilates information more by note taking and annotation than by extracting data as such.”

The realist review considers synthesis as one of refining theory and therefore seeks to refine understanding by bringing together and fine-tuning empirical evidence through a process of questioning, adjudicating and comparing. To achieve this, literature is organised such that competing or contrasting views begin to emerge which are then used for the confirmation or otherwise of existing theory (Pawson et al. 2005). Guided by the review question, in synthesising the literature for this review, the outcomes of interest that emerged were (i) the output effect of austerity; (ii) the distributional consequences of

austerity and (iii) the austerity instruments driving distributional consequences (i.e., austerity instruments impacting income distribution). These were grouped into two thematic areas – a third was subsequently added to capture the theoretical concept of austerity. A tabular presentation of the thematic analysis is seen in *Appendices D to F*. Studies were categorised according to the outcomes and within each category, the results were reported in chronological order. Ordering and grouping the findings in this format is pivotal as it renders the different aspects of the literature explicitly easy for interpretation. The following section details the descriptive analysis of the selected studies.

2.3.1 Descriptive analysis

The descriptive analysis of the selected studies showing the distribution by journal designation, article timeframe, article source (scholarly or working paper) and scholastic lens (theoretical, empirical or conceptual) is seen in this section. Table 4 shows a synopsis of thematic areas grouped by study source. While a quick glance shows that the literature for each area is relatively evenly distributed between academic journals and working papers, Figure 6 indicates that the spread of literature is highest in the redistribution thematic area.

Table 2-4 Database + Google Search (Thematic Areas)

Thematic Areas	Journals	Working Papers
Austerity Effect on Output	17	20
Distributional Consequences of Austerity	19	19
Theoretical Concept of Austerity	4	2
	40	41

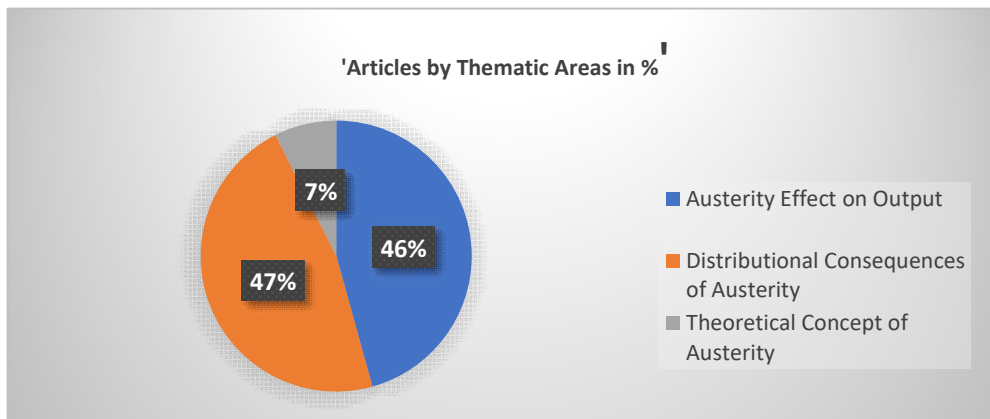


Figure 2-6 Articles by Thematic Areas in %

Source: Author's Elaboration

An overview of the aggregated literature base is seen in Tables 5 and 6. Academic literature is drawn from 33 distinct scholarly journals which disseminated 49% of the literature while 51% was disseminated through specialist sites and databases. This is represented in Figures 2-7 and 2-8. IDEAS which is the largest bibliographic database for economics and the IMF were the two major singular sources for the literature (25%) for this review closely followed by the OECD and NBER which constituted 10%. Figure 9 shows article distribution by year of publication from 1989 to 2020 (corresponding to the oldest and newest literature respectively in the sample for the review). The graphical timeline cursorily reflects the renaissance of the austerity debate in recent times. Interestingly, the literature start off period corresponds to the flurry of studies on

expansionary fiscal consolidation hypothesis as seen between 1989 to 1991. Towards the end of the 1980s, rising deficits concerns had triggered a resurgence in the austerity debate amidst the Eurozone preparations and Maastricht. Interest was sparked by the Denmark (1983) and Ireland (1987-1989) which witnessed growth despite sharp fiscal consolidation episodes. This period marked the resurgence of the austerity debate and the expansionary fiscal consolidation hypothesis. A lack of literature is noticeable for the mid 2000 which corresponds to a period of prolonged expansion (characterised by rapid growth in world savings and wealth) described as the Great Moderation. There is a re-emergence in literature from 2009 with a remarkable spike by 2013. The years of the Great Recession (2007/2008) and a few years after were marked by high and increasing deficits mostly because of several bailout and stimulant packages implemented by global fiscal authorities which led to a clamor for fiscal sustainability and austerity measures. The literature during this period centered on the economic effects of austerity. In more recent times, the literature has expanded to include the redistribution consequences (welfare impact) of austerity. This coincides with the topicality of the phenomenon of rising income inequality globally and within countries.

Table 2-5 Database + Google Search (Journals)

Journal	Article Qty	Journal	Article Qty
Applied Economics Letters	1	Journal of Australian Political Economy	1
Cambridge Journal of Economics	1	Journal of International Economics	1
Comparative Economic Studies	2	Journal of Post Keynesian Economics	1
Comparative European Politics	1	JSTOR	1
Development	1	Macroeconomics Dynamics	1
Economic Modelling	1	OECD Journal	3
Economics and Politics	1	Review of Economics & Statistics	1
Empirica	1	Review of Income and Wealth	1
European Economic Review	1	Review of Keynesian Economics	1
European Journal of Economics and Economics Policies	1	Scandinavian Journal of Economics	1
European Journal of Political Economy	2	Society and Economy	1
IEA	1	Tax Policy and the Economy	1
International Economic Review	1	The American Economic Review	2
International Journal of Emerging Markets	1	The Journal of Economic Perspectives	2
Journal of Advanced Research in Law & Economics	1	University of Chicago Journals	1
Journal of Applied Economics	1	University of Massachusetts Boston Scholar Works	1

Source: Author's Elaboration

Table 2-6 Database + Google Search (Working Papers)

Working Papers	Article Qty
American Enterprise Institute for Public Policy Research	1
Center for Geoeconomic Studies and International Institutions and Global Governance Program	1
Centre for Business Research, University of Cambridge	1
CESIFO	1
G-24 Policy Brief	1
Ideas Working Papers Series	10
IMF	9
IMF Economic Review	1
Institute for New Economic Thinking	1
Manchester School	1
NBER	5
OECD	3
Ovidius University Annals	1
Oxford Scholarship Online	1
Research Gate	1
VOX CEPR	4
WIIW	2

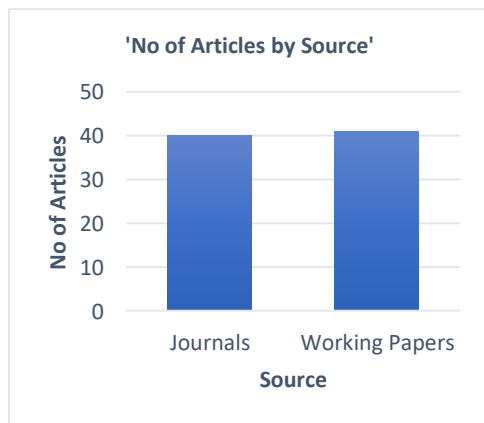


Figure 2-7 No of Articles by Source

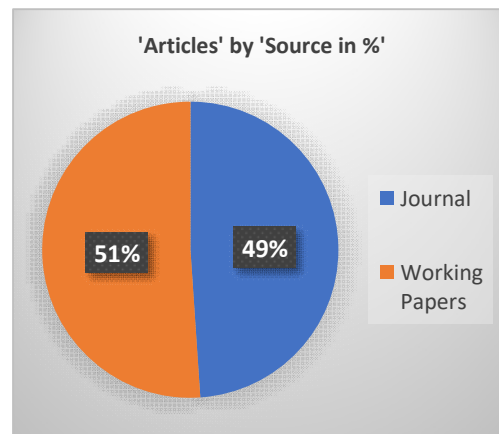


Figure 2-8 Articles by Source in %

Source: Author's Elaboration

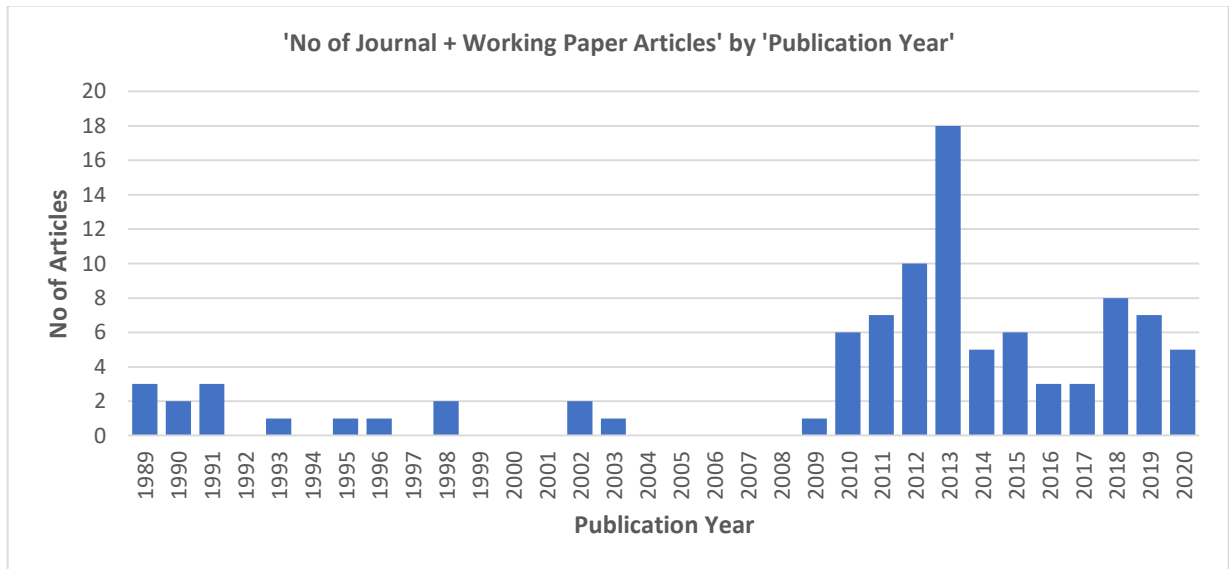
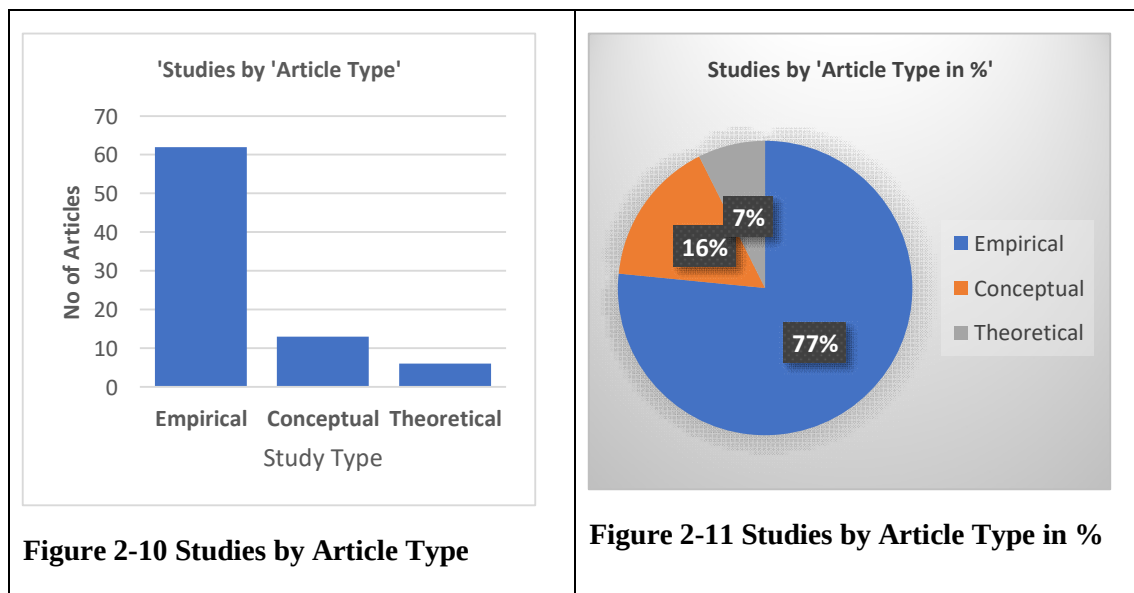


Figure 2-9 No of Journal + Working Paper Articles by Publication Year

Source: Author's Elaboration



Source: Author's Elaboration

Figures 2-10 and 2-11 show the composition of the literature sample by study type. As seen, the discourse is mostly empirical (77%) with greater emphasis situated in the thematic areas of redistribution and economic effects of austerity (Figure 2-6). The

percentage of the literature that is theoretical is rather limited at 7% while conceptual is just 16%.

2.3.2 Thematic synthesis

Consistent with the purpose of this review and the adoption of a realist synthesis approach which seeks to understand what works, how it works and why it works (Pawson et al. 2005), this section synthesizes the literature's perspective based on the findings from the two major thematic areas i.e. (i) austerity effect on output (ii) distributional consequences of austerity. A third thematic area presents a general overview of the theoretical premises of the austerity debate. The findings (extracted evidence) for each thematic area are presented chronologically for ease of flow. A tabular presentation of these is also seen in *Appendices D, E and F*. To present a proper perspective of the main issues and the findings from the two main thematic areas, the analysis will commence with the third area which positions the literature on the austerity debate.

2.3.3 Austerity - theoretical premises

The austerity debate has since the last three decades been premised on three main theoretical approaches— the Keynesian, neoclassical and neoliberal views and more recently the heterodox view. The Keynesian and heterodox views are regarded as demand side theories while the other two are categorised as supply side theories. The Keynesian view as spearheaded by John Maynard Keynes (1883-1946) was developed during the Great Depression as a solution to the prevailing underemployment and persistent unemployment which was characterized by low output with free markets unable to restore

themselves to equilibrium. Keynes believed aggregate demand⁷ could be influenced during economic downturns to restore the economy to optimal performance and as such advocated for active government intervention via fiscal and monetary policies. Keynes consequently prescribed that countercyclical⁸ fiscal policies be undertaken during economic downturns. Increased deficits arising in this case would make up for private investment and yield expansionary effects by boosting private consumption in the economy. Austerity on the other hand should be reserved for the top of the business cycle (boom periods) to prevent it from overheating due to excess demand; and stimulus applied during recessionary times (economic slumps) to restore the economy to full employment.

One of the measures used to gauge the responsiveness of government's spending on aggregate demand is the fiscal multiplier⁹ and is considered a key element in Keynes countercyclical policy. This is because an increase in government spending is expected to generate a positive increase in business activities in the economy with attendant effects of increased income. An implementation of austerity on the other hand would produce immediate and significant contractions with multiplier effects on aggregate demand.

The Keynesian approach on austerity has come under criticisms for its failure to consider microeconomics dynamics in its modelling since it generalises economic agents as myopic or liquidity constrained with a high propensity to consume their disposable income and therefore fails to incorporate the role of future expectations. Keynes views on government intervention also placed him in direct divergence with supply side

⁷ Aggregate Demand is the sum total of all private and government spending in the economy.

⁸ Countercyclical Fiscal Policy is when spend is reduced and tax increased during times of economic boom and vice-versa for economic downturns.

⁹ Fiscal Multipliers are defined as the ratio of a change in output to a discretionary change in government spending or tax revenue.

theorists who advocate for free market equilibria with little or no government intervention. *The resulting neoclassical* views therefore primarily incorporate microeconomic dynamics as well as advocate for a reduction of government spending (deficits) in order to make room for a more efficient allocation of market forces of demand and supply to promote private investment and consumption. In incorporating microeconomic dynamics, they go with the assumption that since economic agents are rational beings who plan their consumption over their lifetime, government's deficit spending can cause economic agents to increase current consumption since taxation is shifted (deferred) to future generations; thus increased consumption in this case lowers savings thereby triggering interest rates to rise with the potential to crowd out private investment thereby leading to detrimental effects on the economy. Consequently, a reduction of government's deficits by way of austerity programmes make room for more efficient private spending with potentials for expansionary effects in the short term.

The neoliberal construct on the other hand, is a policy model that advocates for market-oriented policies as a way of stimulating the economy's productive capacity. Proponents therefore seek for transfer of the control of economic factors from the government to the private sector via policies such as deregulation, privatisation, de-unionisation. In addition, they advocate for minimal government intervention in the economy while actively adjudicating for austerity programmes especially via cuts to government spending in order to make room for efficient allocation of economic resources.

Austerity considerations post the expansionary fiscal policies undertaken during the 2007/8 financial crisis gave rise to a fourth approach – the Heterodox view – and have proponents such as Joseph Stiglitz, Paul Krugman, Mark Blyth, etc. *The Heterodox view*

on austerity is premised on the Keynesian approach and it advocates the pursuit of growth strategies via expansionary fiscal policies during recessionary times. It acknowledges that although these increase the deficit and debt levels, they are necessary prerequisites for growth by boosting aggregate demand. Furthermore, it posits that contrary to the neoliberal views, austerity leads to output loss and increases persistent unemployment thereby triggering a hysteresis¹⁰ effect in the economy (Alexiou and Nellis 2016). The Heterodox approach therefore criticises the supply-side theorists on three main grounds: output growth, confidence levels and rational expectations and advance the following views: (i) austerity pursuit does not improve business confidence but rather aggravates the fall in aggregate demand thereby leading to persistent unemployment and a decline in business confidence (ii) monetary policy intervention via lowering of interest rates is insufficient and ineffective in combating deficits and boosting economic recovery and (iii) discountenances the role of rational expectations with emphasis laid on the fact that during recessionary times, economic agents are constrained, plan in the short term and not in the long term and so do not base their current expenditure decisions on projections of future changes to their lifetime income based on current discretionary tax policies. Austerity therefore rather than promoting growth is self-defeating since cuts in government spending lead to a fall in aggregate demand which leads to greater output loss with a resultant fall in tax revenues thereby lessening the possibility of reduction of the public deficits.

¹⁰ Hysteresis is an event in the economy that persists into the future, even after the factors that led to the event have been removed.

2.3.4 Austerity effect on output

There is a rich stream of evidence (as seen in for example - Giavazzi and Pagano 1990; Bertola and Drazen 1991; Alesina and Perotti 1995; McDermott and Wescott 1996; Alesina and Ardagna 1998, 2010, 2013; Mulas-Granados 2005; Jayadev and Konczal 2010; Romer and Romer 2010; IMF 2010, 2014; Guajardo et al. 2011; Perotti 2011; Calcagno 2012; Agnello et al. 2013; Blanchard and Leigh 2013; Jorda and Taylor 2015; Alesina et al. 2015, 2018, 2019; Born et al. 2019) pertaining to the output effects of fiscal austerity. Several approaches are used in determining these effects in the extant empirical literature. The approach varies from (i) the use of macroeconomic models (ii) simulation models (iii) identifying episodes of fiscal adjustments from country samples - this being the more popular approach and preferred over the Fiscal Multiplier (Mulas-Granados 2005). The traditional Keynesian view - holds that austerity produces large economic contractions with negative multiplier effects on output (Alesina and Ardagna 2010; Bilicka et al. 2012; Anderson and Minneman 2014) and only a small effect on debt/GDP ratio (Blanchard and Leigh 2013). However, the critical issue to the use of fiscal multipliers in the literature is the difficulty in determining its value – since estimating the size of the fiscal multiplier involves identifying the effects of exogenous changes of policy on GDP; on the other hand, it could result in biased estimates if triggered by endogenous changes in policy (Bilicka et al. 2012). As a result, the uncertainty about fiscal multipliers makes it difficult for policy decision making on whether to implement adjustments on the revenue or spending side (Alesina and Ardagna 2010, 2018).

The alternative approach subsequently used in the literature in analysing the output effect is by identifying episodes of discretionary fiscal policy stance and thereafter ascertaining its resultant effect (expansionary or contractionary) on the economy. In what

is viewed as the seminal contribution on the subject, Giavazzi and Pagano (1990), make use of cyclical adjusted revenues to estimate the impact of adjustment episodes on output in Denmark (1983-1986) and Ireland (1987-1989) within a Vector Auto Regressive (VAR) framework and find that, despite draconian tax hikes and spend cuts, these episodes resulted in expansionary fiscal adjustments.¹¹ They note that this finding was anchored on the roles played by future expectations and monetary disinflation policy. This finding challenged the Keynesian views about austerity and paved the way for subsequent contributions and contentious debates on the subject. The most contentious issue being - how to identify episodes of discretionary policy change. Alesina and Perotti (1995) analysed large consolidation data episodes¹² for a panel of countries by scrutinising and classifying changes in the budget to detect if a consolidation was implemented; they find and make a case for expansionary adjustments based on spend cuts. This methodology as employed by the duo and referred to as the Cyclical Adjusted Primary Balance (CAPB) is used to measure discretionary changes in fiscal policy (Alesina and Ardagna 1998, 2010, 2013). The idea behind this is that tax revenue and government spending move automatically with the business cycle. Therefore, once these are cyclically adjusted, any inherent changes in the fiscal variables reflects policy makers decisions to adjust taxes and government spending. A rise in the CAPB would therefore denote a deliberate policy of fiscal adjustment. The primary balance is calculated as the non-interest component of government revenue less the non-interest component of

¹¹ Expansionary fiscal adjustments (also referred to as Expansionary Fiscal Contractions Hypothesis in the literature) is when a fiscal retrenchment exercise stimulates growth in the short term.

¹² Large consolidation episodes as defined by Alesina and Perotti (2010) are years in which the cyclical adjusted balance falls by more than 1.5% of GDP. The reason for this threshold was that such a large difference in the CAPB could only be an indication of the implementation of discretionary fiscal policy.

government expenditure. The CAPB is therefore the primary balance less the estimated effect of business cycle fluctuations on the fiscal accounts. Based on the CAPB methodology: Bertola and Drazen (1991) via intertemporal behaviour modeling show evidence for expansionary austerity especially through the expectations role in driving up private consumption; McDermott and Wescott (1996) utilise a Logistic Probability Model and find that consolidation episodes are non-recessionary but expansionary on growth especially through the expectations function by driving up aggregate demand and output through the private investment and consumption channels; Alesina and Ardagna (1998, 2010, 2013) by using simple regression techniques to determine the output effects of consolidation find evidence for expansionary austerity; Mulas-Granados (2005) explores this relationship by Means Analysis and Parametric Estimation while Mirdala (2017) by VAR and also find evidence for expansionary austerity especially when adjustments are undertaken on the expenditure side. In explaining the expansionary austerity findings, Alesina and Ardagna (2010, 2013) further show that adjustments can be expansionary via the demand and supply sides. They show that *fiscal adjustments are expansionary via the demand channel* if economic agents believe that the current adjustment eliminates the need for a more disruptive one in the future thereby producing wealth and credibility effects. *Wealth effects* manifest through future expectations when households increase their current consumption because they perceive spend cuts are permanent and therefore anticipate a higher lifetime disposable income due to lower tax burden while *credibility effects* manifests thus: when economic agents perceive adjustment efforts are credible, this leads to a reduction in the risk premia which correspondingly leads to falling interest rates and a restoration of investors' confidence thereby spurring investment and aggregate demand. On the other hand, *fiscal adjustments are expansionary via the supply channel*

through public spend cuts and labour liberalisation policies. *A cut in public spend and employment* could result in public sector wage and job losses thereby putting a downward pressure on private sector wages through higher labour supply with attendant effects on higher profits for firms which consequently lead to increased investment. On the other hand, *an increase in tax especially income tax* could lead to an increase in the unit cost of labour especially where labour is strongly unionized thereby dampening profits and investments; but where labour union and wage moderation exist, the unit cost of labour remains stable and the resultant effect is a spur in investment and profits.

The findings for expansionary austerity and the CAPB methodology have been challenged by a host of authors such as - Jayadev and Konczal (2010); IMF (2010); Guajardo et al. (2011); Calcagno (2012); Holden and Midthjell (2013); Jorda and Taylor (2015); Brinca et al. (2017); Castro (2018); Breuer (2019) and Ciminelli et al. (2019). They find and offer proof in their distinct analyses that austerity is contractionary on output rather than expansionary. They dispute the CAPB and offer evidence to show that it suffers from reverse causality. The IMF (2010) further explains that it tends to bias analysis towards finding evidence in favour of expansionary austerity hypothesis in the following ways: (a) including non-policy factors such as asset price or commodity price movement that could affect economic activity. An example of this is where a stock market boom improves the CAPB by increasing capital gains and cyclically adjusted tax revenues (b) including changes in the CAPB which may reflect deliberate policy responses to other developments affecting economic outlook. For example, government may embark on spend cuts and tax increases as a response to rapid increase in domestic demand in order to protect the economy from overheating (c) omits years in which fiscal stimulus was employed to offset adverse shock effects caused by fiscal adjustments. On their part, the

IMF (2010) as an alternative, employs an action-based methodology based on Romer and Romer (2010) narrative approach to identify specific instances in which policy actions intended to reduce budget deficits have been announced and show proof by employing a VAR framework, that in the short run, unemployment rises and domestic demand contracts for both types of adjustment instruments but by more in tax-based instruments. The narrative approach – which was pioneered by *Romer and Romer (2010)* in their research to establish the effect of exogenous tax changes on output in post-war USA - utilised several narrative (historical) sources in order to correctly identify and categorise tax policies which were specifically undertaken to mitigate inherited budget deficits or those associated with long-run objectives. Upon classification, they estimated the output effect of these exogenous tax changes by employing a VAR framework and find for the following: tax increases have large and contractionary effects on output (b) the estimated impact on output is larger with the narrative approach than with the CAPB (c) tax increases implemented to reduce past budget deficits have smaller output effects than those with long run objectives (d) the role of expectations is negligible since output responds more to tax changes than to the news of impending tax changes and (e) tax increases have large contractionary effect on investment than consumption. *Guajardo et al. (2011)* weigh in on the debate by employing both the narrative and CAPB approach in their analysis (through Auto Regressive and VAR models) and find that for the same data set - while the one indicates contractionary output findings; the other indicates expansionary austerity. *Perotti (2011)* in revisiting the evidence for expansionary hypothesis agrees with the IMF (2010) that there is merit in the critique of the CAPB as used by Alesina and Perotti (1995) and Alesina and Ardagna (2010); and goes further to clarify that large consolidations are usually multi-year in duration and so the CAPB as

used by the above parties is not a very suitable approach. Perotti (2011) also further indicates that the narrative approach (action-based methodology) as used by IMF (2010) also suffers from inherent problems (reverse causality errors) such as: (a) fiscal authorities could reverse spending cuts announced in the budget in subsequent supplementary budgets (b) include only actions geared towards debt reduction while omitting actions geared towards stabilisation (c) endogeneity problems could arise if policies announced towards debt reduction are not implemented due to the fact that the economy became recessionary. Perotti further raises an important issue by highlighting that in analysing output effects of austerity, it would be better if countries with similar situations be categorised together rather than grouping countries with inherently different characteristics as done by the parties above. In his analysis, he studies the impact of consolidations on four distinct countries (pairing them by similarities) by employing the narrative approach as used by IMF (2010); in addition, takes into consideration fiscal actions outside the original budget; timelines of the consolidations and other channels (such as macroeconomic policies) that can affect the consolidations. By employing simple regression techniques, he finds for expansionary austerity but details that the conditions (interplay of macroeconomic policies and economic conditions) under which they occurred are not practicable and available for all countries – which then raises a potential issue: should adjustments be designed taking into cognisance each country's peculiar situation? Holden and Midthjell (2013) and Breuer (2019) also argue against the CAPB methodology on the grounds that its measure of changes in fiscal policy is imprecise due to incomplete cyclical adjustments and so suffers from reverse causality and instead employ a fiscal indicator. They show that the fiscal indicator measures discrete changes in fiscal policy more precisely by linking adjustments directly to changes in the main tax

bases. While Holden and Midthjell (2013) findings (by way of simple regression techniques) indicate no clear expansionary indication for the two instruments of consolidation, Breuer (2019) on the other hand employs Two-Way Fixed Effects Regression (2FE) analytical tool and show findings for contractionary austerity. Jorda and Taylor (2015) also weigh in by analysing datasets employed by Alesina and Ardagna (2010) and Guajardo et al. (2011) with the CAPB and narrative methods respectively. In estimating the output effects of fiscal consolidations by using Local Projections and Instrumental Variables, they show findings for: (a) expansionary austerity with the Alesina and Ardagna's dataset (b) they however note that this finding only holds for the top of the business cycle and that the expansionary effects evaporate at the bottom of the business cycle (c) contractionary austerity with the Guajardo et al. (2000) dataset especially when the economy is recessionary. To further eliminate the endogeneity problems associated with the narrative approach, they estimate for output effects using Propensity Score-Based methods and Augmented Inverse Propensity Weighted (AIPW) estimator and show findings for deeper contractionary effect. Due to the issues raised concerning the CAPB, Alesina and Ardagna (2013) revisit the case for expansionary austerity hypothesis by employing both the CAPB and narrative approach and find evidence for (i) expansionary austerity for expenditure-based adjustments when accompanied by pro-growth policies (labour and product market liberalisation policies) and contractionary results for tax-based adjustments for the *CAPB methodology* (ii) on the other hand, when the *narrative approach* is employed, the results are deeply contractionary for tax-based adjustment but not significant for expenditure-based ones; however, when the latter are accompanied with reductions in short term interest rates, expansionary effects occur. It would thus appear from the foregoing, that there might

indeed be merit in the argument about the CAPB and that the choice of instrument might influence the outcomes. In what appears to lend credence to this line of argument, Alesina et al. (2015, 2018, 2019) consequently revisit the case for expansionary austerity hypothesis by employing only the narrative approach in their analysis and find that tax-based plans are deeply contractionary while expenditure-based plans are mildly recessionary in output; however, if implemented in a non-recessionary period, they are accompanied with zero output loss and sometimes instances of growth (expansionary).

Other issues considered in the extant literature (as seen in Bertola and Drazen 1991; Alesina and Perotti 1995; Alesina and Ardagna 1998, 2010, 2013; Mulas-Granados 2005; Jayadev and Konczal 2010; IMF 2010; Guajardo et al. 2011; Perotti 2011; Blanchard and Leigh 2013; Alesina et al. 2015, 2018, 2019; Paulus et al. 2017; Castro 2018; Breuer 2019; Born et al. 2019) are the factors that determine whether output is expansionary or contractionary. These include: (a) the composition of the adjustment (b) the magnitude of the adjustment (c) the economic conditions (d) the duration of the adjustment (e) the accompanying policies and (f) the design of the adjustment. However, before exploring the factors, it is crucial to understand the criteria for categorising an adjustment as expansionary. Alesina and Ardagna (2013) proffer two definitions: *Definition one*: an expansionary fiscal adjustment as one in which the growth rate of the real GDP during the adjustment period is higher than average growth rate in the two years prior to the adjustment. *Definition two*: an expansionary fiscal adjustment as one in which the average growth rate of GDP in the year of the adjustment implementation is higher than the two years prior to the adjustment as well as greater than the G7 average for the same periods. These two definitions present juxtaposing criteria and appear inherently conflicting in that while one compares only internal factors, the other is weighed against

an external criterion. Also, there is the consideration about the conditions prior to the adjustment, assuming the adjustment period preceded a crisis and the economy had started to record some form of growth prior to the adjustment, the change in the growth rate would capture changes that might not be attributable to the adjustment. Nevertheless, for the purposes of the literature, definition two will be used since it provides a broader yardstick for growth measurement.

Regarding the composition & magnitude of the adjustment: several studies - Bertola and Drazen (1991); Alesina and Perotti (1995); McDermott and Wescott (1996); Alesina and Ardagna (1998, 2013); Mulas-Granados (2005); IMF (2010); Guajardo et al. (2011); Alesina (2012); Alesina et al. (2015, 2018a, 2018b, 2019) and Paulus et al. (2017) find that the composition matters in favour of spend-based adjustments. However, while the others find spend-cuts expansionary, the IMF (2010) and Guajardo et al. (2011) find them contractionary but less so than tax-based adjustments. They show that this might be because expenditure-based adjustments are usually accompanied by monetary policy intervention tools - low interest rates and currency devaluation. Holden and Midthjell (2013) on the other hand, find that the composition does not matter. *Regarding the size of the adjustment*, McDermott and Wescott (1996) find that this matter. They proffer evidence showing that during large adjustments implementation, interest rate premium declines and consequently positively impacts business confidence which in turn positively affects growth. On the other hand, Alesina and Ardagna (1998, 2013) finds it effect on output insignificant.

Regarding the economic conditions: evidence is varied and contradictory. Alesina and Ardagna (1998, 2013) find evidence for expansionary adjustment episodes occurring during incidences of high and growing debt levels as insignificant while Mulas-Granados

(2005) finds that spend-based adjustments if undertaken during times of fiscal stress, low growth, high initial deficit and debt levels are expansionary by reducing unemployment, inflation and increasing growth. Jayadev and Konczal (2010) on the other hand, show contradictory evidence that adjustments implemented during a slump result in lower growth and higher debt-to-GDP ratios. IMF (2010) and Guajardo et al. (2011) weigh in on the debate from the sovereign risk view and find in their studies that adjustments implemented in economies with higher perceived sovereign default risk have less contractionary effects. Jorda and Taylor (2015) also find evidence that adjustments implemented during recessionary periods are deeply contractionary but are not very significant during boom times. Alesina et al. (2018a, 2018b, 2019) find that the business cycle position during adjustment implementation is insignificant for either type of adjustment but that instances of expansionary adjustment occur during non-crisis periods. They additionally find in their 2019 study that when initial debt level is low, if spend and tax-based adjustments are implemented jointly, they work faster at reducing debt levels. Born et al. (2019) offer evidence to show that the default risk premia rises when adjustments are implemented during times of severe fiscal stress.

Regarding the design and duration of the adjustment: this appears not to be a well-studied area in the literature; nevertheless, from the available strand, Cournède et al. (2013) show that well designed adjustments can curb negative growth effects; while Alesina et al. (2015, 2018a) offer evidence in favour that adjustments are better suited as multi-year events and result in very low output costs when they are long-lasting rather than transitory.

Regarding the accompanying policies: Giavazzi and Pagano (1990) in their seminal contribution show that the expansionary austerity result was anchored on accompanying

monetary policies of disinflation, currency devaluation and capital flow liberalisation which fostered wealth and credibility effects. Although Alesina and Ardagna (1998) note that monetary policy is not a critical differentiator between the two types of adjustment outcomes, they support Alesina (2012) in opining that a suitable policy mix comprising of income policies (wage moderation), labour union liberalisation can curtail contractionary impacts of adjustments that occur through the supply channels and yield resultant positive effects on private investment. Jayadev and Konczal (2010); IMF (2010) and Guajardo et al. (2011) note that monetary policy intervention by way of interest rate reduction and currency devaluation help to offset the contractionary effects of adjustment policies. They further submit that this intervention occurs mostly for spend-based consolidations and corresponds with the notion that Central Banks are more favourably disposed towards spend based adjustments which they take as a signal towards firmer fiscal discipline and therefore are willing to provide monetary interventions (stimulus) particularly when interest rates are not within the zero-limit threshold. Tax-based adjustments on the other hand especially in the form of indirect taxes such as VAT tend to raise inflation and therefore reduces the chance of any form of monetary intervention by an inflation averse Central bank. Perotti (2011) notes that the aforementioned policies – though they aid expansionary output effect through increased competitiveness and net exports – are not practicable since they are not applicable for the generality of countries (especially for countries within the euro zone since they operate a common monetary policy for all members).

A large strand of the literature (as seen in Alesina and Perotti 1995; Alesina and Ardagna 1998, 2013; Mulas-Granados, 2005; Jayadev and Konczal, 2010; Agnello et al. 2013; Blanchard and Leigh 2013) subsequently covers the determinants of a successful

adjustment. A successful adjustment is one in which the adjustment reduces the deficit and public debt levels. The same factors used in analysing the output effect are used here: (a) the composition of the adjustment – expenditure-based or tax-based i.e. spend cuts versus tax increases (b) the magnitude i.e. the size of the adjustment in relation to the GDP (c) the economic conditions i.e. the business cycle position of the economy (d) the duration of the adjustments and (e) the design – how it is spread out overtime. There is an interconnect between a successful and expansionary adjustment - an expansionary adjustment requires a growth in GDP while successful adjustment requires a reduction in debt and deficit levels; real GDP growth drives down debt and deficit levels.

Regarding the composition of the adjustment: several studies - Alesina and Perotti (1995); McDermott and Wescott (1996); Alesina and Ardagna (1998, 2010, 2013); Mulas-Granados (2005); Agnello et al. (2013); Mirdala (2017) and Alesina et al. (2018b) find that spend based adjustments - especially spend cuts targeted at transfers, welfare programmes, public wage bill and employment - are more successful in reducing deficit and debt levels than tax-based adjustments. A successful adjustment as defined by Alesina and Ardagna (1998) is one in which the Debt/GDP ratio reduces by 5% of GDP three years after the adjustment implementation. However, Holden and Midthjell (2013) define a successful adjustment as one in which the budget deficit is removed and therefore find that the composition of the adjustment is insignificant. This in itself presents as a problem – whereby Alesina and Ardagna (1998) present a referral value, and Holden and Midthjell present a total absence i.e., a zero-referral value as criteria for successful adjustments. However, in so far as the aim is deficit reduction, and governments are presumed to be going concerns, the issue of debt and deficit eradication might appear idealistic and so a more acceptable definition would be that of Alesina and Ardagna

(1998). Blanchard and Leigh (2013) in furtherance with the composition effects, offer evidence that the composition only has a small initial effect on Debt/GDP ratios. Anderson and Minneman (2014) also contribute to the discussion by pointing out that the impact levels of tax increases and spend cuts are dependent on the following: spend cuts undertaken in countries with hitherto low spend levels are likely to have lower impact than in economies with high spend levels while tax increases in countries with low levels of tax are likely to have a greater impact than in economies with relatively high taxes.

Regarding the design of the adjustment: Alesina and Perotti (1998) show that tight adjustments if rightly implemented have lasting positive effects on growth and investment as well as increase competitiveness. Cournède et al. (2013); Alesina et al. (2015) and Mirdala (2017) also submit that well designed measures can reduce the adverse effect on growth. Mirdala (2017) additionally finds that spend based adjustments are better suited as multi-year plans since the effects are less distortionary on output in subsequent years while tax-based plans are best as single-year plans since the output effects are only less distortionary in the first year.

Regarding economic conditions: the evidence for this in the literature is mixed. McDermott and Wescott (1996) find that although the prevailing economic condition *does not* guarantee the successful outcome of an adjustment program, the composition and adjustment size in conjunction with strong global economic conditions tend to make for more successful outcomes. Alesina and Ardagna (1998); Mulas-Granados (2005) find that successful adjustments occur in periods of worse fiscal stance than unsuccessful ones while Jayadev and Konczal (2010) take a contrary view and find that adjustments during a slump, result in lower growth and higher Debt/GDP ratios. Mirdala (2017) find successful adjustments are mostly implemented during pre-crisis periods while

unsuccessful ones are implemented during crisis periods and are mostly tax-based instruments. Born, Muller and Pfeifer (2019) find that spend based adjustments during times of severe fiscal stress induces the default risk premium to rise. On the other hand, Alesina et al. (2019) find that when debt levels are low, expenditure and tax-based instruments if implemented jointly work better and faster in reducing the Debt/GDP ratio.

Regarding the magnitude: the evidence on size as a determinant for a successful adjustment is quite contradictory. While Alesina and Perotti (1995) and Alesina and Ardagna (1998) find that size is not a determiner; Holden and Midthjell (2013) on the other hand show that adjustment size is important for reducing debt levels and ensuring a balanced budget.

Regarding the duration: Agnello et al. (2013) in analysing the durations of consolidations, find that adjustment size does not impact on the duration but that economic conditions tend to affect the duration and effectiveness of consolidation efforts. In explaining further, they find that adjustments implemented during high deficit and debt levels require longer consolidation period; those undertaken at high and increasing debt levels tend to undermine the consolidation efforts by boosting the likelihood of a shortened duration; economic, fiscal or financial crises end consolidation efforts earlier than expected while good economic conditions contribute to faster consolidations. They also find that spend based consolidations are generally shorter in duration than those that act on the revenue side while fast durations are aided by (a) lower interest rates (b) higher inflation rates and (c) trade openness.

2.3.5 Austerity effect on income inequality

By using the narrative approach methodology in identifying episodes of fiscal adjustments, the following papers - Agnello and Sousa 2011, 2012; Loungani 2013; Ball et al. 2013; Woo et al. 2013; Elson 2013; Cournede et al. 2013; Furceri and Loungani 2013; IMF 2014; Gupta et al. 2014, 2015; Ciminelli et al. 2019 all show that fiscal adjustments can have regressive distributional consequences as does Mulas-Granados 2005; Tovar-Jalles 2017; Brinca et al. 2017, who employ the CAPB as well as Cournede et al. 2013; and Paulus et al. 2017 by using simulation studies. Improving the fiscal stance involves either acting on the expenditure or revenue side or a combination of both. On the expenditure side, the question is which spend cuts should be undertaken and on the revenue side: which tax increases – direct or indirect. The literature explores the effects of these instruments – expenditure and revenue and the attendant distributional consequences. To provide a clearer picture, the distributional impacts will be looked at through the lens of (a) composition of the adjustment (b) the magnitude of the adjustment (c) the timing of the adjustment (d) the duration of the adjustment and (e) economic conditions.

Regarding the composition of the adjustment: evidence in support of the more detrimental effects of spend-based instruments is vast and can be seen in Mulas-Granados (2005); Agnello and Sousa (2011, 2012); Ball et al. (2013); Woo et al. (2013); Cournede et al. (2013); Furceri and Loungani (2013); IMF (2014); Clements et al. (2015); Tovar-Jalles (2017); Brinca et al. (2017); Paulus et al. (2017); Bova et al. (2018) and Heimberger (2018) who show that the composition matter and that expenditure-based adjustments (especially cuts targeted at social benefits and transfers) tend to have a more detrimental impact on income inequality than tax-based adjustments. Ball et al. (2013) estimate

Impulse Response Functions (IRFs) from local projections to analyse distributional effects while Woo et al. (2013) and Bova et al. (2018) analyse distributional effects by utilising Seemingly Unrelated Regressions (SUR) and Fixed Effects Estimators (FEE) and additionally show that spend-based adjustments significantly increase income inequality both in the short and medium terms particularly via the unemployment channel by causing persistent long-term unemployment; and with significant and long-lasting negative effect on labour's share of income. The IMF further adds that the decline is harsher for unskilled labour than skilled labour (since employers show a preference for skilled labour over unskilled). Ball et al. (2013) also points out that the effect on labour's share of income is worse than on profit and rent incomes. In underlying the importance of labour income share, Woo et al. (2013) and Bova et al. (2018) note that approximately 15%-20% of increases in income inequality is particularly through the unemployment channel.

Furthermore, Bova et al. (2018) submit that, although tax-based adjustments are better than expenditure-based adjustments, tax-based instruments tend to have *mixed net effects* on inequality – direct taxes tend to be progressive whilst indirect taxes have the tendency to be regressive. They note that direct taxes in the form of income tax can lower inequality depending on their progressivity however indirect recessionary effects could arise via increase in unemployment which lead to an increase in inequality. The evidence on tax adjustment effects therefore presents as a paradox. This is further emphasised in Ciminelli et al. (2019) who in continuation of the tax discourse, assess the effects of direct and indirect tax on inequality by applying a Panel Vector Auto Regressive (PVAR) methodology and submit that the effect is dependent on the labour supply channel. They indicate that direct tax increases could cause either an income or substitution effect. An

income effect dominates when economic agents increase their supply of labour in order to maintain their consumption levels while a substitution effect dominates when they substitute labour for leisure. The effect of the one causes a reduction in inequality while the other causes an increase in inequality; so, depending on which effect dominates, the same kind of tax could have different effects. On the other hand, they report that indirect taxes reduce inequality more than direct taxes. They find that this occurs through the impact on the labour supply channel. They note that when tax increases are in the form of indirect taxes (such as consumption tax), they cause a reduction in disposable income and therefore induce a positive impact on labour force participation by creating incentives for the voluntarily unemployed to seek for employment. Higher labour participation rates therefore lead to an increase in the probability of being employed which ultimately leads to a reduction in income inequality.

Regarding the magnitude and duration of the adjustment: several studies such as Agnello and Sousa (2011, 2012); Woo et al. (2013); IMF (2014); Heimberger (2018) and Bova et al. (2018) find that the size of the adjustment matters. The IMF also shows that the duration and magnitudinal impacts of the adjustment are dependent on the size of automatic stabilisers¹³ in place. Bova et al. (2018) further note that most large sized adjustments (greater than 1.5% of GDP) are expenditure based; tend to worsen income inequality - (a consolidation size of 1% of GDP is associated with a rise in Gini

¹³ Automatic stabilisers are features of the tax and transfer systems that temper the economy when it overheats and stimulates the economy when it slumps without direct intervention by policymakers. For example, when incomes increase, tax liabilities rise and the need for benefits fall and vice-versa for falls in income. Automatic stabilisers therefore offset fluctuations in economic activity without direct intervention by policymakers.

coefficient¹⁴ of about 0.6% - 0.7% of disposable income - and are long-lasting. In other words, most expenditure-based adjustments tend to be larger in size, worsen inequality and are longer in duration. They find that the cumulative impact of the adjustment from the size peaks between years five and six and starts fading by year 10 - which could account for why the effects on inequality are more pronounced compared to tax-based instruments. Correspondingly, Heimberger (2018) analyses for dynamic effects by estimating IRFs from local projections and also notes that inequality is increased when the adjustment period is long rather than short.

Regarding the design of adjustment: equity considerations are quite important during fiscal adjustment deliberations and implementation since they can influence the sustainability of such programmes. Bova et al. (2018) put forward that if progressive tax instruments together with targeted social benefits and transfers are introduced during expenditure-based adjustments, they could help to alleviate the distortionary distributional impacts. The IMF (2014) adopts a similar perspective but adds that despite these measures, the bottom income deciles would remain deeply affected by consolidation shocks.

Regarding the timing of the adjustment: several studies - Agnello and Sousa (2011, 2012); Woo et al. (2013); Tovar-Jalles (2017); Bova et al. (2018) and Heimberger (2018) find that the business cycle position of the economy matters. Agnello and Sousa (2011, 2012) adopt SUR models to investigate for the effects that could arise from financial crisis (banking in particular) and find that adjustments that are implemented during crisis

¹⁴ Gini Coefficient measures the average dispersion of the income or wealth of individuals within a country. The index measures from 0 to 1 – with perfect equality representing 0 and perfect inequality 1 - where one person owns everything.

periods have a negligible effect on income inequality while implementation during non-crisis and post-crisis lead to a rise in inequality - albeit very significantly for the post-crisis period. In support of this, Heimberger (2018) also finds that the distributional impact is more harmful post-crisis than in non-crisis and in periods of low growth than high growth periods. On the other hand, Woo et al. (2013) and Tovar-Jalles (2017) provide contradictory evidence that adjustments implemented during recessive periods have a negative impact on inequality. The IMF (2014) also submits that front-loaded adjustments are detrimental on social welfare particularly when unemployment is high.

Regarding economic conditions: Extant literature provides evidence that the disposable income of lower income groups is usually disproportionately affected during fiscal adjustments. This is further worsened if adjustments are implemented during inflationary periods (Agnello and Sousa, 2012). Relatedly, concerning the effect of debt levels, a strand of the empirical literature (Kumhof and Ranciere 2010; Rajan 2011; van Treeck and Sturn 2012; Klein and Winkler 2017) put forward evidence to show inequality is impacted by private indebtedness. They further indicate that the 2007/8 financial crisis was as a result of private debt overhang. Klein and Winkler (2017) analyse the effect on inequality through the lens of private indebtedness and offer evidence to show that austerity raises inequality levels when private debt is high regardless of the economy's position in the business cycle while the opposite is the case if the debt overhang is low. Three channels are identified through which this could occur – earnings, income and savings. The earnings channel magnifies inequality through employment losses while labour share of income declines through the incomes channel. High interest rates existing at the point of adjustment implementation also hurt borrowers who are at the lower end of the distribution.

2.4 Key Findings Synthesis

No review can be undertaken on the distributional impacts of fiscal adjustment without a discussion on the output effects of such adjustments. A large strand of the empirical literature focuses on the effect fiscal adjustments have on output and other economic impacts are subsequently built on from there. A synopsis of the literature findings indicates the following: fiscal austerity packages can either be implemented on the expenditure or revenue side or a combination of both. These fiscal instruments have implications on output as well as distributional consequences. A synopsis of the literature findings via the output effect lens indicates the following: output effects of adjustments can either be ascertained by (i) estimating the value of the fiscal multiplier on the effect of changes in the fiscal stance or by (ii) identifying instances of changes to the fiscal stance. The second approach is popular in the empirical literature and focuses on whether the outcomes of fiscal adjustments are expansionary or contractionary on growth. Disagreements exist between scholars as to the appropriate methodology for identifying episodes of fiscal adjustments as the two popular methods – the cyclical adjusted primary balance and the narrative approach – seem to result in contradictory outcomes. Other outcome considerations presented in the literature includes the effect of adjustments on debt and deficit levels whereby a positive downward effect is classified as a successful adjustment and vice-versa for the opposite. The literature (such as Alesina and Perotti 1995; Alesina and Ardagna 1998, 2010, 2013; Mulas-Granados 2005; Agnello et al. 2013; Mirdala 2017; Alesina et al. 2018b) suggests that actions on the expenditure side especially those geared towards social benefits, public wage cuts are more effective towards deficit reduction. However, another strand of the literature (some examples include Mulas-Granados 2005; Agnello and Sousa 2011, 2012; Ball et al. 2013; Woo et

al. 2013; Furceri and Loungani, 2013; IMF 2014; Clements et al. 2015; Tovar-Jalles, 2017; Brinca et al. 2017; Paulus et al. 2017) also uncovers that these adjustment decisions tend to have distributional consequences and is viewed from the perspectives of rising or falling income inequalities level. Different channels of inequality transmission are put forward in the literature with labour income share identified as a major driver of income inequality. The effects of fiscal adjustments on income inequality can be determined by the following factors: (i) the composition of the adjustment (ii) the magnitude of the adjustment (iii) the timing of the adjustment (iv) the duration of the adjustment and (v) economic conditions. By considering the impact(s) of these factors to outcomes on growth, debt and deficit levels as well as income inequality, it is possible to obtain a broad picture of the economic effects of fiscal austerity.

2.4.1 Discussion

As seen from the literature, discussions on austerity are premised on the theoretical constructs regarding the short-term economic consequences of fiscal adjustments. While the Keynesian and Heterodox views recommend countercyclical fiscal measures, the supply side theorists recommend procyclical policies. These contrasting views present in the literature in two ways: (i) austerity or stimulus (ii) expansionary or contractionary. Closely associated with the expansionary vs contractionary issue is the method for identifying fiscal adjustment episodes. The third issue – consonant with the purpose of this review – is that of distributional concerns which arise when adjustments are implemented. These issues have largely framed the trajectory of the academic discourse and this discussion will follow along these lines with limitations highlighted.

Austerity or Stimulus: post the 2007/8 financial crisis, the need for governments to strive towards sustainable finances have been the focal emphasis of fiscal authorities. Options

for decreasing debt ratios could either be by: (i) targeting the GDP component and growing nominal GDP at a rate higher than interest rates – while this has the advantage of reducing the debt level, debt stock might remain unchanged; (ii) on the other hand, targeting the debt levels via implementation of fiscal adjustment programmes – while this option might be contractionary in the short-term as seen from the broad literature, proponents consider it a better alternative to the costs associated with high and increasing debt levels. Additionally, increasing debt levels raise burden of payment concerns – who pays: current or future generation?

Expansionary or contractionary: while the broader literature seems to offer evidence of contractionary effects of austerity, there is a strand that suggests a contrasting view of expansionary effects as well as economic conditions under which this could occur. However, such considerations as interest rate and exchange rate policies are not readily available to all countries – the euro zone for example pursues a singular monetary policy and so this option is not open to member countries. Other considerations such as economic rebalancing – by transitioning to export dependency also has impact on the surplus countries who rely on the imports of deficit countries; in addition, all deficit countries cannot enhance their competitiveness in the same period. Another strand of the literature presents evidence of timing and the country's position in the business cycle as relevant to an expansionary outcome. Paradoxically, this ties in with the Keynesian view that austerity is best preserved for the boom and not the slump.

Distributional Impacts: equity concerns cannot be separated from austerity considerations. The empirical literature offers evidence to show that expenditure-based adjustments especially those targeted at social welfare benefits and public wage cuts are best suited for successful reduction of deficit levels as well as expansionary growth.

However, this poses as a conflict for the inequality literature which provides evidence for expenditure-based adjustments - especially when occurring through the transmission channels of labour income share and employment - as drivers for increasing income inequality. A problem therefore arises on how to marry the two paradigms to ensure an equity-efficiency trade-off. While the literature emphasises on the impact of some rigid items on government current expenditure, it is silent on other components of the current expenditure as well as capital expenditure and the attendant distributional and output effects. This review seeks to contribute by attempting to reassemble and also integrate the various fragments in the large empirical body of literature relating to fiscal adjustments in order to provide a succinct overview of the effects on income inequality so policymakers can be equipped for appropriate decision-making.

2.4.2 Future research agenda

The topicality of income inequality seems to suggest that we are in an era of expanding and challenging research in this area. From the systematic review of the extant literature several likely areas in which future research could be beneficial were identified; expanding these areas would therefore work importantly towards optimising knowledge and decision making in combatting trends of increasing inequality. First there seems to be no consensus as to the distributional consequences of tax-based consolidation; although a large strand of the empirical literature offers evidence that adjustments on the revenue side tend to provide equalising effects to the detrimental impact of fiscal adjustments especially when the tax instrument is progressive such as income tax, other contradictory results are put forward indicating that the instruments (direct tax and indirect tax) could yield mixed impacts through the labour supply channel by producing income or substitution effects. Secondly, there appears to be contradictory evidence on

the impact of the timing of an adjustment programme on income inequality. While some studies have shown evidence that austerity policies implemented during recessionary periods have no significant impact on inequality, others have put forward evidence indicating that frontloaded adjustments affect inequality negatively. Thirdly, it would be beneficial if further research is provided showing the durational consequences of long-term adjustments on inequality. A single strand of research from the literature under review addresses this area and seems to suggest that the impact could only recede by the 10th year of adjustment implementation; a validation or otherwise of this evidence would surely have wider implications both for equity and efficiency. The area of indebtedness also presents for wider research – by analysing the impacts of high (low) public debt overhang vis-a-vis high (low) private debt overhang on inequality.

2.4.3 Research questions

Drawing from the areas identified for future research and consistent with the overarching review question, the following research questions will form the basis of the proposed study:

1. What are the durational consequences of long-term (long-lasting) adjustments on income inequality?
2. Does high (low) public debt overhang during adjustment implementation impact on income inequality?

2.4.4 Research design

In order to test the two sets of hypotheses, data will be obtained for a panel of OECD countries for the period 1980 to 2019. The narrative approach methodology (IMF 2010) will be employed for identifying fiscal consolidation data as the traditional approach – the CAPB – could imply a risk of reverse causality (IMF 2010; Guajardo et al. 2011). The Gini coefficient and ratios of top to bottom deciles/quintiles will be used as inequality indicators. Potential data sources will be as follows: income distribution will be obtained from the World Inequality Database because of coverage and quality (being the largest public database for inequality covering 173 countries with observations in some cases dating as far back as 1875); Public Debt to GDP series from the World Development Indicators of the World Bank.

The year range covered in the data series is significant in that 1980 marks the evolution timeframe of global growth of the income inequality trajectory while data evidence after 2019 could lead to biased results due to expansionary policies pursued by fiscal authorities because of the Covid-19 pandemic. The extended timeframe is also particularly beneficial in testing the hypothesis associated with Question 1 since the strand of literature (Bova et al. 2018; Heimberger 2018) which have analysed the durational consequences cover a period set of 1978 to 2009 and 1978 to 2013 respectively. Aside from the timeframe, additionally, in testing the hypothesis associated with Question 2, countries will be grouped into two according to the levels of indebtedness where high debt levels will be categorised as peak countries and low debt levels as non-peak countries. This method is in consonant with the finding by Perotti (2011) that austerity effects are better analysed if countries in similar characteristics are grouped together.

2.4.5 Research limitation

This review represents a first attempt to carry out a systematic review of the literature, and therefore had the following limitations associated with it. First, there were limitations associated with the database search - despite the application of Boolean logic to the keyword word search string, the relevant papers were limited. As discussed in the section for other search – this might be because of the nascency of the field and the time lags associated with publishing relevant materials. Searching by phrase on Google search engine and Specialist sites aided by the snowballing technique were therefore particularly rewarding and enriched the more orthodox search methodology. Also, case studies were limited to OECD countries and the broader Europe for concision reasons; it could be that the outcome would have been different if a wider range of countries had been applied – this therefore could have an impact on the pertinence of the findings to other economic settings. Nevertheless, this review has value for researchers and policymakers as it encapsulates the heuristic developments in the field.

2.5 Concluding remarks and policy implication

This paper set out to investigate if there were distributional consequences associated with implementation of fiscal retrenchment programmes by systematically reviewing the extant empirical literature. By applying the standards of rigorous methodology associated with a systematic literature review, it finds evidence that fiscal adjustment programmes are associated with an increase in inequality. Expenditure and revenue policies can alter the distribution of income in the short and medium terms. Expenditure-based instruments (which are more detrimental on inequality) are more successful in achieving fiscal consolidations than tax-based instruments. Tax-based instruments on the other hand moderate the effects on inequality if they are progressive in nature. Consequently, there is a need for policymakers to balance equity and efficiency trade-offs during austerity considerations since fiscal adjustments have regressive distributional consequences especially for lower income groups by affecting their disposable income. Well-designed adjustment instruments could lead to a decrease in inequality which could impact positively on economic growth since lower income groups have a higher marginal propensity to consume.

REFERENCES

Agnello, L. and Sousa, R. M. (2011) 'Fiscal Consolidation and Income Inequality', *IDEAS Working Paper Series from RePEc*. St. Louis: Federal Reserve Bank of St. Louis. Available at: <https://search.proquest.com/working-papers/fiscal-consolidation-income-inequality/docview/1698807418/se-2?accountid=10297>.

Agnello, L. and Sousa, R. M. (2012) 'How does Fiscal Consolidation Impact on Income Inequality?', *IDEAS Working Paper Series from RePEc*. St. Louis: Federal Reserve Bank of St. Louis. doi: 10.1111/roiw.12004.

Agnello, L. and Sousa, R. M. (2012) 'Fiscal Adjustments and Income Inequality: A First Assessment', *IDEAS Working Paper Series from RePEc*. St. Louis: Federal Reserve Bank of St. Louis. doi: 10.1080/13504851.2011.648315.

Agnello, L., Castro, V. and Sousa, R. M. (2013) 'What determines the duration of a fiscal consolidation program?', *Journal of International Money and Finance*, 37, pp. 113–134. doi: 10.1016/j.jimonfin.2013.05.012.

Alesina, A. (2012) 'Cut Deficits by Cutting Spending', *VOX CEPR Policy Portal*. Available at: <https://voxeu.org/article/cut-deficits-cutting-spending>.

Alesina, A. and Ardagna, S. (1998) 'Tales of Fiscal Adjustment', *Economic Policy*, (27), pp. 487–545. doi: 10.1111/1468-0327.00039.

Alesina, A. and Ardagna, S. (2010) 'Large Changes in fiscal policy: Taxes versus spending', *Tax Policy and the Economy*, 24, pp. 35–68. doi: 10.1086/649828/ASSET/IMAGES/LARGE/FG3.JPEG.

Alesina, A. and Ardagna, S. (2013) 'The Design of Fiscal Adjustments', *Tax Policy and the Economy*, 27(1), pp. 19–68. doi: 10.1086/671243.

Alesina, A. and Drazen, A. (1991) 'Why are Stabilizations Delayed?', *The American Economic Review*, 81(5), pp. 1170–1188. Available at: <http://www.jstor.org/stable/2006912>.

Alesina, A. and Perotti, R. (1995) 'Fiscal Expansions and Fiscal Adjustments in OECD Countries', *NBER Working Paper Series*, 5214, p. 38.

Alesina, A., Ardagna, S. and Perotti, R. (1999) 'Fiscal Policy, Profits and Investment', *NBER Working Paper Series*. Available at: <http://www.nber.org/papers/w7207%0ANATIONAL>.

Alesina, A., Favero, C. and Giavazzi, F. (2015) 'The Output Effect of Fiscal Consolidation Plans', *Journal of International Economics*, 96(S1), pp. S19–S42. doi: 10.1016/j.jinteco.2014.11.003.

Alesina, A., Favero, C. and Giavazzi, F. (2018) 'What do we know about the effects of austerity?', *NBER Working Paper Series*, Working Paper No. 24246 (January), pp. 1–14. Available at: <http://www.nber.org/papers/w24246>

Alesina, A., Favero, C. and Giavazzi, F. (2018) 'Climbing Out of Debt', *International Monetary Fund. Finance & Development*. Vol. 55, No. 1, March 2018.

Alesina, A., Favero, C. and Giavazzi, F. (2019) 'Austerity: When It Works and When It Doesn't', *Princeton University Press*, 2019.

Alexiou, C. and Nellis, J. (2016) 'A Post-Mortem of Austerity: The Greek Experience', *Economic Issues*, Vol. 21, Part 2, 2016, 21(2), p. 3. doi: 10.2307/4344111.

Alfaredo, F. et al. (2018) 'World Inequality Report', Available at <https://wir2018.wid.world>

Anderson, B. and Minneman, E. (2014) 'The Abuse and Misuse of the Term "Austerity" Implications for OECD Countries', *OECD Journal on Budgeting*, 14(1), pp. 109–122. doi: 10.1787/budget-14-5jxrmdxc6sq1.

Atkinson, A. B. (2015) 'Inequality – What Can be Done?', *LSE International Inequalities Institute*, Working Paper (November), pp. 1–17

Ball, L.M., Furceri, D., Leigh, D. and Loungani, P. (2013) 'The Distributional Effects of Fiscal Consolidation', *IMF Working Papers*, 13(151), p. 1. doi: 10.5089/9781475551945.001.

Bastagli, F., Coady, D. and Gupta, S. (2012) 'Income Inequality and Fiscal Policy (2nd Edition)', *IDEAS Working Paper Series from RePEc*. St. Louis: Federal Reserve

Bank of St Louis. Available at: <https://search.proquest.com/working-papers/income-inequality-fiscal-policy-2nd-edition/docview/1698578036/se-2?accountid=10297>.

Bernheim, B. D. (1989) 'A Neoclassical Perspective on Budget Deficits', *Journal of Economic Perspectives*, 3(2), pp. 55–72. doi: 10.1257/jep.3.2.55.

Bertola, G. and Drazen, A. (1993) 'Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity', *American Economic Review*, 83(9), pp. 11–26. Available at: <http://www.nber.org/papers/w3844>.

Birdsall, N. (2005) ' Rising Inequality in the New Global Economy', *WIDER Angle* No 2/2005; 2005 WIDER Annual Lecture. Available at UNU-WIDER : Blog : Rising Inequality in the New Global Economy

Blanchard, O. and Leigh, D. (2013) 'Fiscal Consolidation: At What Speed?' *VOX CEPR Policy Portal*. May 03, 2013. Available at <https://voxeu.org/article/fiscal-consolidation-what-speed>

Bonica, A., McCarty, N., Poole, K.T. and Rosenthal, H. (2013) 'Why Hasn't Democracy Slowed Rising Inequality?', *Journal of Economic Perspectives*, 27, pp. 103–124. doi: 10.1257/jep.27.3.103.

Born, B., Müller, G. J. and Pfeifer, J. (2020) 'Does Austerity Pay Off?', *Review of Economics and Statistics*, 102(2), pp. 323–338. doi: 10.1162/rest_a_00844.

Bova, E., Kinda, T. and Woo, J. (2018) 'Austerity and Inequality: The Size and Composition of Fiscal Adjustment Matter for Inequality', Available at <https://voxeu.org/article/size-and-composition-fiscal-adjustment-matter-inequality> February 07, 2018.

Brinca, P., Ferreira, M.H., Franco, F., Holter, H.A. and Malafry, L. (2020) 'Fiscal Consolidation Programs and Income Inequality', *International Economic Review*, 62(1), pp. 405–460. doi: 10.1111/iere.12482.

Briner, R. B., Denyer, D. and Rousseau, D. M. (2009) 'E X C H A N G E Evidence-Based Management: Concept Cleanup Time? Executive Overview', *Academy of Management Perspectives*, (November), pp. 19–32.

Calcagno, A. (2012) 'Can Austerity Work?', *Review of Keynesian Economics*, (1), pp. 24–36. doi: 10.4337/roke.2012.01.02.

Castro, V. (2018) 'Functional components of public expenditure, fiscal consolidations, and economic activity', *Economics & Politics*, 30(1), pp. 124–150. doi: <http://dx.doi.org/10.1111/ecpo.12104>.

Chancel, L., Hough, A. and Voituriez, T. (2017) 'Reducing Inequalities within Countries: Converting the Global Debate into Action' *Institut du développement durable et des relations internationales*. (January). Available at: www.iddri.org.

Charles-Coll, J. A. (2011) 'Understanding Income Inequality: Concept, Causes and Measurement', *International Journal of Economics and Management Sciences*, 1(3), pp. 17–28. Available at: www.managementjournals.org.

Chowdhury, A. and Jomo, K. S. (2018) 'Inequality and Its Discontents', *Development*, 61(1–4), pp. 21–29. doi: 10.1057/s41301-018-0179-0.

Ciminelli, G., Ernst, E., Merola, R. and Giuliadori, M. (2019) 'The Composition Effects of Tax-Based Consolidation on Income Inequality', *European Journal of Political Economy*, 57, pp. 107–124. doi: 10.1016/j.ejpoleco.2018.08.009.

Clements, B., de Mooij, R., Gupta, S. and Keen, M. (2015) 'Inequality and Fiscal Policy', *International Monetary Fund*. September, 2015.

Cochrane, J. H. (2011) 'Understanding policy in the great recession: Some unpleasant fiscal arithmetic', *European Economic Review*, 55(1), pp. 2–30. doi: 10.1016/j.eurocorev.2010.11.002.

Cojocariu, L. and Oprea, F. (2020) 'Fiscal Consolidation and Economic Crisis – Ten Years After.', *Ovidius University Annals, Series Economic Sciences*, 20(1), pp. 866–882. Available at:

<https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=bth&AN=146384765&site=ehost-live&custid=s1020214>.

Collins, C. (2012) '99 to 1: 7 How Wealth Inequality Crashed the Economy', *International Review of Social History*. Available at: <https://search.proquest.com/docview/1354075171?accountid=10297>.

Counsell, C. (1997) 'Formulating Questions and Locating Primary Studies for Inclusion In Systematic Reviews', *Annals of Intern Med*. 1997 Sep 1;127(5):380-7. doi: 10.7326/0003-4819-127-5-199709010-00008. PMID: 9273830.

Cournède, B., Goujard, A. and Pina, Á. (2013) 'Reconciling fiscal consolidation with growth and equity', *OECD Journal. Economic Studies*, 2013(1), pp. 7–89. Available at: <https://search.proquest.com/scholarly-journals/reconciling-fiscal-consolidation-with-growth/docview/1503126892/se-2?accountid=10297>.

Dabla-Norris, E., Kochhar, K., Suphaphiphat, N., Ricka, F. and Tsounta, E. (2015) 'Causes and Consequences of Income Inequality: A Global Perspective', *International Monetary Fund*, Staff Discussion Notes, 15(13), p. 1. doi: 10.5089/9781513555188.006.

Denyer, D. and Tranfield, D. (2009) 'Producing a Systematic Review', *The SAGE Handbook of Organizational Research Methods*, pp. 671–689.

Denyer, D., Tranfield, D. and Van Aken, J. E. (2008) 'Developing design propositions through research synthesis', *Organization Studies*, 29(3), pp. 393–413. doi: 10.1177/0170840607088020.

Devries, P., Guajardo, J., Leigh, D. and Pescatori, A. (2011) A New Action-based Dataset of Fiscal Consolidation, *International Monetary Fund*, Working Paper, WP/11/128, June, 2011.

Dobbs, R., Madgavkar, A., Manyika, J., Woetzel, J., Bughin, J., Labaye, E. and Kashyap, P. (2016) 'Poorer Than Their Parents? A New Perspective on Income Inequality (Flat or Falling Incomes in Advanced Economies), *MGI-Income -Inequality- July-2016*'.

Eisner, R. (1989) 'Budget Deficits: Rhetoric and Reality', *Journal of Economic Perspectives* 3(2), pp. 73–93.

Elson, D. (2013) 'Austerity Policies Increase Unemployment and Inequality - But Don't Reduce Budget Deficits and Government Borrowing', *The Journal of Australian Political Economy*, (71), pp. 130–133. Available at: <https://search.proquest.com/scholarly-journals/austerity-policies-increase-unemployment/docview/1406216503/se-2?accountid=10297>.

Eyraud, L. and Weber, A. (2013) 'The Challenge of Debt Reduction during Fiscal Consolidation', *IMF Working Papers*, 13(67), p. 1. doi: 10.5089/9781475553864.001.

Figari, F., Paulus, A. and Sutherland, H. (2015) 'The design of fiscal consolidation measures in the European Union: distributional effects and implications for macroeconomic recovery', *IDEAS Working Paper Series from RePEc*. St. Louis: Federal Reserve Bank of St Louis. Available at: <https://search.proquest.com/working-papers/design-fiscal-consolidation-measures-european/docview/1698364530/se-2?accountid=10297>.

Fiorentini, R. (2015) 'Neoliberal Policies, Income Distribution Inequality and the Financial Crisis', *Forum for Social Economics*, 44(2), p. 115. Available at: <https://search.proquest.com/scholarly-journals/neoliberal-policies-income-distribution/docview/1686806089/se-2?accountid=10297>.

Ford, R. (1998) 'Fiscal consolidation, growth and equity', *The OECD Observer*, Paris, 210 (Feb 1, 1998), pp. 37–42. Available at: <https://search.proquest.com/scholarly-journals/fiscal-consolidation-growth-equity/docview/217461149/se-2?accountid=10297>.

Frieden, J. A. (2009) 'Global Imbalances, National Rebalancing, and the Political Economy of Recovery', *Council on Foreign Relations. Center for Geoeconomic Studies*, (October). Available at https://scholar.harvard.edu/files/jfrieden/files/global_imbalances_national_rebalancing_and_the_political_economy_of_recovery.pdf

Frijters, P. and Foster, G. (2015) 'Rising inequality: A benign outgrowth of markets or a symptom of cancerous political favours?', *Australian Economic Review*, 48(1), pp. 67–75. doi: 10.1111/1467-8462.12096.

Furceri, D. and Loungani, P. (2013) 'Who Let the Gini Out?', *IMF Finance and Development*, (December), pp. 25–27.

Furceri, D., Loungani, P., Ostry, J. and Pizzuto, P. (2020) 'Financial Globalization, Fiscal Policies and the Distribution of Income', *Comparative Economic Studies*, 62(2), pp. 185–199. doi: 10.1057/s41294-020-00113-4.

Giavazzi, F. and Pagano, M. (1990) 'Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries', *National Bureau of Economic Research*, MA 02138(3372), p. 55.

Goda, T. (2017) 'A Comparative Review of the Role of Income Inequality in Economic Crisis Theories and its Contribution to the Financial Crisis of 2007-2009', *Revista Finanzas y Politica Economica*, 9(1), pp. 151–174. doi: 10.14718/revfinanzpolitecon.2017.9.1.9.

Guajardo, J., Leigh, D. and Pescatori, A. (2011) 'Expansionary Austerity: New International Evidence', *IMF Working Paper*, WP/11/158, July 2011.

Gupta, S., Goady, D., de Mooij, R. and Clements, B. (2014) 'Taxing, Spending, and Inequality – What is to be Done?' April 15, 2014. Available at <https://voxeu.org/article/taxing-spending-and-inequality>.

Hart, C. (1998) 'The literature review in research: Releasing the social science imagination', *Doing a Literature Review*, pp. 1–25. Available at: <http://www.sjsu.edu/people/marco.meniketti/courses/ARM/s0/Literature-review-Hart.pdf>.

Heimberger, P. (2018) 'The dynamic effects of fiscal consolidation episodes on income inequality: evidence for 17 OECD countries over 1978-2013', *Empirica*, 47, pp. 53–81. doi: 10.1007/s10663-018-9404-z.

Holden, S. and Midthjell, N. (2013) 'Successful Fiscal Adjustments. Does Choice of Fiscal Instrument Matter?', *SSRN Electronic Journal*, (23). doi: 10.2139/ssrn.2345297.

Jensen, S. E. H. and Rutherford, T. F. (2002) 'Distributional effects of fiscal consolidation', *The Scandinavian Journal of Economics*, 104(3), pp. 471–493. Available at: <https://search.proquest.com/scholarly-journals/distributional-effects-fiscal-consolidation/docview/200648568/se-2?accountid=10297>.

International Monetary Fund (2010) 'Will it Hurt? Macroeconomic Effects of Fiscal Consolidation', *IMF World Economic Outlook* (2010) (October) 93-124.

IMF (2013) 'Taxing Our Way out of — or into ?— Trouble', *IMF*. October 2013, Available at www.imf.org/external/pubs/ft/fm/2013/02/pdf/fms2.pdf

International Monetary Fund (2014) 'Fiscal Policy and Income Inequality', *Policy Papers*, 14. doi: 10.5089/9781498343671.007.

International Monetary Fund (2017) 'Tackling Inequality', *Fiscal Monitor*, October 2017 .

Jayadev, A. and Konczal, M. (2010) 'The Boom Not the Slump: The Right Time for Austerity', *The Roosevelt Institute*, pp. 1–8.

Jordà, Ò. and Taylor, A. M. (2015) 'The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy', *Economic Journal*, 126(590), pp. 219–255. doi: 10.1111/eoj.12332.

Kenworthy, L. and Pontusson, J. (2005) 'Rising Inequality and the Politics of Redistribution in Affluent Countries', *Perspectives on Politics*, 3(3), pp. 449–471. doi: 10.1017/S1537592705050292.

Kitromilides, Y. (2011) 'Deficit Reduction, the Age of Austerity, and the Paradox of Insolvency', *Journal of Post Keynesian Economics*, 33(3), pp. 517–536. doi: 10.2753/PKE0160-3477330306.

Klein, M. and Winkler, R. (2019) 'Austerity, Inequality, and Private Debt Overhang', *European Journal of Political Economy*, 57, pp. 89–106. doi: 10.1016/j.ejpoleco.2018.08.003.

Konzelmann, S. (2012) 'The Economics of Austerity', *Centre for Business Research, University of Cambridge*, Working Paper No. 434. June 2012.

Korzeniewicz, R. P. and Moran, T. P. (2005) 'Theorizing the relationship between inequality and economic growth', *Theory and Society*, 34(3), pp. 277–316. doi: 10.1007/s11186-005-4575-6.

Krugman, P. (2012) 'Austerity Is So Wrong!' *The Daily Beast*, New York. May 06, 2012.

Krugman, P. (2013) 'Why Inequality Matters?' *The New York Times*, New York. December 16, 2013.

Krugman, P. (2015) 'The Case for Cuts was a Lie. Why Does Britain Still Believe It? The Austerity Delusion', Available at <https://www.theguardian.com/business/ng-interactive/2015/apr/29/the-austerity-delusion>

Kumhof, M and Rancière, R. (2010) 'Inequality, Leverage and Crises', *IMF*, Working Paper. WP/10/268. November 2010.

Larch, M. (2010) 'Fiscal Performance and Income Inequality: Are Unequal Societies More Deficit-Prone?', *IDEAS Working Paper Series from RePEc*, 65(1), pp. 53–80. Available at: <http://10.0.4.87/j.1467-6435.2011.00527.x>.

Makin, J. H. (2013) 'Austerity Undone', *American Enterprise Institute for Public Policy Research*, (April 2013), pp. 1–5.

Martorano, B. (2015) 'Is It Possible to Adjust “With a Human Face”? Differences in Fiscal Consolidation Strategies between Hungary and Iceland', *Comparative Economic Studies*, 57(4), pp. 623–654. doi: <http://dx.doi.org/10.1057/ces.2015.22>.

McDermott, C. J. and Wescott, R. F. (1996) 'An Empirical Analysis of Fiscal Adjustments', *International Monetary Fund*, Working Paper, WP/96/59. June, 1996.

Mirdala, R. (2017) 'Effects of Fiscal Policy Shocks in the Euro Area (Lessons Learned from Fiscal Consolidation)', *Journal of Advanced Research in Law and Economics*, 7(8), pp. 2236–2276. Available at: <https://journals.aserspublishing.eu/jarle/article/view/1032>

Muinelo-Gallo, L. and Roca-Sagalés, O. (2013) 'Joint determinants of fiscal policy, income inequality and economic growth', *Economic Modelling*, 30, p. 814. Available at: <https://search.proquest.com/scholarly-journals/joint-determinants-fiscal-policy-income/docview/1266249138/se-2?accountid=10297>.

Mulas-Granados, C. (2005) 'Fiscal Adjustments and the Short-Term Trade-Off between economic growth and equality', *Hacienda Pública Española/Revista de Economía Pública*, 172(1), pp. 61–92.

Paulus, A., Figari, F. and Sutherland, H. (2017) 'The design of fiscal consolidation measures in the European Union: distributional effects and implications for macro-economic recovery', *Oxford Economic Papers*, 69(December 2016), p. gpw054. doi: 10.1093/oep/gpw054.

Pawson, R., Greenhalgh, T., Harvey, G. and Walshe, K. (2005) 'Realist review-a new method of systematic review designed for complex policy interventions,' *Journal of Health Services Research & Policy*, Volume 10, pp. 21-34.

Perotti, R. (2011) 'The “Austerity Myth”: Gain Without pain?', *NBER Working Paper Series*, Working Paper 17571, pp. 1–58. Available at: <http://www.nber.org/data-appendix/w17571>.

Petticrew, M. (2001) 'Systematic Reviews From Astronomy to Zoology: Myths and Misconceptions,' *BMJ*. Volume 322. 13 January 2001.

Petticrew, M. and Roberts, H. (2006) 'Systematic Reviews in the Social Sciences. A Practical Guide.' *Blackwell Publishing*. 2006. Available at: <http://www.cebma.org/wp-content/uploads/Pettigrew-Roberts-SR-in-the-Soc-Sc.pdf>

Rawdanowicz, L. (2013) 'Choosing the pace of fiscal consolidation', *OECD Journal. Economic Studies*, 2013(1), pp. 91–119. Available at: <https://search.proquest.com/scholarly-journals/choosing-pace-fiscal-consolidation/docview/1503126880/se-2?accountid=10297>.

Rawdanowicz, L., Wurzel, E. and Christensen, A. K. (2013) 'The Equity Implications of Fiscal Consolidation', *OECD Economic Department Working Papers*. Paris: Organisation for Economic Cooperation and Development (OECD), pp. 0_1,2,5-

36. Available at: <https://search.proquest.com/working-papers/equity-implications-fiscal-consolidation/docview/1282883600/se-2?accountid=10297>.

Romer, C. and Romer, D.H. (2010) 'The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks', *American Economic Review*, 100, pp. 763–801. doi: 10.1257/aer.100.3.763.

Sakkas, S. and Varthalitis, P. (2019) 'Public Debt Consolidation and its Distributional Effects', *Manchester School*. doi: 10.1111/manc.12291.

Savage, M., Callan, T., Nolan, B. and Colgan, B. (2019) 'The Great Recession, Austerity and Inequality: Lessons from Ireland', *Review of Income and Wealth*, 65(2), pp. 312–336. doi: 10.1111/roiw.12337.

Schaltegger, C. A. and Weder, M. (2014) 'Austerity, Inequality and Politics.', *European Journal of Political Economy*, 35, pp. 1–22. Available at: <http://10.0.3.248/j.ejpoleco.2014.03.005>.

Schneider, M. P. A., Kinsella, S. and Godin, A. (2016) 'Changes in the profile of inequality across europe since 2005: Austerity and redistribution', *European Journal of Economics and Economic Policies: Intervention*, 13(3), pp. 354–374. doi: 10.4337/ejeep.2016.03.08.

Schneider, M. P. A., Kinsella, S. and Godin, A. (2017) 'Redistribution in the age of austerity: evidence from Europe 2006–2013', *Applied Economics Letters*, 24(10), pp. 672–676. doi: 10.1080/13504851.2016.1221030.

Siddaway, A. P., Wood, A. M. and Hedges, L. V. (2019) 'How to do a Systematic Review: A Best Practice Guide for Conducting and Reporting Narrative Reviews, Meta-Analyses, and Meta-Syntheses', *Annual Review of Psychology*, 70(1), pp. 747–770. doi: 10.1146/annurev-psych-010418-102803.

Streeck, W. (2013) 'Will Expansion Work? On Mark Blyth, Austerity: The history of a dangerous idea', *Comparative European Politics*, 11(6), pp. 722–728. doi: <http://dx.doi.org/10.1057/cep.2013.23>.

Tovar-Jalles, J. (2017) 'How do fiscal adjustments change the income distribution in emerging market economies?', *International Journal of Emerging Markets*, 12(2), pp. 310–334. doi: 10.1108/IJoEM-10-2015-0219.

Tranfield, D., Denyer, D. and Smart, P. (2003) 'Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review', *British Journal of Management*, 14(3), pp. 207–222. doi: 10.1111/1467-8551.00375.

Tsoufidis, L. (2012) 'Public Debt and J.S. Mill's Conjecture: A Note', *History of Economic Thought and Policy*. doi: 10.3280/SPE2013-002005.

van Treeck, T. and Sturn, S. (2012) 'Income inequality as a cause of the Great Recession? A survey of current debates', *ILO Working Papers*, 470934(39).

Wade, R. H. and Sigurgeirsdottir, S. (2012) 'Iceland's Rise, Fall, Stabilisation and Beyond', *Cambridge Journal of Economics*, 36(1), pp. 127–144. doi: 10.1093/cje/ber038.

Woo, J., Bova, E., Kinda, T. and Zhang, Y.S. (2013) 'Distributional Consequences of Fiscal Consolidation and the Role of Fiscal Policy: What Do the Data Say?', *IMF Working Paper Fiscal Affairs Department*, WP/13/195.

APPENDIX

Appendix A

Person	Title/Organisation	Role
Prof. Constantinos Alexiou	Professor of Macroeconomics and Policy, Cranfield School of Management	Supervisor and Subject Expert
Prof. Joe Nellis	Deputy Dean and Professor of Global Economy, Cranfield School of Management	Supervisor and Subject Expert
Ms. Mary Betts-Gray	Business Information Specialist	Literature Search Expert

Appendix B

Assessment Indices	Criteria	0	1	2	3	4
Purpose	Is there a succinct statement of the research aim? Is there a clearly defined question or problem statement?					
Relevance	Is the research design appropriate to address the research aim? Is data collected in a manner that addresses the research issue?					
Rigour	Is there an in-depth description of the data analysis process? Is the data presented sufficient to support the findings?					
Credibility	Are the findings explicit? Is the credibility of the findings discussed? Are the findings discussed in relation with the problem statement?					
Contribution	Is there any contribution to existing knowledge or understanding? Are there any identified areas for further research? Are there clear implications for policy and practice?					

0 = Not at all; 1 = Only to a limited extent; 2 = At an acceptable level; 3 = Significantly; 4 = Not applicable

Source: Author's Elaboration

Appendix C Data extraction format

Citation Details:
Paper Title
Author(s)
Journal
Date
Research Details:
Research Aim(s)
Research Question(s)
Problem Statement
Study Type:
Empirical, Conceptual, Discursive, etc.
Methodology:
Sample Characteristics
Data Analysis
Findings:
Key Findings
Future Research Agenda
Conclusion:
Implications for Policy

Source: Author's Elaboration

Appendix D Fiscal austerity effect on output

D.1

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Giavazzi and Pagano (1990)	Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries	2 (Denmark & Ireland)	Den=1983-1986; Ire=*1982-1984* & 1987-1989	CAPB	(i) Vector Auto Regression (VAR) (ii) Ordinary Least Squares (OLS)	Growth in Consumption despite Spend Cuts & Tax Hikes; (2) Expansionary Output effect anchored on: (a) monetary disinflation (b) capital flow liberalization (c) fall in nominal & real interest rates (d) currency devaluation.
Bertola and Drazen (1991)	Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity	2 (Denmark & Ireland)	Den=1982-1986; Ire=*1982-1984* & 1987-1989	CAPB	Intertemporal Behaviour Model	Spend-based adjustments are expansionary because of the role of future expectations in driving up private consumption (2) Tax-based adjustments not accompanied by spend cuts result in decreased consumption or no effect.
Alesina and Perotti (1995)	Fiscal Expansions and Fiscal Adjustments in OECD Countries	20 OECD Countries	1960-1992	CAPB	Ordinary Least Squares (OLS)	The composition of the adjustments determine their success (2) Successful adjustments are mostly spend-based in composition; cuts are usually undertaken on (a) transfers i.e., welfare programs (b) government wages and employment (3) Spend-based adjustments are expansionary (a) have a crowding in effect on investments (b) improve competitiveness (4) Unsuccessful adjustments are majorly tax-based in composition.
McDermott and Wescott (1996)	An Empirical Analysis of Fiscal Adjustments	20 Industrial Countries	1970-1995	CAPB	Logistic Probability Model	Strong fiscal consolidations do not cause economic recessions (2) Interest rate premium declines during strong consolidations and consequently boost investment spending (3) Expectations play a role in increasing Aggregate Demand and Output via the investment and consumption channels (4) Expenditure-Based (EB) adjustments especially those geared towards transfers, public wage cuts and employment are more successful in reducing the Debt/GDP ratio than Tax-Based (TB) adjustments (5) Size of the adjustment matters - large adjustments tend to be successful (6) Timing of the global business cycle does not guarantee the outcome of an adjustment program; however, this can be influenced by the composition and size of the adjustment.

D.2

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Alesina and Ardagna (1998)	Tales of Fiscal Adjustment	20 OECD Countries	1960-1992	CAPB	Probit Model	Successful adjustments occur in periods of worse fiscal stance than unsuccessful ones (a) Debt/GDP ratio is high and fast growing (b) Successful adjustments are usually exclusively EB while unsuccessful ones are TB (2) Growth rates & investment increase during and after successful adjustment episodes (3) Monetary policy not a critical differentiator in both successful and unsuccessful adjustments (4) Successful & expansionary adjustments are more likely influenced by composition and not size (5) Expansionary episodes are higher when spend cuts are in the form of transfers and government wage bill (6) Evidence for expansionary adjustment episodes occurring during incidences of high & growing debt levels is insignificant.
Mulas-Granados (2005)	Fiscal Adjustments and the Short-term Trade-off between Economic Growth and Equality	15 EU Member Countries	1960-2000	CAPB	(i) Means Analysis (ii) Parametric Estimation	The composition of the adjustments is crucial in determining the economic outcomes in the short run (2) Successful adjustments are mostly spend-based in composition; cuts are usually in the form of (a) in-transfers (b) public wage cuts and employment (3) Spend-based adjustments undertaken during times of (a) fiscal stress (b) low growth (c) high deficit & debt levels are expansionary by reducing (a) unemployment (b) inflation and (c) increasing growth (4) Expansionary adjustments occur via demand and supply sides.
Alesina and Ardagna (2010)	Large Changes in Fiscal Policy: Taxes Versus Spending	21 OECD Countries	1970-2007	CAPB	Ordinary Least Squares (OLS)	Fiscal adjustments are expansionary on the demand side through the expectations of economic agents (i.e. current adjustments eliminate the need for future more disruptive adjustments) (2) Fiscal adjustments are expansionary on the supply side via the labour market (public spend cuts lead to public sector job losses, increased labour supply in the economy which exerts downward pressure on private sector wages which inadvertently leads to increased profits and therefore increased investments) (3) Spend cuts + zero Tax hikes are more likely to reduce deficits and debt-to-GDP ratios (4) Spend-based adjustments are therefore expansionary.

D.3

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Jayadev (2010) and Konczal	The Boom Not the Slump: The Right Time for Austerity	21 OECD Countries	1970-2007	-	-	Examine the same dataset for the same period as Alesina & Ardagna (2010) and find: (1) No evidence for expansionary austerity: (a) of the 26 successful adjustments found by Alesina and Ardagna - growth occurred for 3 years preceding 20 of such adjustments (b) Norway & Ireland were the exceptions that recorded growth during a recession (c) this exception could be linked to low interest rates & currency devaluation. (2) Therefore adjustments during a slump result in lower growth & higher debt-to-GDP ratios.
IMF (2010)	Will It Hurt? Macroeconomic Effects of Fiscal Consolidation	15 OECD Countries	1980-2009	Narrative Approach	(i) Auto Regressive Model (ii) Vector Auto Regression (VAR)	Fiscal adjustments have a contractionary effect on output in the short term (2) Impact GDP negatively & unemployment rises in the short run (3) Spend-based adjustments have smaller contractionary effects than tax-based adjustments because of monetary policy intervention (interest rate reduction & currency devaluation) (4) Adjustments in countries with higher perceived sovereign default risk tends to be less contractionary.
Romer (2010) and Romer	The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks	United States of America	1945Q1-2005Q1	Narrative Approach CAPB	(i) Ordinary Least Squares (OLS) (ii) Vector Auto Regression (VAR)	Tax increases have large and contractionary effects on output (2) Estimated impact on output is larger with the narrative approach than with the CAPB or all captured legislated tax changes (3) Tax increases implemented to reduce past budget deficits have smaller output effects than those with long run objectives (4) Expectations impact are negligible since output responds more to tax changes than to the news of impending tax changes (5) Tax increases have large contractionary effect on investment than consumption.
Guajardo et al. (2011)	Expansionary Austerity: New International Evidence	17 OECD Countries	1978-2009	Narrative Approach CAPB	(i) Auto Regressive Model (ii) Vector Auto Regression (VAR)	Narrative Approach: Fiscal adjustments have a contractionary effect on output in the short term (2) Tax-based adjustments are more contractionary than Spend-based (3) Monetary policy (interest rate reduction & currency devaluation) intervention offset the contractionary effects of fiscal adjustments (4) Adjustments are less contractionary in economies with perceived high default sovereign risks. CAPB: Fiscal adjustments have an expansionary effect on output.

D.4

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Perotti (2011)	The "Austerity Myth:" Gain Without Pain?	4 OECD Countries (Denmark, Ireland, Finland & Sweden)	Den=1982-1986; Ire=1987-1990; Fin=1992-1998; Swe=1993-1998	Narrative Approach	Simple Regression	Evidence for expansionary austerity hypothesis is doubtful (2) The twin aspects of timing & exports growth casts doubt on the role of expectations & confidence in fiscal adjustments (3) The channels - (a) depreciation (b) export growth (c) interest rate reduction (d) income policies - through which growth was achieved is not applicable to many countries.
Calcagno (2012)	Can Austerity Work?	17 Emerging Countries	8 Countries = 1998-2001; 9 Countries = 2009-2010	-	-	Procyclical fiscal policies: lead to contraction of output & employment in the short run (2) fail to recover (or grow) the confidence of financial agents rather undermine the confidence of households & entrepreneurs.
Alesina (2012)	Cut Deficits by Cutting Spending	-	-	-	-	Private investment rises during episodes of spend-based adjustments as a result of: (1) rise in business confidence (2) pro-growth measures such as deregulation, labour market liberalization and tax reforms.
Bilicka et al. (2012)	The Effects of Fiscal Consolidation on Short-Term Growth: A Review and Implications for the UK	24 OECD Countries	24 Countries = 1994-2012 UK =2006-2015	CAPB	-	Factors that determine if fiscal adjustments are expansionary or contractionary include: (1) the size and composition of the adjustments (2) Initial debt levels (3) Monetary policy - interest rates and exchange rates - intervention.

D.5

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Agnello et al. (2013)	What determines the duration of a fiscal consolidation program?	17 Industrialised Countries	1978-2009	Narrative Approach	Time Duration Model	Spend Cuts are more effective at delivering fiscal consolidations than Tax Hikes (2) High deficits require longer consolidation periods (3) High & Increasing debt levels undermine consolidation efforts by boosting the likelihood of a shortened duration (4) Economic, fiscal or financial crisis also act in ending the consolidation efforts earlier than ear-marked (5) Good economic conditions contribute to faster consolidations (6) Spend based consolidations are shorter in duration than Tax based consolidations (7) The size of the adjustment does not affect its duration (8)Faster consolidation duration is aided by (a) lower interest rates (b) higher inflation rates and (c) trade openness.
Alesina and Ardagna (2013)	The Design of Fiscal Adjustments	21 OECD Countries	1970-2010	(i) Narrative Approach (ii) CAPB	Ordinary Least Squares (OLS)	Expenditure-Based (EB) adjustments are more successful and lead to long-lasting reductions of Debt/GDP ratios (2) EB adjustments are associated with smaller recessions - either zero or mildly recessionary - than Tax-Based adjustments (3) Current spend cuts have small or zero effect on output than public investment cuts (4) EB adjustments can be expansionary when implemented with labour and product market liberalisation policies (5) EB or TB effect on output is not differentiated by the role of monetary policy.
Makin (2013)	Austerity Undone	-	-	-	-	Severe bouts of austerity can result in slow growth or recession.
Blanchard and Leigh (2013)	Fiscal consolidation: At what speed?	-	-	-	-	Spend cuts & Tax hikes have large adverse effect on output in the short term and only a small initial effect on debt to GDP ratio when fiscal multipliers are large.
Courmède et al. (2013)	Reconciling Fiscal Consolidation with Growth and Equity	31 OECD Countries	2009-2012	-	Simulation Studies	Well-designed adjustment measure can curtail negative effects on growth, equity and current account imbalances.

D.6

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Holden and Midthjell (2013)	Successful Fiscal Adjustments: Does Choice of Fiscal Instrument Matter?	24 OECD Countries	1970-2011	HM ¹⁵ Fiscal Indicator	Regression	Argue against the CAPB Methodology employed by Alesina and Perotti (1995) and Alesina and Ardagna (2010) and finds it suffers from reverse causality. They find as follows: (2) Fiscal instrument implemented is not a determinant for successful and expansionary adjustment (3) Adjustment size is important for reducing debt levels and ensuring a balanced budget.
Elson (2013)	Austerity Policies Increase Unemployment and Inequality - But Don't Reduce Budget Deficits and Government Borrowing	-	-	-	-	Budget deficits are reduced through output and employment stimulation rather than austerity.
IMF (2014)	Fiscal Policy and Income Inequality	27 Advanced Countries + Emerging Europe	2007-2012	Narrative Approach	Micro-Simulation Studies	Austerity leads to short-term reduction in output & employment as a result of wage decline.
Jorda and Taylor (2015)	The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy	21 OECD Countries 17 OECD Countries UK	1970-2007 1978-2009 2010-2013	CAPB Narrative Approach	(i) Propensity-Score Based Methods (ii) Rubin Causal Model (iii) Augmented Inverse Property Weighted (AIPW) Estimator (iv) IRFs from Local Projections (v) Instrumental Variable	Austerity is deeply contractionary on output (2) Timing of implementation matters. Austerity implemented during recessionary periods are deeply contractionary but not very significant during boom periods.
Alesina et al. (2015)	The Output Effect of Fiscal Consolidation Plans	17 OECD Countries	1978-2009	Narrative Approach	Seemingly Unrelated Regressions (SUR)	Employs the narrative approach methodology of Romer and Romer (2010). Consolidations are usually multi-year by design. Output effects of consolidations depend on (a) the design and composition of the adjustment (b) consistency of the adjustment i.e. transitory or permanent (2) Spend-based adjustments are non/mildly recessionary & short-lived; (3) Tax-based adjustments are deeply recessionary and prolonged (4) Differences in the output effect of the 2 types of adjustment can be credited to the response of private investment rather than consumption growth (5) Fiscal adjustments which are lasting and not intermittent can be linked with very low output costs.

¹⁵ The authors employ a fiscal indicator (referred to as the 'HM') to identify fiscal adjustments – linking them directly to identified changes in the main tax base

D.7

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Paulus et al. (2017)	The design of fiscal consolidation measures in the European Union: distributional effects and implications for macro-economic recovery	8 European Countries	2009-2012	Micro-Simulation Techniques	Ordinary Least Squares (OLS)	Spend-based cuts in the form of public wage & transfer cuts impact negatively on aggregate demand.
Mirdala (2017)	Effects of Fiscal Policy Shocks in the Euro Area (Lessons Learned from Fiscal Consolidation)	19 EU Countries	1995-2015	CAPB	Vector Auto Regression (VAR)	Successful adjustments are mostly implemented during pre-crisis periods (a) are single-year episodes (b) mostly EB while some are EB+TB (c) mostly resulted in positive growth output (2) Unsuccessful adjustments are usually implemented during crisis periods (a) are single-year episodes (b) mostly TB while some were TB+EB (c) mostly resulted in negative output growth (3) Exchange rate policies + improved price competitiveness not significant determinants of successful adjustments (4) EB adjustments are more suitable for multi-year consolidations due to less distortionary output effects in subsequent years (5) TB adjustments are better suited for single-year plans due to less distortionary output effects in the first (current) year than subsequent years.
Brinca et al. (2017)	Fiscal Consolidation Programs and Income Inequality	13 European Countries	2007-2013	CAPB	(i) Micro Simulation Model (ii) Regression	Austerity (spend or tax-based) leads to a decrease in output (2) Output contraction is caused by decrease in labour supply.
Alesina et al. (2018)	Climbing Out of Debt	16 OECD Countries	1981-2014	-	-	EB adjustments are mildly recessionary and less harmful to growth than TB (2) EB adjustments are expansionary when implemented during periods of economic growth (3) TB adjustments are associated with large and long-lasting recessions (4) Private investment responds positively to EB measures and negatively to TB measures (5) EB adjustments are more effective in reducing deficit levels with minimal effects on output.

D.8

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Alesina et al. (2018)	What Do We Know About the Effects of Austerity?	16 OECD Countries	1978-2014	Narrative Approach	Vector Auto Regression (VAR)	Employs the narrative approach methodology of Romer and Romer (2010): EB adjustments are mildly recessionary (2) Instances of occurring EB output loss as a result of very tight measures (3) Instances of output loss are short-lived when cuts are in the form of transfers and entitlement programmes (4) Instances of expansionary adjustments occur during non-crisis periods (5) TB adjustments are deeply recessionary (6) Private demand and investment growth respond positively to EB measures and negatively to TB measures (7) Consumption and net export not affected by adjustment instrument (8) Timing for adjustment implementation not significant for either type of adjustment (9) Multipliers are lower for EB measures than TB (10) Multipliers during recessionary periods are lower for both types (11) Business confidence more associated with EB measures than TB (12) Implemented adjustments are usually multi-year in duration.
Castro (2018)	Functional Components of Public Expenditure, Fiscal Consolidations and Economic Activity	15 EU Countries	1990-2012	Narrative Approach	Least Squares Dummy Variable Estimator (LSDVC)	Spend-based adjustments (especially in the form of education, public order & recreation) undermine economic growth (2) Unemployment rises.
Breuer (2019)	Expansionary Austerity and Reverse Causality: A Critique of the Conventional Approach	21 OECD Countries	1970-2007	Corrected CAPB ¹⁶	Two-Way Fixed Effects Regression	Examine the same dataset for the same period as Alesina & Ardagna (2010) and find no basis for expansionary austerity (2) Spend-based adjustments decrease output in the short run.
Ciminelli et al. (2019)	The Composition Effects of Tax-based Consolidation on Income Inequality	16 OECD Countries	1978-2012	Narrative Approach	Panel Vector Auto Regression (PVAR)	Tax-based adjustments lead to contraction in economic activity.

¹⁶ The authors propose a corrected CAPB by using “expenditures as a ratio of potential or trend GDP, rather than as a ratio of GDP” (Breuer 2019, pp 13).

D.9

Study	Research Question	Country Sample	Period	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Alesina et al. (2019)	Austerity: When It Works and When It Doesn't	16 OECD Countries	1978-2014	Narrative Approach	Impulse Response Function (IRF)	Spend-based adjustments are less harmful to growth than Tax-based adjustments (2) Spend-based adjustments are mildly recessionary in short term while economy grows in the medium term (3) Spend-based adjustments implemented during periods of economic growth have zero output cost on average (4) Austerity can be expansionary if spend cuts are accompanied by increases in private consumption & investment as well as net exports (5) Spend cuts on entitlement programs & government transfers are less harmful than Tax increases (6) Tax-based adjustments are deeply recessionary in short & medium term (7) Spend-based + Tax-based adjustments work better and faster at reducing debt levels when initial debt level is low.
Born et al. (2019)	Does Austerity Pay Off?	26 Developed and Emerging Countries	1990-2013	-	(i) Panel Vector Auto Regression (PVAR) (ii) Local Projections	Expenditure-based adjustments during times of severe fiscal stress induces the default premium to rise.

Appendix E Fiscal austerity effect on income inequality

E.1

Study	Research Question	Country Sample	Period	Income Inequality Indicator	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Mulas-Granados (2005)	Fiscal Adjustments and the Short-term Trade-off between Economic Growth and Equality	15 EU Countries	1960-2000	(i) Gini - WIID (ii) Theil Index	CAPB	(i) Means Analysis (ii) Parametric Estimation	Spend-based adjustments significantly increase income inequality more than Tax-based instruments (2) Tax-based adjustments reduce incidences of rising income inequality.
Agnello and Sousa (2011)	Fiscal Consolidation and Income Inequality	18 Industrialised Countries	1970-2010	(i) Gini - SWIID (ii) Income Share Percentiles	Narrative Approach	Seemingly Unrelated Regressions (SUR)	Austerity leads to: (1) significant increase in inequality during and post adjustment implementation (b) Top 1% income share rises during and significantly increases post adjustment periods (2) Composition of the adjustment matters: (a) spend-based adjustments are more detrimental than tax-based adjustments (3) Timing of the adjustments matter: (a) adjustments during non-crisis lead to an increase in inequality; (b) impact during crisis is negligible (c) adjustments post crisis lead to a significant rise in inequality (d) adjustments implemented during inflation boosts income inequality (4) Kuznet's relationship is confirmed: (a) inequality increases during economic development but flattens out with increases in per capita GDP (5) Trade openness matters: as openness increases, income inequality increases.
Agnello and Sousa (2012)	How Does Fiscal Consolidation Impact on Income Inequality?	18 Industrialised Countries	1978-2009	Gini - SWIID	Narrative Approach	Seemingly Unrelated Regressions (SUR)	Austerity leads to: (1) significant increase in inequality (2) Composition of the adjustment matters: (a) spend-based adjustments are detrimental i.e. regressive (b) tax hikes (particularly at top levels) lead to decreasing inequality (3) Timing of the adjustments matter: (a) adjustments during non-crisis lead to an increase in inequality; (b) during crisis is negligible (c) adjustments post crisis lead to a substantial rise in inequality (d) adjustments implemented during inflation boosts income inequality (4) Size of the adjustment matters: (a) spend cuts larger than 0.77% of GDP are detrimental on income gaps (b) tax increases (particularly at the top) greater than 0.57% of GDP lead to decrease in inequality.

E.2

Study	Research Question	Country Sample	Period	Income Inequality Data	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Loungani (2013)	“Austerity” and Inequality: Is there a Link?	17 OECD Countries	1978-2009	(i) Gini - SWIID (ii) Labour's Income Share	Narrative Approach	Impulse Response Functions (IRFs) from Local Projections	Austerity leads to: (1) significant increase in inequality (2) decline in labour's share of income (3) increases in long-term unemployment.
Ball et al. (2013)	The Distributional Effects of Fiscal Consolidation	17 OECD Countries	1978-2009	Gini - SWIID	Narrative Approach	Impulse Response Functions (IRFs) from Local Projections	Austerity leads to: (1) significant increase in inequality levels in short & medium term (2) significant & long-lasting negative effect on labour's share of income (3) larger negative effects on labour share of income than profit & rent incomes (4) labour income levels fall more with spend-based adjustments (5) significant & persistent increase in long-term unemployment over the medium term. (6) spend-based adjustments have larger distributional effects (are more detrimental to inequality) than tax-based adjustments.
Woo et al. (2013)	Distributional Consequences of Fiscal Consolidation and the Role of Fiscal Policy: What Do the Data Say?	17 OECD Countries & 48 Advanced & Emerging Countries	17 Countries = 1978-2009; 48 Countries = 1980-2010	(i) Gini - SWIID (ii) Top to Bottom Quintile/Decile Ratios (iii) Labour's Income Share	Narrative Approach	(i) Fixed-Effects Regression (ii) Seemingly Unrelated Regression (SUR)	Austerity increases income inequality (2) the cumulative effect of austerity on inequality peaks between 5-6 years and gradually starts fading by the 10th year (3) Spend-based cuts worsen inequality while the outcome for Tax-based plans are mixed: direct taxes (through progressivity) tend to lower inequality while indirect taxes tend to be regressive (4) spend-based cuts in the form of social benefits worsen inequality more than other spend cuts such as public wage cuts (5) adjustments implemented during recessions have greater negative impact (6) large sized adjustments worsen inequality (7) adjustments increase inequality especially through the unemployment channel.
Elson (2013)	Austerity Policies Increase Unemployment and Inequality - But Don't Reduce Budget Deficits and Government Borrowing	-	-	-	-	-	Austerity increases income inequality and unemployment.

E.3

Study	Research Question	Country Sample	Period	Income Inequality Data	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Cournede et al. (2013)	Reconciling Fiscal Consolidation with Growth and Equity	31 OECD Countries	2009 -2012	-	-	Simulation Studies	Spend cuts (especially benefits) aggravate income inequality.
Furceri and Loungani (2013)	Who Let the Gini Out?	17 Advanced Economies	1978-2009	Gini - SWIID	Narrative Approach	(i) Seemingly Unrelated Regression (SUR) (ii) Impulse Response Functions (IRFs) from Local Projections	Fiscal Austerity leads to an increase in income inequality through the channels of: (a) social benefit cuts (b) public sector wage cut © public employment cuts (d) increase in long-term unemployment.
IMF (2014)	Fiscal Policy and Income Inequality	27 Countries (Advanced Economies & Emerging Europe)	2007-2012	OECD Luxembourg Income Study Database (LIS)	Narrative Approach	Micro-Simulation Studies	Fiscal Consolidations lead to an increase in income inequality. For Developed Countries: Austerity: (1) leads to increase in inequality through impacts on market & disposable income (2) the duration & magnitude of effects depend on the size of automatic stabilisers (3) the composition & pace of adjustments influence the impact on inequality. (4) a progressive mix of austerity measures help to alleviate its adverse effects on inequality even though it still leads to reduced incomes for the poor in the short run. For Developing Countries: (1) Austerity has adverse effects on inequality in the short-term but in the long-term, effects are positive (2) positive long run effects could be because government spending in these economies are not progressive, so when spend cuts are embarked on, the effects are not usually damaging to inequality.
Gupta et al. (2014)	Taxing, spending, and inequality – what is to be done?	27 Advanced Economies & Emerging Europe	2007-2012	EUROMOD EUROSTAT	-	EUROMOD Micro-Simulation Studies	Austerity increases market income inequality (2) progressive spend-cuts (deeper public sector wage cuts at the top than the bottom; steeper benefits reduction for high pensions) + progressive income taxes tend to reduce income inequality.

E.4

Study	Research Question	Country Sample	Period	Income Inequality Data	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Clements et al. (2015)	Inequality and Fiscal Policy	49 Advanced & Developing Economies	1945-2012	-	-	-	Austerity affects income inequality (2) the composition & pace of adjustments matter (3) spend-based adjustments worsen inequality than tax-based ones (4) income inequality increases if spend-based and tax-based adjustments are regressive.
Tovar-Jalles (2017)	How do Fiscal Adjustments Change the Income Distribution in Emerging Market Economies?	27 Emerging Countries	1980-2014	Gini - SWIID	CAPB	Impulse Response Functions (IRFs) from Local Projections	Fiscal Austerity leads to an increase in income inequality and reduces the redistributive role of fiscal policy (2) Spend-based adjustments are more detrimental to income inequality than Tax-based plans (3) Adjustments during bad times raise income inequality.
Brinca et al. (2017)	Fiscal Consolidation Programs and Income Inequality	13 European Countries	2007-2013	Income Percentile Share	Narrative Approach	Structural Vector Autoregression (SVAR)	Austerity has more recessive impact on economies with high income inequality (2) Spend-based cuts amplify income inequality.
Klein and Winkler (2017)	Austerity, Inequality, and Private Debt Overhang	17 OECD Countries	1980-2011	Gini - SWIID	Narrative Approach	Ordinary Least Squares (OLS) Impulse Response Functions (IRFs) from Local Projections	Austerity raises inequality when private debt is high (2) this occurs through 3 channels - earnings, income & savings (3) inequality significantly increases during periods of high private debt overhang regardless of the economy's position in the business cycle (4) austerity has no apparent effect on inequality when private debt is low irrespective of the economy's position in the business cycle.
Paulus et al. (2017)	The Design of Fiscal Consolidation Measures in the European Union: Distributional Effects and Implications for Macro-Economic Recovery	8 European Countries	2009-2012	Total Income Distribution	Micro-Simulation Techniques	Micro-Simulation Models Ordinary Least Squares (OLS)	Spend cuts (public wage cuts & in-transfers) affect more liquidity constrained households than Tax hikes.
Castro (2018)	Functional Components of Public Expenditure, Fiscal Consolidations and Economic Activity	15 EU Countries	1990-2012	Gini - SWIID	Narrative Approach	Least Squares Dummy Variable Estimator (LSDVC)	Income inequality increases when spend cuts in the form of social protection expenses are implemented.

E.5

Study	Research Question	Country Sample	Period	Income Inequality Data	Fiscal Adjustment Methodology	Econometric Model	Empirical Findings
Bova et al. (2018)	Austerity and Inequality: The size and Composition of Fiscal Adjustment Matter	17 OECD Countries	1978-2009	(i) Gini - SWIID (ii) Top to Bottom Quintile/Decile Ratios (iii) Labour Income Share	(i) Narrative Approach (ii) CAPB	(i) Seemingly Unrelated Regressions (SUR) (ii) Fixed Effects Regressions	Austerity increases income inequality particularly through their effects on unemployment (2) spend-based adjustments significantly worsen inequality relative to tax-based measures (3) the timing & size of the adjustment matters (4) the country's position in the business cycle matters (5) labour market condition matters (6) tax-based adjustments have mixed net effects on inequality: direct taxes are progressive whilst indirect taxes are regressive (7) cuts targeted at social benefits tend to worsen inequality relative to other cuts (8) progressive taxation + targeted social benefits & subsidies when introduced during spend-based adjustments help to alleviate some of the negative distributional effects of adjustments.
Heimberger (2018)	The Dynamic Effects of Fiscal Consolidation Episodes on Income Inequality: Evidence for 17 OECD Countries over 1978-2013	17 OECD Countries	1978-2013	Gini - SWIID	Narrative Approach	Impulse Response Functions (IRFs) from Local Projections	Austerity increases income inequality (2) the composition of the adjustment matters (3) spend-based adjustments are more detrimental than tax-based measures (4) the timing (aftermath of a crisis rather than a non-crisis period; low growth rather than high growth) & size of the adjustment matters - large rather than small (5) the duration is long rather than short. Fiscal Austerity has long lasting effects on income inequality: (a) it decreases demand, lowers growth and pushes up unemployment thereby leading to a more unequal distribution of market incomes (b) Spend cuts on public programs beneficial to the poor increases disposable income inequality.
Ciminelli et al. (2019)	The Composition Effects of Tax-based Consolidation on Income Inequality	16 OECD Countries	1978-2012	(i) Gini - SWIID (ii) Top to Bottom Ratios (iii) Top Income Share	Narrative Approach	Panel Vector Auto Regression (PVAR)	Tax-based adjustments lead to a reduction in income inequality (2) Income Inequality effects through the labour supply channel could differ. Higher direct taxes decrease net wage thereby causing: (a) income effects or (b) substitution effects (3) Indirect taxes reduce income inequality more than direct taxes through its impact on the labour supply channel (4) Personal Income Taxes increase equity and reduce equity-efficiency trade-off.

Appendix F Austerity historical origin

F.1

Theoretical School	Contributors	Position Summary
The 18 th and 19 th Century Classical Economists	Pinto, Hume, Smith, Ricardo, Malthus, Mill	- o Fiscal Policy was about maintaining a balanced budget - o Government should either be balanced or in surplus - o Government borrowing encroaches on wealth accumulation (i.e. capacity for savings to grow) - o Deficits should only be tolerated in situations such as war, natural disasters, etc. - o Anything contrary to such extenuating circumstances was considered fiscal folly.
The Classical Debate About Austerity	Isaac de Pinto (1761)	On national debt & stock market speculation: - o These helped in fostering credit - o Increased money circulation and - o Promoted economic well-being.
	David Hume (1752);	On national debt:
	Adam Smith (1776)	- o Debt financing was the result of government profligacy and - o This imposed undue fiscal burdens on the next generation which would have to pay for it - o Deficits should only be run during times of emergency such as war times, natural disasters, etc. - o At such instances, expenditures should be financed via taxation rather than borrowings - o Governments should not run budget deficits since these lead to debt accumulation - o Public debt reduction entails increased taxation: (a) which leads to negative investment and (b) capital flight implications.
	David Ricardo (1820)	On national debt: - o Referred to it as “one of the most terrible scourges ever invented to afflict a nation” - o Maintained that there was no economic difference between the options (current taxes or bonds issuance) available for funding public debt - o If economic agents had rational expectations, they would be indifferent to the 2 options - o During peace times, efforts be geared towards debt repayment and eradication of debts acquired during war times.

F.2

Theoretical School	Contributors	Position Summary
The Classical Debate About Austerity	Thomas Malthus (1836)	On national debt: - o Cautioned against abrupt national debt reduction because of the powerful interests of the investors of national debt who were also drivers of the production process and so responsible for ensuring effective consumption through the process of production & demand and - o National debt eradication & tax removal would not necessarily result in the increase of national wealth and ensure full employment (particularly for the working class).
	John Stuart Mill (1848)	On national debt: - o Public debt is necessary during times of under-consumption - o On the other hand, public debt could prove a nemesis if it utilized capital that would otherwise be gainfully employed for production and employment - o Government's competing for capital (through borrowing) that could be used for production process could end up driving up interest rates and - o Public debt could be beneficial if: (a) it is financed from excess foreign savings (b) generates savings that would not have occurred without government's borrowing (c) it absorbs domestic savings that would have been used in unproductive capacities or invested in foreign countries.
From Warfare to Welfare – The Politicization of Austerity	John Ruskin (1862-63)	Idealised on: o Government being committed to full employment and provision of benefits to the old, destitute and those in need.
	Williams H. Beveridge (1909);	Idealised on:
	John A. Hobson (1909);	
	Clarence E. Ayres (1918)	o Welfare provision by government as a benefit to society and not a cost.

F.3

Theoretical School	Contributors	Position Summary
The British “Treasury View”, The “Keynesian” Challenge and The Politics of Austerity	The British Treasury View (1920s)	Prevailing Backdrop: WW1 end; economic depression; persistent unemployment despite increased public works spend. Treasury view (premised on pre-Keynesian notions); Savings boost investment growth (b) Increased government borrowings depress private trade & investment which lead to prolonged & persistent unemployment (c) monetary policy used as intervention policy for economic fluctuation. As a result there was: - o Implementation of wage cuts - o Restoration of Gold Standard to 1914 parity.
	Pre-Keynesian View	Viewpoints: - o Monetary policy intervention as prescription for economic fluctuations - o Increased private savings lead to increased investment.
	The Keynesian View (1930s)	Viewpoints: - o Stimulate domestic demand through monetary policy intervention + increased government spending - o Increased public spending should be funded by borrowings - o The cure for unemployment during a slump is stimulus - o Fine-tuning of the economy during recovery by locating new productive capacities in underemployed regions - o Austerity to be applied during a boom to prevent overheating of the economy - o The right time for austerity is (a) during a boom (b) to avert inflation (c) to avert financial collapse
Neo-Liberalism, Deficit Growth and	1950s, 1960s, 1970s, 1980s	1950s:

Theoretical School	Contributors	Position Summary
Exposure to Financial Markets		o Re-ignition of the public debt debate (a) long-term implications of the national debt (b) substitution of government borrowing for tax financing
	1960s:	
		o The rise of neo-liberalism - shift of focus to consumption-based supply side economics
	1970s:	
		o Financial & Trade markets liberalisation – the reliance on market forces to bring about economic equilibria
	1980s:	
		o Reaganomics & Thatcherism - the dominance of supply side economics; the emergence of expansionary fiscal contractions hypothesis.

F.4

Theoretical School	Contributors	Position Summary
The Economics of Austerity in the Wake of the 2007/8 Financial Crisis	Keynesian, Neo-Liberal & Heterodox Theorists	- o The re-birth of the "1920s Treasury View" sentiments (high levels of public debt are economically damaging) - o The re-emergence of the austerity controversy (debate) - o Primary focus of the debate: (a) economic effects of austerity versus stimulus - o Push for austerity agenda by sovereign debt holders i.e. global financial markets - o Keynesian versus Neo-liberalism austerity sentiments.

3 LONG TERM AND DYNAMIC DISTRIBUTIONAL EFFECTS OF FISCAL ADJUSTMENT EPISODES: EVIDENCE FROM A PANEL OF 16 OECD COUNTRIES

ABSTRACT

This paper empirically explores the long-term distributional consequences of fiscal adjustment episodes and the dynamic consequences of fiscal consolidation for countries with large sized consolidations via-a-vis countries with small sized consolidations by estimating impulse response functions from local projections for a panel of 16 OECD countries covering the period 1980 to 2019. The evidence suggests that adverse income disparities which tend to arise upon implementation of fiscal adjustments are dynamic and persist through the long run. While baseline results for the Gini suggest that long-term inequality levels hold at approximately the same as peak levels i.e. by the 7th period, the inequality levels as measured by the bottom 40 income share appear to be indicative of higher long-term point estimates. In addition, when exploring the dynamic effects and consolidation size nexus by categorising countries in terms of the size of adjustments implemented, the evidence appears to indicate that adverse dynamic distributional effects arising from fiscal consolidations appear to be absent in the short and medium term for countries which implement small-sized adjustments whilst the opposite holds for countries with large-sized adjustments.

Keywords: Income Disparity, Inequality, Distribution, Fiscal Adjustment, Fiscal Consolidation, Gini, Labour Income Share, Long-term, Dynamic effects.

3.1 Introduction

Following the deregulation and liberalisation policies which ear-marked the 1980s, income inequality levels have grown across nearly all the world regions¹⁷ albeit at different speeds – with inequality levels highest in the Middle East¹⁸ and lowest in Europe (wir 2018, 2020, 2022). As of 2021, while global income share which accrues to the Top 10 stands at 52%; specifically for the regions, figures indicate as follows - North America 46%, Europe 36%, South-East Asia 54%, Latin America 55%; Sub-Saharan Africa 56% and Middle East & North Africa 58% (wir2022). Rising income inequality is primarily instigated by a conglomeration of domestic and global factors and if left unrestrained (i.e. if rising inequality levels remain unchecked) can lead to all manners of malaise – social cohesion, political, health, economic, etc. (Atkinson 1999, 2015; Pressman 2007; Charles-Coll 2011; IMF 2014, 2017; Piketty 2014; Chancel et al. 2017; wir 2018, 2020, 2022).

Since the Great Recession (2007-2008), rising income inequality has been at the forefront of global economic policy debate along with emerging views on its role in triggering global economic crisis (van Treeck and Sturén 2012; Calcagno 2012). It can also be influenced by institutions and policies which contribute towards shaping its trajectory - with one of such policies being fiscal policy. The primary roles of fiscal policy include macro-economic stability, market failure correction and income redistribution. Fiscal sustainability concerns due to increasing debt levels have arisen post the Great Recession and underpin most austerity considerations. Such

¹⁷ Although within country inequality is still very much on the increase, global inequality between countries has decreased.

¹⁸ Although inequality levels are highest in the Middle East, growth is most rapid in the US, China and India whilst moderate in Continental Europe and steady in the Middle East, Sub-Saharan African and Brazil albeit at tremendous high levels (wid.world 2018).

considerations in recent times have led to a resurgence of contentious sentiments with particular regards as to the economic consequences of such actions thereby further reigniting the austerity debate.

On the one hand, the debate has focused on the effect of austerity on national output with different strands of the literature putting forward evidence for contractionary and expansionary effects - with contractionary effects being associated with output decline and unemployment albeit in the short run. Critical to the “expansionary-contractionary” academic discourse is the method used in identifying changes to the fiscal stance as the two popular methods in the empirical literature - the Cyclical Adjusted Primary Balance (CAPB)¹⁹ and the Narrative approach²⁰ seem to yield contradictory results – with a large strand of the literature (e.g. IMF 2010; Guajardo et al. 2011; Calcagno 2012; Holden and Midthjell 2013; Jorda and Taylor 2015; Brinca et al. 2017; Castro 2018; Breuer 2019 and Ciminelli et al. 2019) proffering evidence that the CAPB suffers from reverse causality issues and therefore tends to render biased estimates in favour of expansionary effects of austerity. On the other hand, austerity considerations have given rise to attrition wars between conflicting sides (Alesina and Drazen 1991) due to equity and distributional concerns; with regards to equity - as it impacts the lower deciles in the income distribution stream which have a higher propensity to consume and tend to be particularly affected during instances

¹⁹ The CAPB is calculated as the primary balance net the estimated effect arising from business cycle fluctuations on the fiscal accounts (Alesina and Ardagna 1998, 2010, 2013; Guajardo et al. 2011) and is used to measure discretionary changes in fiscal policy based on the premise that since tax revenue and government spending move automatically with the business cycle - once these are cyclically adjusted, any inherent changes in the fiscal variables reflects policy makers decisions to adjust taxes and government spending; therefore a rise in the CAPB would therefore denote a deliberate policy of fiscal adjustment.

²⁰ The narrative approach (pioneered by Romer and Romer 2010) employs an action-based methodology to identify specific instances in which policy actions intended to reduce budget deficits have been announced and implemented by utilising several narrative (historical) sources in order to correctly identify and categorise these episodes.

of austerity implementation (IMF 2017). With regards to distributional concerns – because improving the fiscal stance can involve either acting on the expenditure side, revenue side or a combination of both; and regardless of which side, such actions tend to have distributional consequences as reported in the extant literature (see for instance Mulas-Granados 2005; Agnello and Sousa 2011, 2012; Ball et al. 2013; Woo et al. 2013; Furceri and Loungani 2013; IMF 2014; Clements et al. 2015; Jalles 2017; Brinca et al. 2020; Paulus et al. 2017; Heimberger 2020) which show that government’s fiscal adjustment decisions tend to have adverse distributional consequences especially through the labour income share and employment transmission channels (since government’s spend cuts in form of public sector wage and job cuts tend to adversely affect the share of income which accrues to labour as well leads to an increase in unemployment levels). The impact of these adjustment programmes on income inequality can be affected by the composition, magnitude, timing and duration of these adjustments as well as the prevailing economic conditions during adjustment implementation.

In recent years, although, growing interest as to the distributional consequences of fiscal adjustments has led to a surge in the output of literature on the subject – the dynamic consequences of fiscal adjustments on income inequality is an area in the literature which is comparatively understudied and pertain mostly to the short- and medium-term outlook. Seminal work in this area as seen in Ball et al. (2013) – and subsequently Furceri et al. (2016); Bova et al. (2018) and Heimberger (2020) explore these and provide empirical support for dynamic adverse effects – albeit only for the short and medium terms. Relatedly, Woo et al. (2013) in exploring the distributional impacts of adjustments through the lens of the composition and magnitude of fiscal adjustments note that large-sized expenditure-based adjustments (typically those greater than 1.5%

of GDP) tend to worsen income inequality and are long-lasting in duration with impact only receding by the 10th year of adjustment implementation.

This study contributes to the extant literature by exploring the far-reaching effects of fiscal consolidation episodes on income inequality and the fiscal channels (i.e. spend or revenue) driving these impacts in order to enable us to effectively assess how long *and by how much* these linger into the future – since a strand of the literature (see for e.g. IMF 2014) shows that those at the bottom of the distribution ladder tend to be more disproportionately affected during instances of fiscal adjustments. Evidence such as this, would crucially add to the discourse by enabling policymakers balance equity-efficiency trade-offs during austerity considerations. This study, furthermore, explores the adjustment size-inequality nexus by assessing and effectively comparing the dynamic effects of fiscal adjustments for countries with large sized consolidations vis-à-vis countries with small sized consolidations. By deriving impulse response functions from local projections (based on the Jorda 2005, 2009 methodology) and utilising data for a panel of 16 OECD countries over a 40-year period (1980 – 2019), we provide novel evidence suggesting that: (i) government’s adjustment decisions tend to have persistent adverse distributional effects which last up to the 15th year of adjustment implementation with inequality increasing by 0.21, 0.49 and 0.5 percentage points in the short (3rd year), medium (7th year) and long-term (15th year) respectively (iii) adverse effects appear to be more persistent for the Bottom 40 with peak point estimates at the 15th year higher than previous peak estimates held at the 5th period and (iii) adverse dynamic effects are lagged and typically absent in the short to medium term in small-sized adjustment countries whilst the opposite holds for large-sized adjustment countries. Furthermore, by making use of a wider selection of inequality indicators - Gini, Labour income share, Top income share (comprising the Top 1 & 10), Middle income share and, Bottom income share

(comprising the Bottom 40 and the Palma ratio to capture the dynamics at the bottom of the distribution) - than previously used in the extant literature we also establish - the distributional points that are particularly affected by government's fiscal adjustment decisions.

The rest of the study is organised as follows: Section 2 reviews the literature pertaining to the economic effects of fiscal consolidations whilst Section 3 expounds upon the econometric strategy adopted in this study. Section 4 presents the empirical estimates as well as discusses the results whilst Section 5 provides some concluding remarks as well as highlights potential limitations.

3.2 Literature Review

Austerity concerns post the expansionary fiscal policies undertaken during the 2007/8 financial crisis have led to a resurgence of the debate surrounding fiscal adjustment. The trajectory of the austerity debate in the last few decades has been largely driven by: (i) the theoretical concepts governing austerity and relates to the fiscal strategies that should be pursued during recessionary times with the over-arching issue being "*Austerity or Stimulus*" and more recently (ii) the economic and distributional effects pertaining to the implementation of Austerity.

3.2.1 Theoretical considerations

With regards to the theoretical construct, the main views guiding the discourse are broadly classified into two strands:

(a) demand side theories comprising of the Keynesian and Post-Keynesian views – call for government's intervention through fiscal and monetary policies especially during times in which economic resources are extremely under-employed in order to spur output growth in the economy by targeting aggregate demand. Specifically, the Keynesian view maintains that during

recessionary times (slumps), expansionary fiscal policies should be undertaken in order to grow output by stimulating aggregate demand. Austerity, on the other hand, produces deep contractions with adverse multiplier effects on aggregate demand and therefore should be a policy tool reserved for the top of the business cycle i.e. during boom times in order to prevent the economy from overheating as a result of rising prices spurred by excess demand.

(b) supply side theories comprising of the neoclassical and neoliberal views – call for limited government intervention by way of reduction in government's deficit spending; rather promulgate deregulation, privatisation and free interplay of market forces as ways of restoring the economy to equilibrium. In addition, they posit that government's discretionary spending tends to crowd out private investment by way of increased interest rates thereby leading to adverse growth effects on the economy. On the other hand, when governments embark on a deliberate effort to reduce their deficits by way of austerity measures, these could have positive effects on interest rates, build investors' confidence thereby spurring private investment with attendant expansionary effects on output in the short-term.

The Post-Keynesian view which is more recent than the other concepts and premised on the Keynesian view, disputes the role of rational expectations, business confidence and monetary policy in promoting output growth – rather maintain that monetary policy in the form of low interest rates are insufficient in stimulating economy recovery and growth; economic agents are budget constrained and do not base their current consumption on expectations of future changes to their lifetime income; austerity pursuit rather than promoting growth therefore tends to cause a decline in aggregate demand which aggravates persistent and long-term unemployment as well as a deterioration in business confidence. Instead, they advance the pursuit of expansionary fiscal

policies as vital tools to spur aggregate demand especially during instances of weakened demand resulting from economic recessions.

3.2.2 Distributional aspects of fiscal adjustment

In so far as distributional effects are concerned, since improving the fiscal stance involves either acting on the revenue side, expenditure side or both sides, by employing both the CAPB and narrative methodologies to identify instances of fiscal adjustments, the inequality literature (see for instance Agnello and Sousa 2011, 2012; Elson 2013; IMF 2014; Ciminelli et al. 2019) provides evidence showing that fiscal adjustment programmes tend to have regressive distributional effects in the short and medium-term especially through the wage and unemployment channels. *On the revenue side*, actions targeted at higher labour tax (direct tax) could lead to an increase in income inequality since they tend to decrease net wage thereby affecting the disposable income of households especially those with low earnings. Consistent with this, the IMF (2014) notes that since low-income households have a higher marginal propensity to consume, their disposable incomes tend to be more disproportionately affected during instances of fiscal adjustments. In furtherance, increase in direct taxes could also lead to an increase in unemployment thereby leading to an increase in inequality if they produce a substitution effect (Ciminelli et al. 2019) or through recessionary impacts resulting from their indirect effects (Woo et al. 2013). On the other hand, *actions on the expenditure side* – particularly those targeted at public sector job and wage cuts tend to lead to an increase in inequality. To the extent that public spend cuts result in lower public sector employment (or lower wages), this could lead to increased labour supply in the economy and therefore a depression of private sector wages thereby increasing inequality. Consistent with this, the literature (for instance, Ball et al. 2013; Woo et al. 2013; and Bova et al. 2018) note that short and medium term increases in inequality particularly via the unemployment

channel causes persistent long-term unemployment with significant and long-lasting negative effect on labour's share of income. Specifically, they note that approximately 15-20% of increases in income inequality is particularly through the unemployment channel. In furtherance, the IMF (2014) emphasises that unskilled wages fall relative to skilled wages since employers tend to show a preference for skilled labour over unskilled labour – thereby worsening the distributional impacts for those at the lower end of the distribution ladder. Other considerations - which have benefitted from extensive discourse in the literature - through which fiscal adjustments impact on income inequality include the magnitude, duration and pace of these adjustments as well as the prevailing economic conditions during adjustment implementation.

With recourse to the above, the dynamic effects of fiscal consolidation episodes on income inequality is an area comparatively under-researched in the extant literature. Seminal work in this area as can be seen in Ball et al. 2013 explore these using a panel corrected standard error fixed effects model i.e. PCSE model and impulse response functions from local projections (likewise Furceri et al. 2016; and Bova et al. 2018) and provide empirical support for dynamic adverse effects – albeit only for the *short and medium terms*. Woo et al. (2013) on the other hand, utilise a univariate autoregressive model (lagged up to two places) to estimate impulse response functions - and find that large-sized expenditure-based adjustments (typically those greater than 1.5% of GDP) tend to worsen income inequality, are long-lasting in duration with impact only receding by the 10th year of adjustment implementation. In recent times, Heimberger (2020) similarly explores the short and medium termed dynamic impact of fiscal adjustment episodes on income inequality (by also estimating with the PCSE fixed effects model and deriving impulse response functions from local projections in order to foster comparability with the literature) and adds to the literature

by extending the data to cover a longer period up to 2013 and investigating whether the dynamic impacts are dependent on the size, duration, and timing of the business cycle.

Since the academic discourse has mostly focused on the *short-term effects* of the austerity policy, it becomes crucial to explore the dynamic distributional *long-term effects* in order to assess how long these linger into the future; and also the fiscal channels (i.e. spend or revenue) driving these and the income distribution points particularly affected by these decisions – evidence such as this would crucially add to the discourse enabling policymakers to balance equity-efficiency trade-offs during austerity considerations; since the IMF (2017) notably shows that a reduction in inequality might positively impact economic growth since the poor tend to have a higher marginal propensity to consume. Following on therefore from the existing studies, this study sets out to explore the far-reaching effects of fiscal consolidation episodes on income inequality by making use of a wider selection of inequality indicators than previously used in the extant literature. Furthermore, this paper also explores the adjustment size and inequality nexus by assessing the dynamic effects of fiscal adjustments for countries with large sized consolidations vis-à-vis countries with small sized consolidations. In this direction, the following hypotheses will be explored:

H₁: Fiscal adjustments have far-reaching consequences on income inequality

H₂: Dynamic consequences are the same for countries with large-sized adjustments and countries with small-sized adjustments.

3.3 Econometric Strategy

The ensuing methodological approach as seen from the strand of seminal literature which investigates (explores) the dynamic impact of fiscal consolidation episodes on income inequality

is premised on the empirical framework of Jorda (2005) in which impulse response functions (IRFs) are estimated using local projections. Although traditionally, IRFs can be derived from a panel vector auto regression (PVAR) model, however due to limitations associated with identification and non-linearity issues with regards to the first – correlation problems relating to the VAR shocks make it difficult to estimate dynamic responses thereby creating the need to orthogonalise the shocks in order to make them uncorrelated²¹ (Jorda 2005; Brugnolini 2018; Ronayne 2011); and with regards to the second - *non-linearity problems* relating to the time horizon for as the horizon increases to time periods greater than one, the polynomial functions also increase. The IRFs from local projections proffer an alternative intuitive methodology since it estimates new regressions that are peculiar and local for each subsequent time horizon by shifting the endogenous variables used in the regressions forward to their lag values - thereby making each projection local to its time horizons. Therefore the advantages for the IRFs from local projections include: (a) robustness to misspecification in the data gathering process; and (b) simplicity for inference purposes without the application of tasking numerical calculations. Following on from the extant literature, dynamic effects are estimated from IRFs of local projections.

3.3.1 Data

The data used to evaluate the hypotheses covers a span of 40 years from 1980 to 2019. The panel of countries selected is guided by fiscal adjustment data availability based on the chosen methodology i.e. the narrative approach for identification of fiscal adjustment episodes – and therefore is limited to 16 OECD countries – Australia, Austria, Belgium, Canada, Denmark,

²¹ This can be achieved by imposing restrictions on the VAR model in order to put it in a structural form - SVAR (Jorda 2005; Brugnolini 2018; Ronayne 2011). However, since there is no uniform methodology (there are various techniques such as the Wold causal chain, sign restrictions) in which this structural form can be attained, the simplicity of the VAR for IRF estimation becomes increasingly removed (Ronayne 2011).

Finland, France, Germany, Ireland, Italy, Japan, Portugal, Spain, Sweden, United Kingdom and the United States of America. In testing *Hypothesis 2*, the panel of countries is categorised into two according to the magnitude of adjustments implemented relative to GDP i.e. countries with large sized adjustments vis-à-vis countries with small sized adjustments. This is in line with Perotti (2011) that countries in similar situation are best grouped together for analysis. Fiscal Adjustment data includes the episodes of fiscal adjustments implemented post the Great Recession while the income inequality data covers the evolution time frame (1980) of global rise of the income inequality trajectory up to 2019 - this is because *post 2019* inequality indicators might simultaneously reflect the impact of the COVID-19 pandemic as well as the expansionary policies pursued by fiscal authorities in a bid to manage the fiscal consequence arising from the pandemic thereby rendering potentially biased estimates.

3.3.2 Income inequality data

In their respective papers, Ball et al. (2013), Woo et al. (2013), Furceri et al. (2016) and Heimberger (2020) use the Gini coefficient for market and disposable income obtained from the Standardised World Income Inequality Database (SWIID) as inequality indicators. While the advantages for this data source as elaborated by Woo et al. (2013) and Heimberger (2020) include: (i) harmonized data measurement across countries (ii) coverage and availability of long-term data series and (iii) comparability and transparency of the data collection process; Furceri et al. (2016) however, highlight concerns about the SWIID data source which border on the excessive use of data interpolation and assumptions to fill in missing blanks in the data gathered. They, therefore, as a result, also make use of alternate inequality indicators such as: (i) the shares of wages and profits in GDP obtained from the Organisation for Economic Co-operation and Development (OECD) analytical database; (ii) the Gini coefficient for disposable income obtained from OECD

Statistics and; (iii) the “all the Ginis” indices compiled by Milanovic (2014) which merges several sources into one database.

In this study apart from the Gini coefficient, which is widely used in the extant literature, additional inequality indicators (Labour income share, Top 1 & Top 10, Bottom 40, Mid 40 and the Palma ratio) are also incorporated in order to elicit a more holistic picture as well as to check the robustness of initial estimates. Although the Gini is one of the most widely used measures of inequality, it has been criticised for often downplaying shifts at the top and bottom of the distribution (Cobham and Sumner 2013). Consistent with this, significant findings in the inequality literature pertain to the evolution of top income shares and their corresponding impact on income distribution (see [wir2018.wid.world](#) for extensive discussion on this and the trajectory of inequality growth in the past few decades). To that end, a rich stream of literature (see for instance Kumhof and Ranciere 2010; Woo et al. 2013) employ the top income share as alternative indicators of inequality. Following the same rationale, top income share ratios (Top 1 and Top 10²²), bottom income ratios which capture the dynamics at the lower end of the distribution (Bottom 40 and the Palma ratio) as well as the labour income share are employed to elicit a more holistic picture and to check the robustness of our initial estimates. Furthermore, in so far as spend-based fiscal adjustments entail public sector job loss and wage cuts,²³ the share of income which accrues to labour becomes significant as an important channel for inequality increase due to potential loss in earnings. Consistent with this, the inequality literature (e.g. Ball et al. 2013; Loungani 2013; IMF

²² Estimated results did not show a significance difference between the Top 1 and Top 10 – and so only results for the Top 1 are presented.

²³ Through multiplier effects, they can also affect private sector wages.

2014) highlights the significance of this indicator as a measure of inequality with Woo et al. (2013) noting that up to 20% of increases in income inequality can be attributed as occurring through the transmission channel of unemployment with impact notably persisting till the long-term. *See Table 1A* in the Appendix for definition of the inequality indicators. Data source used for analysis is from the World Inequality Database (wid.world) because of (i) coverage - being the largest public database for inequality covering 173 countries with observations in some cases dating as far back as 1875 - and; (ii) quality since it makes use of Distributed National Accounts – DINA. Distributed National Accounts “provide annual estimates of the distribution of income and wealth using concepts of income and wealth that are consistent with the macroeconomic national accounts”²⁴ (Alvaredo et al. 2016, p.4). Since national income has a *uniform definition and homogenous method for calculation*, using the distribution of the totality of national income allows for a global comparison of income and wealth inequality across countries.

Traditionally, household surveys and tax records were the methods used to study inequality levels; however because of the growing levels of disparity between these data sets and national income used in the national accounts – it has grown increasingly difficult to analyse issues such as the share of incomes captured by the different percentiles in income distribution (Saez and Lucman 2020; Alvaredo et al. 2021). The WID therefore sets out to reconcile these differences through the use of DINAs since they employ macro and microeconomic aggregates in the computation of income and wealth distribution. Saez and Lucman (2020) in elaborating the virtues of data predictability and comparability of the DINA further note:

²⁴ “The objective is to release homogenous series both on the macro-level structure of national income and national wealth, and on the micro-level distribution of income and wealth, using consistent concepts and methods. By doing so, we hope to contribute to reconcile inequality measurement and national accounting” (Alvaredo et al. 2016, p.4).

“Distributing the totality of income and wealth allows us to compute income growth rates for the different social groups consistent with the official macroeconomic growth rates, thus bridging the gap between macroeconomic analysis and the study of inequality. This procedure *reduces arbitrariness* compared to approaches that focus on narrower notions of economic resources. In addition, because the macroeconomic aggregates are defined and estimated following harmonized, internationally agreed upon concepts and methods, distributional national accounts should *maximize the comparability of inequality over time and across countries.*” (p.4)

The income inequality data covers a range of 16 OECD countries with average Gini disposable income at 0.359²⁵ and average Gini pre-tax national income at 0.365. The Palma ratio data was obtained from the OECD data bank – however since there was a considerable amount of missing data, interpolation had to be heavily relied on for the missing data points. Since excessive data interpolation tends to give rise to issues pertaining to data quality – consequently, the Top 10 Bottom 50 inequality indicator as obtained from the WID database was preferred as a close substitute; however estimation results based on the two indicators (Palma ratio and the Top10Bottom50) did not indicate a significant difference²⁶. A summary table of the relevant statistics for the inequality indicators can be seen in *Table 2A* while the Gini trend (1980 to 2019) for the countries can be seen in *Figures 1 & 2 in the Appendix*. In conducting robustness checks,

²⁵ Post-tax disposable income Gini data was only available for 12 countries and so pre-tax national income Gini data was relied on for Australia, Canada, Japan and USA; despite the use of these series, they do not detract from the overall trend.

²⁶ And so in the estimated results section, the Top10/Bottom50 are not presented.

missing labour income share for some cross-sections²⁷ was also interpolated in order to obtain a balanced panel.

3.3.3 Fiscal adjustment data

Fiscal adjustment data for the select panel of 16 OECD countries is obtained from the combined adjustment datasets of Devries et al. (2011) and Alesina et al. (2015). Devries et al. (2011) by employing the narrative methodology encapsulate a database capturing: (i) 173 fiscal adjustment episodes for 17 OECD countries over a 32-year period (1978-2009) from several historical sources²⁸ and (ii) the budgetary impact of the identified episodes scaled relative to GDP i.e. measured in magnitude (percentage) of GDP. Alesina et al. (2015) by using the same narrative methodology, extend the Devries et al. dataset (up to year 2014) in order to capture more recent years of fiscal adjustments. Heimberger (2020), in his paper, combines these two datasets in order to include the relevant years not covered by the Devries et al. (2011) dataset. In order therefore to foster comparability, the empirical analysis for this study is built on fiscal adjustment data based on the narrative approach from the combined²⁹ datasets of Devries et al. (2011) and Alesina et al. (2015) – as the latter covers the adjustment period following the Great Recession which is critical to this discourse.

²⁷ Austria, Denmark, Ireland, Portugal and Spain for the period 1980 to 1994; Germany – 1980 to 1989; Belgium – 1980 to 1984; Japan – 2018 to 2019; USA – 2019.

²⁸ Budget reports and speeches, central banks' reports, IMF reports, OECD economic surveys, convergence and stability programs submitted to the Euro Commission, country specific reports (e.g. congressional budget office reports in the US), etc.

²⁹ Since the Devries et al. (2011) dataset covers adjustment episodes up to 2013, this study makes use of Alesina et al. (2015) dataset from 2010 forward to 2014.

The countries are further categorised into two – according to the magnitude of fiscal adjustments scaled relative to GDP. Large-sized consolidations are those considered greater than 1.5% of GDP (Woo et al. 2013). An overview of the combined adjustment dataset for the select panel of 16 countries is reported in *Table 3A in the Appendix*.

3.3.4 Methodology

In the relevant stream of literature pertaining to this study, the authors³⁰ estimate a panel corrected standard error (PCSE) fixed effects regression model and thereafter employ the associated beta coefficients to estimate impulse response functions from local projections. Nevertheless, as first steps, we estimate a panel ARDL model and thereafter estimate an OLS regression (via a var model) from which the derived beta coefficients are used to estimate IRFs from local projections. We follow this direction since a core concern in regression modelling revolves around the issue of endogeneity within a dynamic framework. The fixed effects model³¹ whilst useful in addressing heterogeneity issues does not address these issues. However, although the literature assumes the exogeneity of the adjustment size variable due to the methodology (narrative approach) used in identifying them – nevertheless we address them by adopting the panel ARDL with the *pooled mean group estimator* which is able to assuage endogeneity issues if sufficient lags are applied to the variables. In addition, they are less sensitive to outliers in data particularly when the cross sections are not large (Pesaran et al. 1999). Furthermore, since the panel ARDL includes the lags of the dependent variable and the independent variables in the regression equation – it is able to capture the time series dynamics and therefore provides a more accurate estimation of the long-run relationship between the variables following the implementation of a fiscal adjustment

³⁰ Heimberger uses a Driscoll Kraay standard error

³¹ With the PCSE and Driscoll Kraay standard error

programme. The ARDL model is therefore called a dynamic heterogeneous model because it captures the time-varying relationships between variables and recognises the persistence of past effects on the current values of the variables. However, since Ball et al. (2013) and Heimberger (2020) note that the IRFs derived from the coefficients of the panel ARDL tend to be sensitive to the number of lags thereby rendering them potentially unstable, we have consequently estimated IRFs from local projections by constructing an OLS regression (using a var model – since it treats all variables as endogenous and therefore is robust in assuaging endogeneity issues). The generalised panel ARDL model is expressed as follows:

$$Y_{i,t} = \sum_{j=1}^p \partial_i Y_{i,t-j} + \sum_{j=0}^q \beta'_{i,j} X_{i,t-j} + \gamma_i + \varepsilon_{i,t} \quad (3-1)$$

where $Y_{i,t}$ is the dependent variable and a measure of income inequality³² for country i at time t ; ∂_{ij} is the coefficient of the lagged dependent variable and also a scalar; $X_{i,t}$ is a $k \times 1$ vector of regressors that could be integrated at order 0, order 1 or co-integrated and includes: the fiscal adjustment size and a dummy variable that takes the value 1 (one) to correspond to the start date of each fiscal adjustment episode in country i at time t and zero (0) otherwise; $\beta'_{i,j}$ are $k \times 1$ coefficient vectors of unknown (undetermined) parameters; γ_i are the group (country) fixed effects with time invariant properties.....; p, q are optimal lag orders and $\varepsilon_{i,t}$ is the error term.

In order to estimate the long run coefficients of the regressors, Equation (i) is re-

³² These are the measures of inequality earlier highlighted and include the Gini, ratios and labour income share.

parameterised to reflect the long-run (transformation) information for the model – the Error Correction Term (ECT) and is referred to as the *re-parameterised ARDL* ($p, q, q, \dots, q$) as seen below:

$$\Delta Y_{i,t} = \Theta_i [Y_{i,t-1} - \lambda'_i X_{i,t-j}] + \sum_{j=1}^{p-1} \hat{\alpha}_{ij} \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta X_{i,t-j} + \gamma_i + \varepsilon_{it} \quad (3-2)$$

where $\Theta_i = -(1 - \hat{\alpha}_i)$ is the group-specific speed of adjustment coefficient and is less than 0 (and ranges between -1 and -2); $[Y_{i,t-1} - \lambda'_i X_{i,t-j}]$ is the Error Correction Term (ECT) which represents the Long Run (LR) information for the model and also represents the speed at which any deviation occurring in the system (ignoring any other short-term deviation) will take to return to long run equilibrium ; λ'_i is the vector for LR relationships; and $\hat{\alpha}_{ij}$; β'_{ij} are the Short Run (SR) dynamic coefficients. In selecting the lag structure for the SR components, the automatic optimal lag structure as generated by the econometric software package (EViews) based on the AIC criterion is relied on.

In addition, in estimating the baseline regression, three categories of regressors corresponding to the fiscal adjustment regressor were introduced *separately and distinctly* in order to further assess if the results would vary or remain the same: a binary or dummy regressor to indicate the fiscal adjustment episodes (ii) a continuous regressor i.e. the adjustment size and (iii) an interaction regressor³³ i.e. the dummy regressor as the slope of the adjustment size.

³³ Results seem to indicate that outcomes on the interaction terms and adjustment size were more or less the same and so these are not presented. Additionally, the results for the dummy fiscal adjustment episodes are not discussed separately and are relegated to the appendix.

The Variables:

A set of variables which can impact on inequality distinctly and also influence the outcome of adjustment programmes on inequality are introduced in the model in order to mitigate against omitted variable bias. In analysing the effect of austerity on output, Perotti (2011) and Agnello et al. (2013) in their respective papers, find that the prevailing macroeconomic conditions of a country can impact on fiscal adjustments; Woo et al. (2013) and Heimberger (2020) examine and also maintain the same stance on the side of inequality. Consequently, and in line with the literature a set of macroeconomic variables which can impact inequality and also influence the outcome of adjustment programmes is introduced in order to mitigate biases arising from omitted variables and endogeneity. This includes *inflation* - because rising prices tend to affect (negatively impact) the incomes of the bottom cadre thereby increasing inequality (Woo et al. 2013; Ball et al. 2013). It also tends to erode the debt stock and can consequently affect the success of an adjustment programme by reducing the duration (Agnello et al. 2013); *unemployment* - rising and prolonged unemployment rates tend to increase income inequality (Woo et al. 2013; Ball et al. 2013; IMF 2017; wir2018) while decreasing rates tend to have the opposite effect by decreasing the effectiveness of fiscal adjustment programmes as a result of positive growth on government revenue; *GDP growth and trade openness* (calculated as the sum of total exports and imports of goods and services scaled to GDP) follow the traditional Kuznets curve trajectory: as the degree of trade openness grows, inequality grows, peaks and is expected to gradually fall (Chancel et al. 2017; IMF 2017; wir2018). On the other hand since trade expansion and GDP growth have a linear relationship with government revenue, the gains therefore associated with growing revenues tend to impact and also shorten the duration of fiscal adjustments. *Interest rate* was also initially

considered as a control variable but it was dropped from the model since results indicated there was an issue of multicollinearity.

3.4 Estimation of Results

Prior to estimating the baseline panel regression, standard diagnostic tests such as – stationarity, heteroskedasticity and correlation - were performed to ensure the viability (fitness) of the variables used in the model. In conducting the *stationarity* test, a summary of different measures (test types) was adopted for robustness purposes in order to mitigate against the limitations associated with any particular test and maximise the gains from each test type; for example, the Im Pesaran Shin (IPS) assumes that the regression slopes are heterogenous while the Levin Lin Chu (LLC) test assumes that they are homogenous. The result showed that all the variables were either stationary at levels (0) or at first difference (1). *Correlation* tests revealed that there were no signs of multicollinearity among the regressors. A summary of these results can be seen in *Table 3*.

3.4.1 Hypothesis 1: Long-term distributional effects on income inequality

The results from the baseline regression are first of all scrutinised before looking at the dynamic effects of IRFs from Local Projections. In order to ascertain the long run dynamics for the inequality indicators when fiscal adjustment decisions are embarked on, model selection for the baseline panel regression is based on the default Akaike Information Criterion (AIC) and total number of models evaluated for optimal lag selection is 16. A synopsis of the results for significant inequality indicators observed for the whole data panel indicate the following:

Gini Coefficient: results here suggest a one percent increase in the adjustment size seems to be associated with a short run decline (0.538 percentage point (ppt) at the 5% significance level) and a 0.523 percentage point increase in long-term inequality at the 1% significance level.

Furthermore, this increase in inequality is seen to manifest through the tax channel with inequality increasing by 0.638 percentage point. Although the inequality literature finds that tax-based adjustments tend to have a more moderating effect – this is however dependent on the type of tax i.e. direct or indirect and nature of the tax i.e. progressive or non-progressive. For instance, Bova et al. (2018) find that indirect taxes such as VAT seem to result in adverse distributional effects for budget constrained households while Ciminelli et al. (2019) find that via the operation of substitution effects, direct taxes tend to cause an increase in inequality.

Ratios & Labour income share: Estimates are also indicative in the long run for increase (0.374ppt) in income disparity occurring through the *Top1 indicator*, however, for transmission via the spend channel. To the extent that cash and in-transfers are more beneficial to those at the bottom of the distribution, then spend cuts targeted at these as well as public sector job & wage cuts - tend to impact and hurt those at the bottom of distribution. Consonant with this, we see the impact from job and wage cuts further reflected in the estimate for the *unemployment variable* which is also indicative of long run increases of 0.406. For the *labour share specification*, sharp increases in inequality (up to 3.981ppts) as a result of income share loss are also observed via the spending channel. In the same manner, we note that long-run increases in inequality can also be witnessed for the *Palma* indicating that during spend-based adjustments, disparities between the Top10 and Bottom40 widen by as much as 0.921. This result is not surprising since a widening of the income gap can be seen occurring via top income share. Although, these results are indicative for the long run while the short-run coefficients are largely insignificant, a look at country short-run specifics for instance for the Top 1 specification - is equally suggestive of a short run increase in inequality for six of the countries (inclusive five of the countries with notably large sized adjustments - Belgium, Ireland, Italy, Portugal and Sweden); however, the US is also suggestive of inequality

increase. Intuitively, this result for persistence in the US for both the short and long run might not be surprising if one considers that a strand of the literature (e.g. Kumhof and Ranciere 2010; van Treeck and Sturman 2012) has linked the global financial crises which emanated from the US as a consequence of increased inequality. Furthermore, Brinca et al. (2020) note that high income inequality tends to amplify the recessive effects of fiscal consolidation. In this regard, implementation of fiscal adjustment policies would therefore fuel already existing perennial inequality with noticeable impacts both for the short and long run. See summary of significant result for the panel ARDL in *Model 1, Table 3-1*.

Robustness Check:

Alternative models (Driscoll Kraay fixed effects and pooled OLS) used for robustness checks indicate that the labour share and Top1 results are in line with what was established previously by the long run estimate, i.e. inequality increases significantly with the size of the adjustment. Other inequality indicators are further introduced but are not reported for economy of space - and show that our findings are robust with alternative inequality indicators. For instance, the MID40 (which captures the median income distribution) is also significant for the pooled OLS and is suggestive of adverse distributional consequences with increases in inequality seen operating through both the spend and tax channels – albeit with larger increases occurring via the spend channel. As such, this finding relating to the median class would appear quite intuitive considering the evidence in the extant literature that the median class has also lost earnings in recent years (Atkinson 1999, Dobbs et al. 2016). See summary result for the Driscoll Kraay fixed effects model in *Model 2, Table 3-2*. For full results with the control variables, see *Models 1 and 2 in Appendices D and*

Table 3. Diagnostic Tests – Unit roots and Correlation

VARIABLES	Panel unit root test: Summary				
	Levin, Lin & Chu t*	Breitung t-stat	Im, Pesaran and Shin W-stat	ADF - Fisher Chi-square	PP - Fisher Chi-square
	Prob.**				
GINI	0.065	0.019	0.017	0.022	0.000
D(LABOUR SHARE)	0.000	0.000	0.000	0.000	0.000
D(TOP 1)	0.000	0.000	0.000	0.000	0.000
D(TOP10)	0.000	0.000	0.000	0.000	0.000
BOTTOM40	0.002	0.045	0.002	0.001	0.000
D(BOTTOM50)	0.000	0.000	0.000	0.000	0.000
D(PALMA RATIO)	0.008	0.000	0.000	0.000	0.000
TOP10BOTTOM50	0.020	0.001	0.012	0.020	0.000
D(MID40)	0.000	0.000	0.000	0.000	0.000
ADJUSTMENT SIZE	0.000	0.000	0.000	0.000	0.000
SPEND	0.000	0.000	0.000	0.000	0.000
TAX	0.000	0.000	0.000	0.000	0.000
INFLATION	0.000	0.306	0.000	0.000	0.000
UNEMPLOYMENT	0.009			0.002	0.268
TRADE	0.000	0.003	0.025	0.098	0.505
GDPG	0.000	0.000	0.000	0.000	0.000

	Correlation Test				
	Adjustment Size	Inflation	Unemployment	Trade	GDPG
ADJUSTMENT SIZE	1				
INFLATION	-0.042	1			
UNEMPLOYMENT	0.3335	0.0494	1		
TRADE	0.1216	-0.1464	0.0677	1	
GDPG	-0.2362	-0.0175	-0.0449	0.1675	1

Table 3-1 Model 1. Full country sample – Panel ARDL Model Summary of estimation results

Panel ARDL - Full Country Sample								
	Gini		Labour Share		TOP 1		Palma Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Long Run Coefficients								
ADJUSTMENT SIZE	0.00523***	0.0020	-2.3106***	0.2074	-0.00224	0.0016	0.1000**	0.0434
SPEND	0.00418	0.0036	-3.9813***	0.3233	0.00374**	0.0017	0.9210***	0.1890
TAX	0.00638**	0.0030	11.5121	1.3188	-0.00859	0.0042	-0.5002***	0.0596
INFLATION	0.00239***	0.0005	0.0427	0.0818	-0.00146***	0.0004	0.0234	0.0146
UNEMPLOYMENT	0.00675***	0.0005	0.4425***	0.0912	0.00406***	0.0007	0.0509***	0.0148
TRADE	0.00217***	0.0001	-0.1758***	0.0086	0.00152***	0.0001	0.0022	0.0016
GDPG	0.01996***	0.0012	-2.6358***	0.2499	0.00798***	0.0011	-0.0204	0.0254
Short Run Coefficients								
ADJUSTMENT SIZE	-0.00538**	0.0022	0.3678**	0.1452	-0.00278	0.0018	0.0042	0.0040
SPEND	-0.00402*	0.0023	0.4093	0.2635	-0.00217	0.0016	-0.0076	0.0076
TAX	-0.01726*	0.0089	0.3893	0.5916	-0.00532	0.0036	0.0197*	0.0109
INFLATION	0.00192	0.0017	0.0485	0.0843	0.00194***	0.0005	-0.0014	0.0019
UNEMPLOYMENT	-0.00092	0.0027	-0.3250***	0.1246	0.00069	0.0011	0.0025	0.0019
TRADE	-0.00025	0.0006	-0.0053	0.0374	-0.0007***	0.0002	-0.0004	0.0009
GDPG	-0.00433	0.0029	-0.0146	0.1454	0.00103	0.0006	0.0010	0.0011

Notes: *** = significant at 1% level; ** = significant at 5% level; * = significant at 10% level

Table 3-2 Model 2. Full country sample – Driscoll Kraay Fixed Effects Model Summary of estimation results

	Model 2: Driscoll Kraay Fixed Effects Model					
	Gini		Labour Share		TOP 1	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
ADJUSTMENT SIZE	-0.0005	0.0004	-0.1873**	0.0723	0.00058*	0.00032
SPEND	-0.00085	0.0005	-0.3638***	0.1291	0.00122**	0.0005
TAX	-0.00072	0.0009	-0.1602	0.1334	0.00032	0.0006
INFLATION	-0.00042**	0.0002	0.0322	0.0294	0.00001	0.0001
UNEMPLOYMENT	0.00028**	0.0001	-0.1276***	0.0316	0.00041***	0.0001
TRADE	0.00006	0.0000	0.0040	0.0052	0.00000	0.0000
GDPG	0.00035*	0.0002	-0.2291	0.0555	0.00106***	0.0002

Notes: *** = significant at 1% level; ** = significant at 5% level; * = significant at 10% level

3.4.1.1 Dynamic effects of fiscal consolidations from IRFs of local projections

Since economic variables are prone to fluctuations which could be due to either exogenous or endogenous shocks, economic dynamics reflect fluctuations in the economy which could be sustained or display large oscillations in trend or growth rate (Hommes 2004). In order to estimate the dynamic effects of consolidation programs on income distribution, impulse response functions are derived from local projections (Jorda 2005) for the cross-sections in the panel data - “one of the attractions of an impulse response analysis is the ability to graphically convey statistical information about the dynamic behaviour of the system under consideration” (Jorda 2009, p. 11). Traditionally, IRFs are constructed with marginal error bands; however due to problems of serial correlation which manifest in the coefficient estimates and so affect the trajectory of the impulse responses, the IRFs for this study are constructed using conditional error bands.³⁴

The IRFs are estimated up to the 15th horizon and show the effects of distinct shocks from the total adjustment size as well as the spend and tax-based measures (since this study is also interested in assessing if the composition channels amplify dynamic impacts) on the various inequality indicators. In their paper, Ball et al. (2013) note that IRFs estimated from the coefficients of an ARDL tend to be unstable as a result of lag sensitivity – therefore to avoid this, a multivariate VAR model lagged up to two periods is estimated and the derived coefficients subsequently used to compute IRFs from local projections; the advantage in doing so, is that it allows all the variables to be treated as endogenous. In this regard, Jorda (2005) equally notes that IRFs from local projections are also robust when estimated from ordinary least squares.

³⁴ Jorda (2009) proffers two methods for dealing with serial correlation: Scheffe error bands or conditional error bands. The latter extract the variability caused by the serial correlation by assessing the significance of each individual coefficient.

A visual inspection of the graphs depicts the trajectory of the impulses from the shocks; while the vertical axis measures the divergence (variation) from the pre-shock trajectory, the horizontal axis measures the annual time element, the blue line represents the impulses from local projections and the two red dashed lines are the associated conditional error bands. *A look at the Gini graphs*, (see figures 1 - 2 in panel 1) suggest that a one standard deviation shock (innovation) to the total adjustment size (referred to as *adjsize* in the graphs) causes inequality to rise on impact with resulting persistent effects till the 15th year. Specifically by the 3rd year of adjustments, observed impact is 0.125; by the 15th period the same impact (0.175) observed for the peak period (year 6) is seen prevailing. The robustness of this result is subsequently tested by estimating with different lags and the results do not appear significantly different. Specifically, impact for the short term i.e. 1st period for lag 1 to 4 ranges between 0.07 to 0.08ppt; for the medium term i.e. 6th period, it ranges between 0.175 to 0.18 and; for the long term i.e. 15th period, it ranges between 0.175 to 0.33ppt. It is additionally observed that when a *univariate model* is estimated, the impact on inequality is very similar, however, by the 10th year, the estimated IRFs are at the zero-bound threshold (see figures 5 - 9 in panel 1) – which is consistent with the findings by Woo et al. (2013) since they estimate a univariate model. However, since the multivariate model (the baseline model) includes the control variables, we believe the IRFs produced to be more robust since other drivers for inequality have been controlled.

Impulse Response Function from Local Projections – Full Country Sample

Gini - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel 1

Figure 1

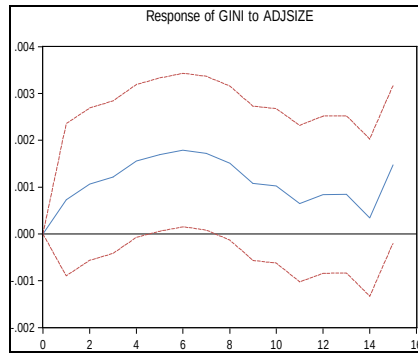


Figure 2

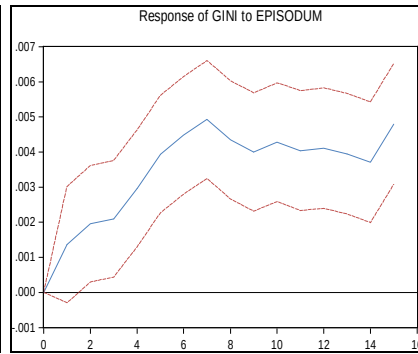


Figure 3



Figure 4

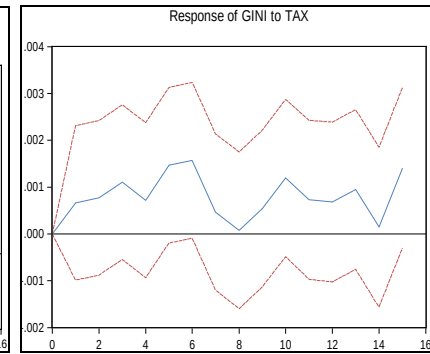


Figure 5

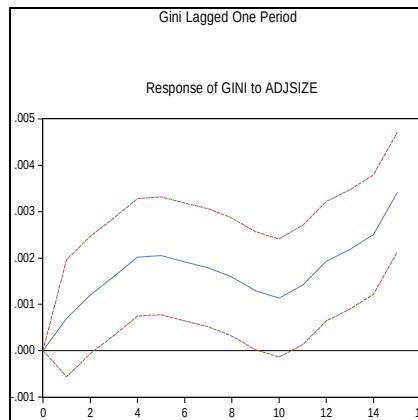


Figure 6

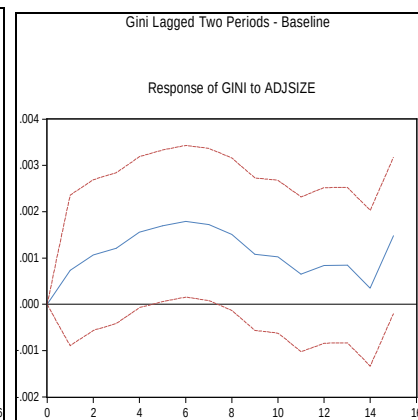


Figure 7

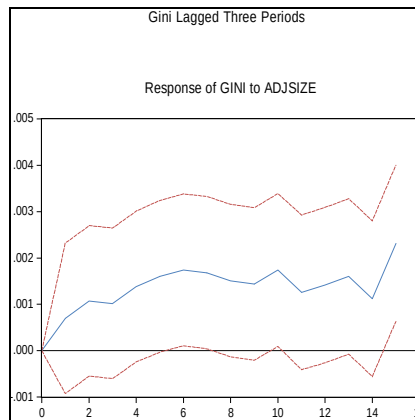
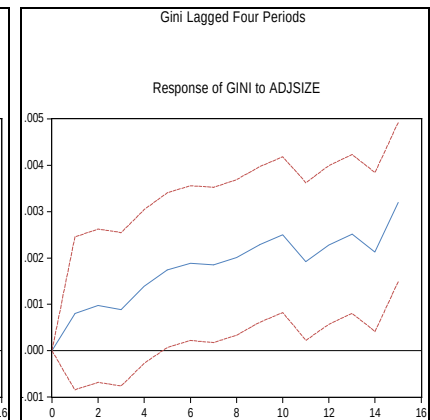


Figure 8

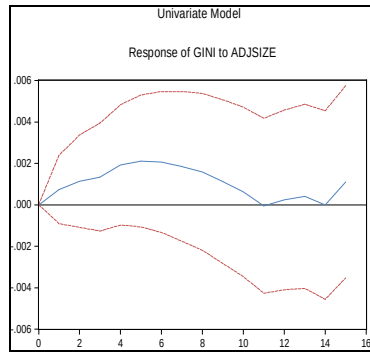


Notes: Red dashed lines = conditional error bands; Blue line = impulses from local projections; EPISODUM = binary or dummy adjustment episode; ADJSIZE = continuous adjustment size variable; SPEND = spend adjustment variable; TAX = tax adjustment variable

BOTTOM40 Income Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel 1

Figure 9



Panel 2

Figure 2

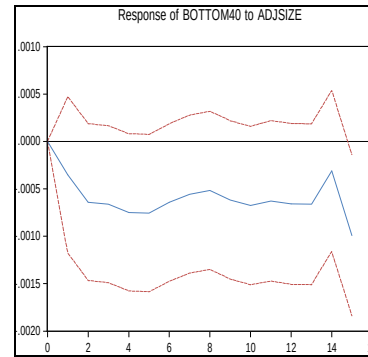
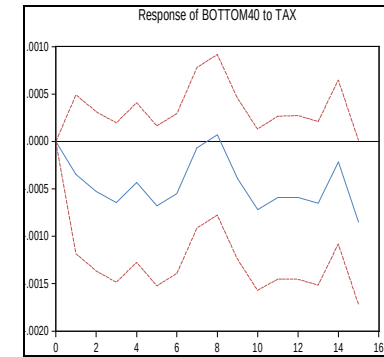
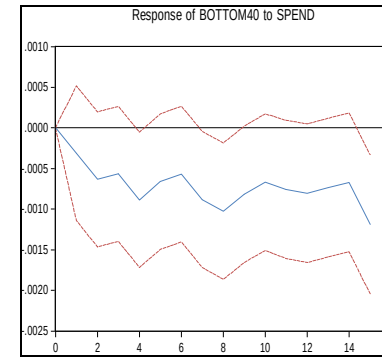


Figure 3



Notes: Red dashed lines = conditional error bands; Blue line = impulses from local projections; ADJSIZE = continuous adjustment size variable; SPEND = spend adjustment variable; TAX = tax adjustment variable

Panel 3

Figure 1

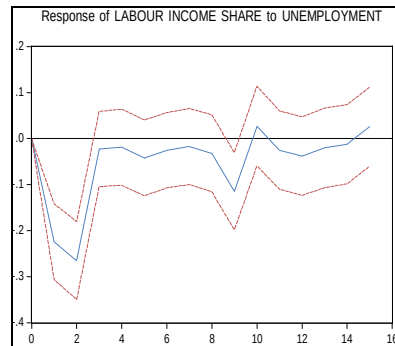


Figure 2



To assess the fiscal channel for pervasive inequality effects, impacts from the spend and tax channels are considered with results indicating that although the dynamic impact is replicated in both channels, increases in inequality appear to be steeper from spend shocks – with peak point estimates at 0.25 and 0.2 by the 8th and 15th year respectively (tax measures are indicative at 0.15 & 0.14 ppt by the 6th & 15th year respectively) See figures 3 - 4 in panel 1. Intuitively persistent dynamic effects might not be surprising if one considers that most adjustment episodes are typically multi-year events (average duration as seen from our sample is 6 years; Canada is the longest at 15 years, followed by the US and Ireland at 9 and 7 years respectively) - since evidence as seen in the extant literature (e.g. Bova et al. 2018; Heimberger 2020) is indicative that adjustments which are long in duration tend to worsen inequality. Furthermore, findings by Bova et al. (2018) that most spend-based adjustments tend to be longer in duration with cumulative impact from the adjustment peaking between years five and six before it gradually starts fading by year 10 - could account for why the dynamic impact from the spend channel on inequality is steeper compared to tax-based instruments. Similarly *for the Bottom 40*, although dynamic effects follow the same trend as the Gini, – however peak point estimates for the 15th year are higher than hitherto peak estimates held at the 5th year. See figures 1-3 in panel 2. In addition, peak point estimates (0.125) are only observed by the 15th year for spend shocks. On the other hand, while dynamic effects *for the top income share and labour share specifications* are not as persistent, however impact from the spend channel is also steeper than that observed when the tax channel is considered (see Appendix III, figures 1 - 9 in panel 2).

Control Variables

Inflation: the results of the baseline panel regression for the Gini and top income share are mixed. While the one suggests that a one percentage point increase in inflation causes long-run inequality to rise by 0.239ppt, the other suggests that it falls by 0.146ppt. In line with economic theory, an increase in inflation rate could cause inequality to increase (as we see reflected in the *Gini*) since it tends to affect more disproportionately the disposable income of lower earning households. Furthermore, inflation could also lower inequality (consistent with our results for the *top income share*) if it causes an increase in the nominal income of top earners thereby leading to *higher payable* taxes. Consistent with these, findings from the extant literature (as seen for e.g. IMF 1998; Yue 2011; Moninn 2014; Law and Soon 2020) suggest that inflation could have ambiguous effects on income inequality depending on the inequality channel. For instance while Monnin (2014) finds that inflation effects for lower income households are moderated by the extent to which government transfers are indexed for inflation; the IMF (1998) further signifies that though earnings that are inflation-indexed fare relatively better than those which are not, thereby causing pre-transfer income disparities to widen, nonetheless in absolute terms, the incomes of both groups tend to fall. Similarly, dynamic consequences for inflation appear to be mixed depending on the inequality specification. While dynamic impact for top income share is significant for a short-run decrease in inequality, income inequality is aggravated by the presence of inflation by up to 0.35 ppts for the Gini and Bottom 40 with adverse distributional consequences commencing from the 3rd period and lasting till the 15th period³⁵ - with point estimates highest at the 15th period. These findings are also consistent with those observed for the baseline regression.

³⁵ impact starts from the 2nd period for the Bottom 40

Unemployment: consistent with the estimates for the top income share as seen in the baseline panel regression, evidence for long run increases in inequality (at 0.325 and 0.051) as a result of spend measures is further observed via the unemployment channel respectively for both the labour share and Palma ratio - albeit in the short run for labour share. However, for the Gini, the evidence points to an impact occurring via the tax model. In so far as tax-based adjustments induce an income substitution effect (Ciminelli et al. 2019), then increases in inequality via the unemployment channel are bound to arise. Results from the IRF – as can be seen for the Gini and Bottom 40 indicate that impacts arising from unemployment are persistent till the 10th year with point estimates peaking between years 6 and 7 at 0.25 ppt. This is consistent with results from Woo et al. (2013) which similarly show that impact on inequality from the unemployment channel only recede by the 10th year of adjustment implementation. However, unemployment results from the labour income share appear to be more persistent for inequality increases – with inequality only returning to the pre-shock threshold by the 14th year.³⁶ The far-reaching effects on inequality could be because as unemployment persists, the position of the unskilled (relative to the skilled) becomes worse-off, further impacting on their ability to return to work thereby causing a structural problem (Glyn 1995) and further entrenching inequality (IMF 2014). Consistent with this position, when the *inequality-unemployment graph* is compared to the graph depicting the distinct effect of adjustment shocks on unemployment i.e. the *unemployment-adjustment size graph*, despite a decline between the 7th and 11th periods, very steep increases with peak point estimates of 0.48ppt are observed in the latter. This result for steep and prolonged unemployment levels from adjustment size shocks would appear consistent with the austerity literature as seen in Alexiou and

³⁶ Although a decline is seen briefly at the 10th period.

Nellis (2016) that fiscal adjustment implementation could produce a hysteresis effect in the economy since they tend to be associated with persistent long-term unemployment. See figures 1-2 in panel 3.

Trade: the literature highlights mixed evidence for effects of trade on inequality. While a strand (e.g. Cerdeiro and Komaromi 2017) advance the notion that improved standards of living as a result of trade openness tends to lower income inequality, another strand (e.g. Monnin 2014; Dorn and Levell 2021) associate increases in inequality as a result of trade to be consistent with economic theory which attribute these increases to globalisation and country endowment factors. Along this line, Monnin (2014) notes in keeping with the idea that trade openness tends to highlight the degree of trade comparative advantage - lower labour costs in developing nations may unintentionally lower the cost of labour in wealthy countries, resulting in widening income gaps. Kuznets theory on the other hand further advances that as the gains of trade become accessible to all, inequality initially increases and subsequently falls. Increase in long-run inequality due to trade openness is associated with the inequality indicators in the baseline panel regression. On the other hand, the IRF results seen for the inequality indicators would seem consistent with Kuznets theory since they appear to indicate a persistent negative association between income inequality and the degree of trade openness.

GDPG: estimates from the baseline panel regression appear to suggest that GDP growth is significant (at the 1% level) for long-run inequality increase of varying magnitude across the inequality indicators. GDP gains in itself is consistent with the cross-country determinants of inequality literature and Kuznets theory as a driver for inequality. Along this line, the OECD (2014) suggests that increases in gdp growth due to skill biased technology change has been a driver for inequality in the past two decades for majority of the OECD countries. IRF findings also

depict a trend of persistent adverse distributional consequences witnessed for the Gini and Bottom 40 specifications with dynamic impacts lasting till the 15th period. Furthermore, Monnin (2014), elaborates that as traditional sectors give way to new ones, the transitional phase tends to be associated with increases in inequality, however once these industries reach their peak or optimal level, inequality decreases. A look at the trajectory of the top income and labour share succinctly captures this notion by depicting a trend (cycle) of initial inequality increase, fall and then increase (see Appendix III, figures 1 - 6 in panel 3).

3.4.2 Hypothesis 2: Comparison between large adjustment sized and small adjustment sized countries

To determine if the long run consequences of fiscal adjustment programmes are affected by the magnitude of adjustment, the countries in the data panel are categorised into two according to adjustment size. In order to do this, period-wise country averages are obtained - large-sized adjustments are considered as those greater than 1.5% of GDP (Alesina and Ardagna 1998; Woo et al. 2013). Accordingly, 7 countries (Australia, Canada, Germany, France, Japan, United Kingdom and the United States of America) fall into the small group while 9 countries (Austria, Belgium, Denmark, Finland, Ireland, Italy, Portugal, Spain and Sweden) fall into the large group. One approach to estimating the baseline panel regression would have been to generate dummy variables to represent both country categories, but this would have resulted in an inability to properly distinguish the effects of the control variable for each country group; as a result, separate estimations were carried out.

Estimated results from the baseline panel regression point to a more pronounced adverse impact for the large adjustment countries compared to the small adjustment ones as both the long run estimates for the Gini and the labour share specifications indicate a significant increase in income inequality. Specifically, findings for the large adjustment size countries are indicative via the tax channel (as well as the spend channel for labour share) with increases of up to 4.076 and 7.308ppts for the Gini and labour share respectively. Although the short run point estimates are not significant for the Gini, a look at the short run coefficients for the individual countries within this category are suggestive of inequality increases (ranging between 0.263 to 1.095ppt) for Portugal, Ireland and Finland. The literature (as seen in for e.g. Agnello and Sousa 2011, 2012; Woo et al. 2013) finds that large-sized adjustments tend to have a more detrimental effect on

inequality; and so this finding for inequality being adversely impacted both in the short and long run for these countries is not surprising since a look at the data shows that they exhibit very high adjustment size averages. Similarly, it is observed that although top income share is indicative for long run inequality *decline*, short-run inequality increase (ranging between 0.037 to 0.9680) via the tax channel can be observed for all the countries in this category apart from Austria and Belgium. Consistent with findings for the full sample, results are suggestive that point estimates for the control variables – *unemployment, trade and gdp growth* - are significant for increases in inequality, albeit marginally than those of the full sample.

On the other hand, results for the *small adjustment sized countries* indicate a long run decline in inequality for both Gini and top income share specifications. Furthermore, while short run point estimates are also significant through the tax channel for inequality decrease for the Gini, they are insignificant for the top income share specification. However, country short run estimates for the latter are indicative for inequality increase³⁷ for all but two of the countries (Australia and the UK). These findings for increases in inequality via the top income share might attenuate to the lack of progressivity of the tax instruments implemented. Furthermore since the austerity literature (e.g. Alesina and Ardagna 1998; IMF 2010) notes that tax-based adjustments are more contractionary on output – this might explain why the duration is short-lived and impact only witnessed in the short run for both country categories. With regards to the control variables, findings indicate that whilst they are mostly significant for only a long run increase, in addition *gdp growth* is significant for both short and long run increase. These results for the country categories are equally robust to the alternative models specification used as robustness checks for

³⁷ Increases in inequality ranging between 0.273 to 3.067 ppts.

the full country sample. *See summary results for the Panel ARDL Model under Model 1 in Table 3-3. For full results with the control variables, please see Models 1 and 2 in Appendices F and G.*

Table 3-3 Model 1. Large adjustment size countries – Panel ARDL Model Summary of estimation results

	Panel ARDL - Large Adjustment Sized Countries					
	Gini		Labour Share		TOP 1	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
	Long Run Coefficients					
ADJUSTMENT SIZE	0.01153**	0.0054	1.4499	1.5656	-0.00344**	0.0016
SPEND	-0.00372	0.0028	-5.3894***	0.7581	-0.00017	0.0025
TAX	0.04076***	0.0118	-7.3079***	0.5670	-0.00643***	0.0024
INFLATION	-0.00843***	0.0011	-0.4936***	0.0633	0.00034	0.00051
UNEMPLOYMENT	0.00634***	0.0011	-0.1400*	0.0760	0.00641***	0.0007
TRADE	0.00160***	0.0001	-0.199***	0.0118	0.0009***	0.0002
GDPG	0.02746***	0.0042	-2.8118***	0.1803	-0.00109	0.0017
	Short Run Coefficients					
ADJUSTMENT SIZE	-0.00368	0.0030	0.0243	0.2664	0.00070	0.0016
SPEND	-0.00219*	0.0013	0.4940	0.4123	-0.00048	0.0021
TAX	-0.00997	0.0069	0.8499**	0.4138	-0.00071	0.0040
INFLATION	0.00220***	0.0005	0.2149***	0.0534	0.00187***	0.0006
UNEMPLOYMENT	-0.00062	0.0023	-0.3281**	0.1265	-0.00126	0.0013
TRADE	-0.00024	0.0003	0.0029	0.0263	-0.00052**	0.0002
GDPG	-0.00457*	0.0024	0.1378	0.2293	0.00124**	0.0005

*** 1% significance level; ** 5% significance level; * 10% significance level

Table 3-4 Model 1. Small adjustment size countries - Panel ARDL Model Summary of estimation results

	Panel ARDL - Small Adjustment Sized Countries			
	Gini		TOP 1	
	Coefficient	Std. Error	Coefficient	Std. Error
	Long-Run Coefficients			
ADJUSTMENT SIZE	-0.04934***	0.0077	-0.08059***	0.0155
SPEND	0.00787	0.0086	-0.00017	0.0025
TAX	-0.02553*	0.0132	-0.28107***	0.0832
INFLATION	-0.00225**	0.0011	-0.00805***	0.0006
UNEMPLOYMENT	0.00021	0.0013	-0.00283***	0.0006
TRADE	0.00145***	0.0002	0.00057***	0.0001
GDPG	-0.00615***	0.0019	-0.00282***	0.0014
	Short-Run Coefficients			
ADJUSTMENT SIZE	-0.00093	0.0042	-0.0020	0.0037
SPEND	-0.00122	0.0041	-0.0005	0.0021
TAX	-0.01492**	0.0062	0.00438	0.0066
INFLATION	0.00222	0.0019	0.0030	0.0023
UNEMPLOYMENT	-0.00253	0.0021	-0.0002	0.0025
TRADE	-0.00101	0.0008	-0.0007	0.0007
GDPG	0.00189**	0.0009	0.00289***	0.0010

*** 1% significance level; ** 5% significance level; *10% significance level

3.4.2.1 Dynamic effects from IRFs of local projections: large adjustment sized countries vis-à-vis small adjustment sized countries

Dynamic adverse impacts for large sized countries appear to be indicative at start of consolidation and persistent on average till the 7th period whilst the opposite appears to be the case for small adjustment sized countries. Specifically, by scrutinising the graphs for the dynamic effects emanating from the IRFs for the large sized adjustment countries, it can be observed that income disparities which last for 15 years (albeit with a four year break – between the 7th and 11th periods) are typically seen for the inequality indicators under consideration. Interestingly, findings further indicate that point estimates (with the exception of labour share) by the 15th period are higher than previous peak levels. Additionally, the findings indicate that adverse effects arising from tax measures are less severe than spend-based measures and generally short-lived.

For the small adjustment countries, dynamic distributional effects are the reverse to that observed for the large-sized countries. Although findings for the Gini are indicative of persistent dynamic effects, however, unlike the large-sized countries - point estimates remain close to the zero-bound threshold. Similar to the large-sized countries, tax-based measures appear to be less severe than spend measures. For the control variables, findings are suggestive that while decreases in inequality can be seen for *trade*, inequality increase is present from the medium term for *inflation*. On the other hand, *unemployment and gdp growth* are persistent till the 15th period; however while peak point estimates (0.3) are observed at the 10th period for unemployment, higher peak point estimates (0.95) are witnessed for gdp growth. The respective IRF figures are incorporated in *figures 1-3 in panels 4 and 5* and can be used to visualize the respective trajectories. *The comprehensive IRF can be seen in the Appendices K and L.*

Large adjustment countries Panel 4

Gini - Response to Cholesky One S.D 95% Conditional Confidence Bands

Figure 1

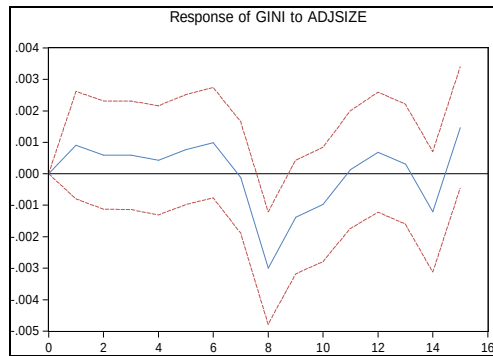


Figure 2



Figure 3



Small adjustment countries – Panel 5

Figure 1

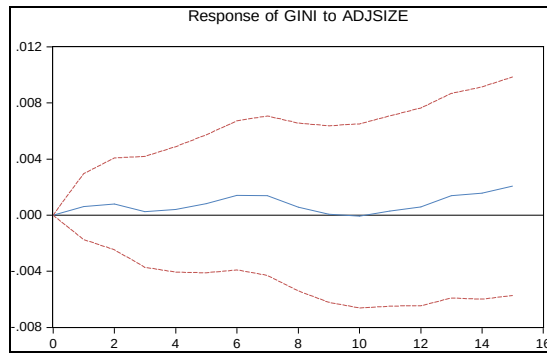


Figure 2

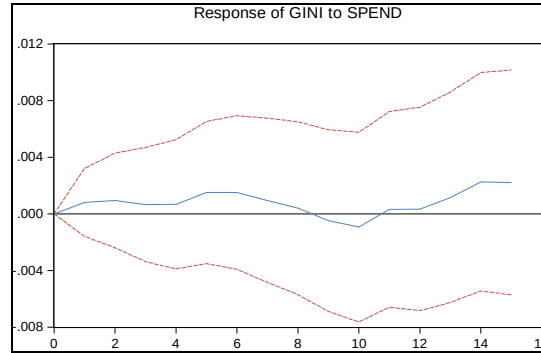
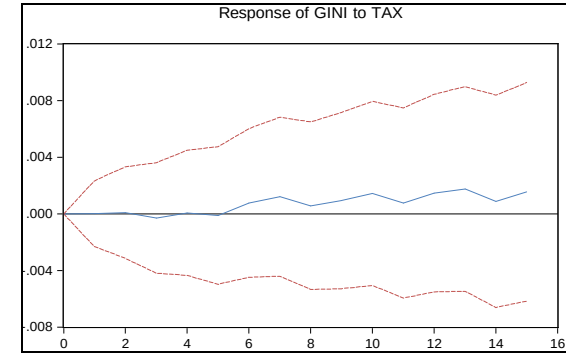


Figure 3



Notes: Red dashed lines = conditional error bands; Blue line = impulses from local projections; ADJSIZE = continuous adjustment size variable; SPEND = spend adjustment variable; TAX = tax adjustment variable

3.4.3 Discussion

In analysing the dynamic effects of fiscal consolidations, the extant literature relies on estimations based on the binary regressor i.e. the dummy adjustment episode variable (see Agnello and Sousa 2012; Ball et al. 2013; Heimberger 2020). Additionally, Heimberger (2020) employs the continuous regressor i.e. the adjustment size variable for robustness checks and finds that the dynamic effects for inequality *increase* are not sensitive to the choice of regressor. Consequently, in assessing the dynamic impact *in hypothesis 1*, in order to ensure comparability with the extant literature, initial estimates will also be on the binary variable for the *Gini*. However, since this study seeks to establish the dynamic effects emitted from the fiscal adjustment measure, the tax and spend channels, as well as *explore the severity* of the dynamic consequences of fiscal adjustments *for country groups* categorised according to adjustment size, the impulses from shocks emanating from the continuous variable for these groups cannot be neglected and therefore are key to this investigation; accordingly, subsequent discussion of our findings will be based on the continuous regressor (i.e. the adjustment size). Therefore, based on the underlying hypotheses driving this research, the synopsis of the key findings are as follows: (i) income inequality tends to rise during instances of fiscal consolidation not just in the short and medium term but also in the long term (ii) adverse effects for the Bottom 40 are long-lasting with point estimates for the 15th year higher than previous peak periods (iii) spend-based shocks tend to be steeper than tax-based shocks.

Specifically, our results suggest that in the short and medium-term (i.e. years 3 and 7), the Gini of inequality tends to increase by 0.21 and 0.49 ppts respectively. These results are consistent

with the findings in the literature: Ball et al. (2013) find that an adjustment of one percent of GDP tends to lead to an increase in short and medium-term³⁸ inequality by 0.1 and 0.9 ppts in years 1 and 8 respectively, Furceri et al. (2016) similarly find for 0.1 and 0.9 ppts, Woo et al. (2013) find for 0.13 (year 2) and 0.4 ppts (year 5) and Heimberger (2020) similarly reports an increase of 0.35 and 0.6 ppts respectively for years 3 (short) and 5 (medium) following the implementation of an adjustment episode. This study also finds long-term inequality at 0.5 ppt by year 15 indicating a sustained persistence in long-term inequality. Specifically, findings are suggestive that adverse effects are present for the Gini and Bottom 40 from the 1st year till the 15th horizon with inequality increases at the 15th year higher for the Bottom 40 than previously established peak levels. Furthermore, since the average Gini in our panel is 39.02, the results are comparative to a growth in inequality by 0.54%, 1.26% and 1.28% in the short, medium and long-term respectively. The finding for long-term inequality is also consistent with results from the baseline panel regressions as evidenced from the distributional outcomes pertaining to the inequality indicators of the Gini *as well as* top income share and labour income share. Correspondingly, Agnello and Sousa (2011) find that income share of the Top 1 increase during and more significantly post consolidation. Findings for labour income share loss is also consistent with literature which finds up to 20% of increases in inequality as occurring via the Labour income share and unemployment channels (Ball et al. 2013; IMF 2014; Bova et al. 2018; Castro 2018; Heimberger, 2020). Notably, the finding that during instances of fiscal adjustments, income share increases for top income share and income loss is suffered by labour is sustained across the methodologies considered for the panel regression.

³⁸ Ball et al. (2013), Woo et al. (2013), Furceri et al. (2016) and Heimberger (2018) in their respective papers classify medium term as occurring up to Year 8.

With regards to the dynamic effects from the adjustment channels, adverse distributional effects appear to persist via both the tax and spend channels. This in itself is not surprising and could allude to the fact that since most of the adjustment episodes seen for our panel are mostly mixed (i.e. a combination of revenue and spend measures) this could therefore account for the persistence since as noted by the wir2022, a mix of instruments tend to amplify the adverse distributional consequences and therefore inadvertently and disproportionately hurt lower income groups. In this light, the obtained results showing persistent distributional disparities for the Bottom 40 would therefore appear consistent with literature. Furthermore, findings further show that adverse effects emanating from spend-based shocks on average tend to be steeper and longer-lasting than tax-based shocks. In particular, findings for the Gini and Bottom 40 are significant for being persistent to the 15th horizon.

For hypothesis 2 – with regards to the dynamic consequences arising for countries with large-sized consolidations the findings for the inequality indicators under consideration are indicative for adverse dynamic consequences which are immediate (i.e. commence on impact), steep and persist averagely till the medium-term (6 years from impact). One could infer that this medium-termed duration could be attributed to its distortionary costs on inequality especially as seen that the effects from the spend channel are steeper than those from the tax channel. Such an argument would seem to be consistent with equity concerns regarding the implementation of austerity measures, as the literature (see for instance IMF 2014; Bova et al. 2018) demonstrates that adjustments that are perceived as fundamentally unfair may be counterproductive. On the other hand, while findings for the small-sized consolidation countries point to longer lasting adverse dynamic consequences (as occurring through both the Gini and Bottom 40) than observed for the large-sized adjustment countries, these are however at near zero-bound thresholds - with

peak point estimates by the 15th period ranging between 0.15 and 0.2ppt for the Gini and Bottom 40. In addition, findings are also suggestive of steeper adverse effects from the spend channel. While this might seem contrary to the evidence shown by the literature (see for e.g. Bova et al. 2018) that dynamic effects of large-sized consolidations are larger than small-sized consolidations, interestingly, a look at the composition of countries under this category indicates that four – notably Australia, Canada, Japan and the US - out of the seven countries under consideration are ranked as highly unequal countries³⁹ based on the Gini ranking and so it could therefore be the case that the dynamic effects on inequality are being magnified by the pre-existing high unequal levels. In addition, it could also be the case that persistent dynamic effects might be as a result of long-tenured adjustment episodes since two of the countries in this category have implemented the longest multi-year events (Canada at 15 years and the US at 7 years) and so persistent effects for the sub-sample might be driven by ‘*key country effects*’ since evidence as shown in the literature (e.g. Bova et al. 2018; Heimberger 2020) is indicative that adjustments which are long in duration tend to worsen distributional effects.

3.5 Concluding remarks and policy implication

While the empirical literature provides evidence pertaining to the short to medium term dynamic effects of fiscal consolidation on income equality, this contributes to the literature by: (i) investigating the long-term dynamic consequences of fiscal adjustments for a select panel of 16 OECD countries by using more recent data (including an encompassing set of alternate inequality indicators); as well as (ii) establishing the extent of dynamic effects via the adjustment channels

³⁹ See the world inequality report 2022 for country rankings

and (iii) finally by exploring whether differences in dynamic effects arise when countries are categorised based on adjustment size.

By employing various models for the baseline panel regression and deriving impulse response functions from local projections based on Jorda's (2005, 2009) methodology to estimate the dynamic distributional effects, the findings that emerge are suggestive of persistent upward trending long-term income inequality with adverse dynamic effects lasting up to 15 years following the implementation of a fiscal adjustment programme. In addition, this study also finds evidence that the adverse dynamic effects occurring through the Bottom 40 indicator are not only persistent but point estimates are higher at the 15th horizon than hitherto peak levels whilst point estimates for the Gini, at the 15th horizon are approximately the same as peak levels. Additionally, findings are indicative that dynamic effects occurring through the spend channel are more persistent and steeper than those observed from the revenue channel.

Furthermore, when countries are grouped based on adjustment size, the dynamic impact for small adjustment sized countries (emitted from the Gini and Bottom 40 specifications) tend to be long-lasting up to the 15th period albeit at near zero-bound thresholds. In contrast, dynamic effects for large-sized countries tend to be steeper but persist on average till the 6th period.

Questions which tend to arise when decisions are undertaken to improve the fiscal stance revolve around which side to act on: expenditure, revenue or a combination of both? While the broad literature finds that spend cuts (especially those geared towards public wage cuts, social benefits and transfers) are more likely to render an improvement to the fiscal stance, extant literature also provides evidence to show that these kind of cuts are detrimental on the side of inequality.

For policy considerations, there is therefore a need for an efficient mix of adjustment measures in order to address distributional issues since high-and-rising-income inequality not only presents with equity concerns (IMF, 2017) but also has an implication on long-term economic growth as well as impacts on the sustainability of the adjustment programme since most adjustments tend to be multi-year events. Given the fact that fiscal authorities in recent times have grown their budget deficits by implementing expansionary fiscal policies in a bid to combat the Covid-19 pandemic and the need to improve the fiscal stance in the near future might arise - in light of the foregoing, it would only be fair for the burden of consolidation to be equitably spread. As noted by Martorano (2015), “...participation in the adjustment process should be progressive, reflecting the ability-to-pay rule. In other words, it is difficult to ask people who received less during the good times to participate more in the bad times” (p. 20). In view of these findings and in consideration of the persistence of dynamic effects which result from austerity implementation, there might be a need for policymakers to also consider the rigid aspects of the budget i.e. non-current budgetary items as alternatives to austerity.

Finally, the findings for this paper, however, come with certain limitations: since it is observed that a number of countries within the small adjustment sized group can be categorised as highly unequal, it would be beneficial to investigate if the persistent dynamic effects observed are driven by pre-existing high inequality levels.

REFERENCES

Agnello, L. and Sousa, R. M. (2011) ‘Fiscal Consolidation and Income Inequality’, *IDEAS Working Paper Series* from RePEc. St. Louis: Federal Reserve Bank of St Louis. Available at: <https://search.proquest.com/working-papers/fiscal-consolidation-income-inequality/docview/1698807418/se-2?accountid=10297>.

Agnello, L. and Sousa, R. M. (2012) ‘Fiscal Adjustments and Income Inequality: A First Assessment’, *IDEAS Working Paper Series* from RePEc. St. Louis: Federal Reserve Bank of St Louis. doi: 10.1080/13504851.2011.648315.

Agnello, L. and Sousa, R. M. (2012) ‘How does Fiscal Consolidation Impact on Income Inequality?’, *IDEAS Working Paper Series* from RePEc. St. Louis: Federal Reserve Bank of St Louis. doi: 10.1111/roiw.12004.

Agnello, L., Castro, V. and Sousa, R. M. (2013) ‘What determines the duration of a fiscal consolidation program?’, *Journal of International Money and Finance*, 37, pp. 113–134. doi: 10.1016/j.jimonfin.2013.05.012.

Alesina, A. (2012) ‘Cut Deficits by Cutting Spending’, *VOX CEPR Policy Portal*. Available at: <https://voxeu.org/article/cut-deficits-cutting-spending>.

Alesina, A. and Drazen, A. (1991) ‘Why Are Stabilisations Delayed?’ *American Economic Review*. 81(5) pp 1170-1188.

Alesina, A. and Ardagna, S. (1998) ‘Tales of Fiscal Adjustment’, *Economic Policy*, (27), pp. 487–545. doi: 10.1111/1468-0327.00039.

Alesina, A. and Ardagna, S. (2013) 'The Design of Fiscal Adjustments', *Tax Policy and the Economy*, 27(1), pp. 19–68. doi: 10.1086/671243.

Alesina, A. and Perotti, R. (1995) 'Fiscal Expansions and Fiscal Adjustments in OECD Countries', *NBER Working Paper Series*, 5214, p. 38.

Alesina, A., Ardagna, S., Perotti, R. and Schiantarelli, F. (1999) 'Fiscal Policy, Profits, and Investment', *NBER Working Paper Series*.

Available at: <http://www.nber.org/papers/w7207%0ANATIONAL>.

Alesina, A., Favero, C. and Giavazzi, F. (2015) 'The output effect of fiscal consolidation plans', *Journal of International Economics*, 96(S1), pp. S19–S42.

doi: 10.1016/j.jinteco.2014.11.003.

Alesina, A., Favero, C. and Giavazzi, F. (2018) 'What do we know about the effects of Austerity?', *NBER Working Paper Series*, Available at: <http://www.nber.org/papers/w24246>

Alesina, A., Favero, C. and Giavazzi, F. (2019) 'Austerity: When It Works and When It Doesn't', Princeton University Press, 2019.

Alexiou, Constantinos; Nellis, J. (2016) 'A Post-Mortem of Austerity: The Greek Experience', *Economic Issues*, Vol. 21, Part 2, 2016, 21(2), p. 3. doi: 10.2307/4344111.

Alvaredo, F. *et al.* (2016) 'Distributional National Accounts Guidelines: Methods and Concepts Used in WID.world', *WID.world Working Paper Series* No 2016/2, Available at [Alvaredoetal2016WIDworld-2.pdf](#)

Alvaredo, F. et al. (2018) World Inequality Report, Available at <https://wir2018.wid.world>

Alvaredo, F. et al. (2021) 'Distributional National Accounts Guidelines: Methods and Concepts Used in the World Inequality Database', *World Inequality Lab*, Available at [*
\(wid.world\)](https://wid.world)

Atkinson A.B (1999) 'Is Rising Inequality Inevitable? A Critique of the Transatlantic Consensus', *WIDER Annual Lectures 3*.

Atkinson A.B (2015) 'Inequality: What Can Be Done?' *International Inequalities Institute, London School of Economics and Political Science*, London, UK. Working Paper 2.

Ball, L. M., Furceri, D., Leigh, D. and Loungani, P. (2013) 'The Distributional Effects of Fiscal Consolidation', *IMF Working Papers*, 13(151), p. 1. doi: 10.5089/9781475551945.001.

Bova, E., Kinda, T. and Woo, J. (2018) 'Austerity and Inequality: The Size and Composition of Fiscal Adjustment Matter for Inequality', February 07, 2018. Available at <https://voxeu.org/article/size-and-composition-fiscal-adjustment-matter-inequality>.

Brinca, P., Ferreira, M.H., Franco, F., Holter, H.A. and Malafry, L. (2020) 'Fiscal Consolidation Programs and Income Inequality', *International Economic Review*, 62(1), pp. 405–460. doi: 10.1111/iere.12482.

Brugnolini, Luca (2018) 'About Local Projection Impulse Response Function Reliability', *Tor Vergata University*, CEIS Research Paper 440, 09 Jun 2018.

Calcagno, A. (2012) 'Can Austerity Work?', *Review of Keynesian Economics*, (1), pp. 24–36. doi: 10.4337/roke.2012.01.02.

Castro, V. (2018) 'Functional components of public expenditure, fiscal consolidations, and economic activity', *Economics & Politics*, 30(1), pp. 124–150.

doi: <http://dx.doi.org/10.1111/ecpo.12104>.

Cerdeiro, D. and Komaromi, A. (2017) 'The Effect of Trade on Income and Inequality: A Cross-Sectional Approach', *International Monetary Fund*.

Chancel, L., Hough, A. and Voituriez, T. (2017) 'Reducing Inequalities within Countries: Converting the Global Debate into Action', *Institut du développement durable et des relations internationales*. (January). Available at: www.iddri.org.

Chancel, L., Piketty, T., Saez, E. and Zucman, G. (2022) 'World Inequality Report 2022, Available at <https://wir2022.wid.world/>

Charles-Coll J.A (2011), Understanding Income Inequality: Concept, Causes and Measurement, *International Journal of Economics and Management Sciences*, Vol. 1, No. 3, pp. 17-28.

Ciminelli, G., Ernst, E., Merola, R. and Giuliadori, M. (2019) 'The Composition Effects of Tax-Based Consolidation on Income Inequality', *European Journal of Political Economy*, 57, pp. 107–124. doi: 10.1016/j.ejpoleco.2018.08.009.

Clements, B., de Mooij, R., Gupta, S. and Keen, M. (2015) 'Inequality and Fiscal Policy', *International Monetary Fund*. September, 2015.

Collischon, M. and Eberl, A. (2020) 'Let's Talk About Fixed Effects: Let's Talk About All the Good Things and the Bad Things', *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 72, pp. 289–299. doi: 10.1007/s11577-020-00699-8.

Devries, P., Guajardo, J., Leigh, D. and Pescatori, A. (2011) ‘A New Action-based Dataset of Fiscal Consolidation’, *IMF Staff Papers*.

Available at: <https://www.imf.org/external/pubs/ft/wp/2011/wp11128.pdf>.

Dobbs, R., Madgavkar, A., Manyika, J., Woetzel, J., Bughin, J., Labaye, E. and Kashyap, P. (2016) ‘Poorer Than Their Parents? A New Perspective on Income Inequality (Flat or Falling Incomes in Advanced Economies)’, *MGI-Income -Inequality-July-2016*’.

Furceri, D., Jalles, J. T. and Loungani, P. (2016) ‘Fiscal Consolidation and Inequality in Advanced Economies: How Robust is the Link?’, *Income Inequality and Fiscal Policy* (2nd Edition), *IMF Staff Discussion Notes*, 12(08), p. 1. doi: 10.5089/9781475510850.006.

Giavazzi, F. and Pagano, M. (1990) ‘Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries’, *National Bureau of Economic Research*, MA 02138(3372), p. 55.

Guajardo, J., Leigh, D. and Pescatori, A. (2011) ‘Expansionary Austerity: New International Evidence’, *IMF Working Paper*, WP/11/158, July 2011.

Glyn, A. (1995) ‘Unemployment and Inequality’, Available at: <http://bibliothek.wz-berlin.de/pdf/1995/i95-303.pdf>

Heimberger, P. (2020) ‘The dynamic effects of fiscal consolidation episodes on income inequality: evidence for 17 OECD countries over 1978-2013’, *Empirica*, 47, pp. 53–81. doi: 10.1007/s10663-018-9404-z.

Holden, S. and Midthjell, N. (2013) ‘Successful Fiscal Adjustments. Does Choice of Fiscal

Instrument Matter?', *CESifo Working Paper* No. 4456.

Hommel, C. (2004) 'Economic Dynamics', *CeNDEF*, Working Paper 04-13, University of Amsterdam.

International Monetary fund (2010) 'Will it Hurt? Macroeconomic Effects of Fiscal Consolidation', *IMF World Economic Outlook 2010* (October) 93-124.

International Monetary Fund (2013) '2 . Taxing Our Way out of — or into ?— Trouble' *IMF*. October 2013, Available at www.imf.org/external/pubs/ft/fm/2013/02/pdf/fms2.pdf

International Monetary Fund (2014) 'Fiscal Policy and Income Inequality', *Policy Papers*, 14. doi: 10.5089/9781498343671.007.

International Monetary Fund (2017) 'Tackling Inequality', *Fiscal Monitor*, October 2017.

Jalles, J. (2017) 'How do fiscal adjustments change the income distribution in emerging market economies?', *International Journal of Emerging Markets*, 12(2), pp. 310–334. doi: 10.1108/IJoEM-10-2015-0219.

Jorda, Oscar, 2005, "Estimation and Inference of Impulse Responses by Local Projections," *American Economic Review*, Vol. 95, No. 1, pp. 161–82.

Jorda, Oscar, 2009, 'Simultaneous Confidence Regions for Impulse Responses' *The Review of Economics and Statistics*, 2009, Vol. 91, Issue 3, 629-647.

Kumhof, M and Rancière, R. (2010) 'Inequality, Leverage and Crises', *IMF, Working Paper*. WP/10/268. November, 2010.

Law, C. H. and Soon, S. V. (2020) 'The impact of inflation on income inequality: the role

of institutional quality’, <https://doi.org/10.1080/13504851.2020.1717425>, 27(21), pp. 1735–1738.
doi: 10.1080/13504851.2020.1717425.

Martorano, B. (2015) ‘Is It Possible to Adjust “With a Human Face”? Differences in Fiscal Consolidation Strategies between Hungary and Iceland’, *Comparative Economic Studies*, 57(4), pp. 623–654. doi: <http://dx.doi.org/10.1057/ces.2015.22>

Monnin, P. (2014) ‘Inflation and Income Inequality in Developed Economies’, Available at: www.cepweb.org

Paulus, A., Figari, F. and Sutherland, H. (2017) ‘The design of fiscal consolidation measures in the European Union: distributional effects and implications for macro-economic recovery’, *Oxford Economic Papers*, 69 (December 2016), p. gpw054. doi: 10.1093/oep/gpw054.

Perotti, R. (2011) ‘The “Austerity Myth”: Gain Without pain?’, *NBER Working Paper*, pp. 1–58. Available at: <http://www.nber.org/data-appendix/w17571>

Pesaran, M. Hashem and Smith, Ron. (1995) ‘Estimating long-run relationships from dynamic heterogeneous panels’, *Journal of Econometrics*, Volume 68, Issue 1, Pages 79-113.

Pesaran, M.H., Shin, Y., Smith R.P. (1999) ‘Pooled mean Group Estimation of Dynamic heterogeneous Panels’. *Journal of the American Statistical Association*, 94:446, 621-634, DOI: 10.1080/01621459.1999.10474156.

Pressman S. (2007) ‘The Decline of the Middle Class: An International Perspective’, *Journal of Economic Issues* Vol. XLI No.1.

Ronayne, D. (2011) ‘Which Impulse Response Function?’, *Warwick Economic Research Papers*, (No. 971), pp. 1–46.

Available at: http://www2.warwick.ac.uk/fac/soc/economics/staff/phd_students/dronayne.

Roodman D. (2009) ‘How to do Xtabond2: An Introduction to Difference and System GMM in Stata’, *Center for Global Development*, Working Paper No 100.

Saez, E. and Zucman, G. (2020) ‘The Rise of Income and Wealth Inequality in America: Evidence from Distributional Macroeconomic Accounts’, *Journal of Economic Perspectives*—Volume 34, Number 4—Fall 2020—Pages 3–26.

van Treeck, T. and Sturn, S. (2012) ‘Income inequality as a cause of the Great Recession? A survey of current debates’, *ILO Working Papers*, 470934(39).

Woo, J., Bova, E., Kinda, T. and Zhang, Y.S. (2013) ‘Distributional Consequences of Fiscal Consolidation and the Role of Fiscal Policy: What Do the Data Say?’, *IMF Working Paper Fiscal Affairs Department*, WP/13/195.

Appendix A

Table 1A. Definition of variables

Variables	Definition	Source
GINI	The Gini coefficient measures the distribution of income in a population. It ranges between 0 and 1; where 0 denotes perfect equality and 1 perfect inequality	OECD
LABOUR SHARE	It is that part of national income which is allocated for labour compensation.	OECD
TOP1	This refers to the share of all income received by the 1% with the highest income in the population.	https://wid.world
TOP10	This refers to the share of all income received by the 10% with the highest income in the population.	https://wid.world
MID40	This refers to the share of income received by the people in the middle of the income distribution ladder.	https://wid.world
BOTTOM40	This is the share of all income received by the bottom 40% in the income distribution ladder i.e. the 40% with the lowest income in the population (wid.world). It is measured in percentages.	https://wid.world
BOTTOM50	This is the share of all income received by the bottom 50% in the income distribution ladder i.e. the 50% with the lowest income in the population (wid.world). It is measured in percentages.	https://wid.world
PALMA RATIO	The Palma ratio is the share of all income received by the 10% people with highest disposable income divided by the share of all income received by the 40% people with the lowest disposable income. In other words, the Palma ratio indicator measures the income share of the top decile relative to the bottom 40.	OECD
TOP10BOT50	This is the ratio of the top decile to the bottom 50 in the income distribution i.e. the income share of the richest 10% in the population divided by the income share of the poorest 50%.	https://wid.world
INFLATION	This refers to the inflation rate and is the annual percentage change in the cost of living and is measured by the consumer price index. In other words, it measures the changes in price level (activity in goods and services); an increase in inflation rate therefore corresponds to a decrease in purchasing power.	oecd.org ; un.org ; imf.org
UNEMPLOYMENT	The annual unemployment rate measures the numbers of unemployed people as a percentage of the labour force.	OECD
TRADE	Trade refers to trade openness and captures the sum of total exports and imports as a percentage of GDP.	oecd.org ; worldbank.org ; imf.org
GDPG	This refers to the gross domestic product growth rate and it measures the total annual income earned from productive capacities (i.e. economic activities) less imports.	OECD
EPISODE DUMMY	This is a dummy variable which represents the fiscal adjustment episodes - with 1 corresponding to the start of an episode and 0 otherwise.	Agnello et al. (2013); Ball et al. (2013); Furceri et al. (2013); Heimberger (2020)
ADJUSTMENT SIZE	This is the budgetary impact of the fiscal adjustments scaled relative to GDP i.e. the fiscal adjustment size measured as a percentage of GDP.	Devries et al. (2011); Alesina et al. (2015)

Table 2A. Descriptive statistics

Regressor	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
ADJUSTMENT SIZE	0.470	0.000	9.748	-0.750	1.075	3.738	22.749	11890.760	640
SPEND	0.282	0.000	6.244	-0.290	0.679	3.858	23.720	13035.780	640
TAX	0.188	0.000	3.871	-0.750	0.512	3.501	18.470	7689.632	640

Control Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
INFLATION	3.449	2.335	28.380	-4.480	3.775	2.518	11.264	2497.685	640
UNEMPLOYMENT	8.042	7.500	26.090	1.460	4.000	1.447	5.909	448.881	640
TRADE	66.628	59.307	252.335	15.810	36.708	1.610	6.410	586.773	640
GDPG	2.284	2.322	25.176	-8.074	2.414	1.009	16.843	5218.880	640

Inequality Indicator	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
GINI	0.390	0.380	0.560	0.260	0.069	0.537	2.376	41.161	640
LABOUR SHARE	75.351	75.520	97.650	50.830	6.022	0.082	5.571	177.041	640
TOP1	0.090	0.086	0.193	0.032	0.030	1.006	4.204	146.571	640
TOP10	0.303	0.287	0.460	0.208	0.057	1.062	3.493	126.809	640
BOTTOM40	0.169	0.177	0.257	0.094	0.038	-0.371	2.080	37.273	640
BOTTOM50	0.240	0.252	0.336	0.128	0.050	-0.475	2.075	46.868	640
MID40	0.456	0.452	0.565	0.383	0.031	0.624	4.491	100.860	640
PALMA RATIO	1.289	1.180	4.040	-1.560	0.754	0.240	5.254	124.412	562
TOP10BOTTOM50	6.902	6.000	18.000	3.000	3.122	1.446	4.448	278.848	640

Table 3A: Fiscal Adjustment Episodes (1978 – 2014)

Combined Data Set: Devries et al. (2011) + Alesina et al. (2015)⁴⁰

17 OECD COUNTRIES	1978 – 2014
Countries	Fiscal Adjustment Episodes (Years)
Australia	1985-88; 1994-99
Austria	1980-81; 84; 1996-97; 2001-02;2011-14
Belgium	1982-85;1987;1990; 1992-94;1996-97;2010-14
Canada	1984-97;2010-14
Denmark	1983-86;1995;2009-10;2011-13
Finland	1992-97;2011-14
France	1979;1987;1989;1991-92;1995-97;1999-00;2011-14
Germany	1982-84;1991-95;1997-00;2003-04; 2006-07;2011-13
Ireland	1982-88;2009-14
Italy	1991-98;2004-07;2010-14
Japan	1979-83;1997-98;2003-07
Portugal	1983;2000;2002-03;2005-07;2010-14
Spain	1983-84;1989-90;1992-97;2009-14
Sweden	1984;1993-98
United Kingdom	1979-82;1994-99;2010-14
United States	1978;1980-81;1985-86;1988;1990-98;2011-13

⁴⁰ The more recent fiscal adjustment episodes are captured by Alesina et al. (2015)

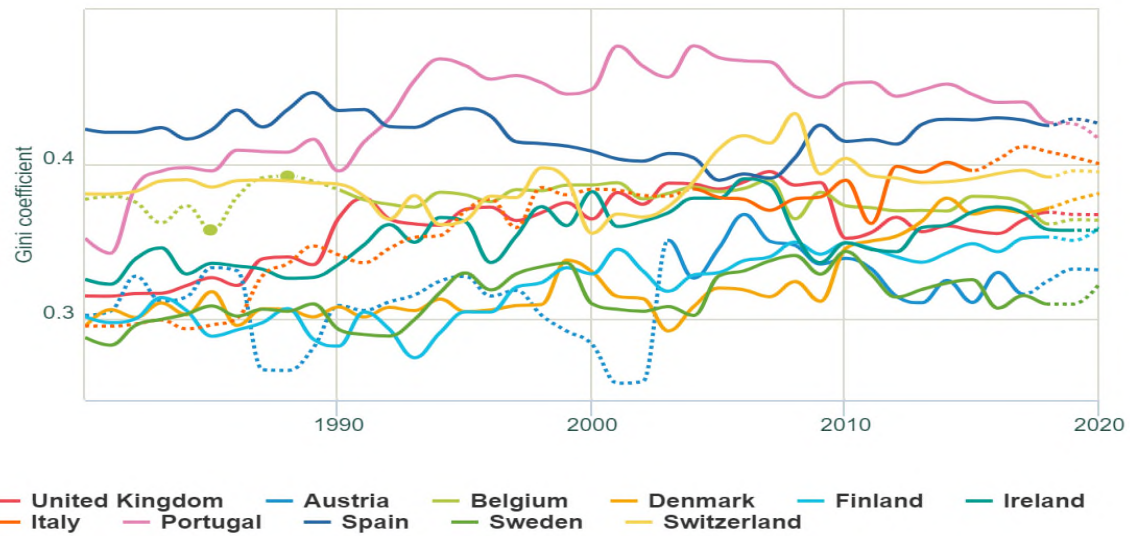


Figure 3-1 Gini index of post-disposable income

Source: wid.world

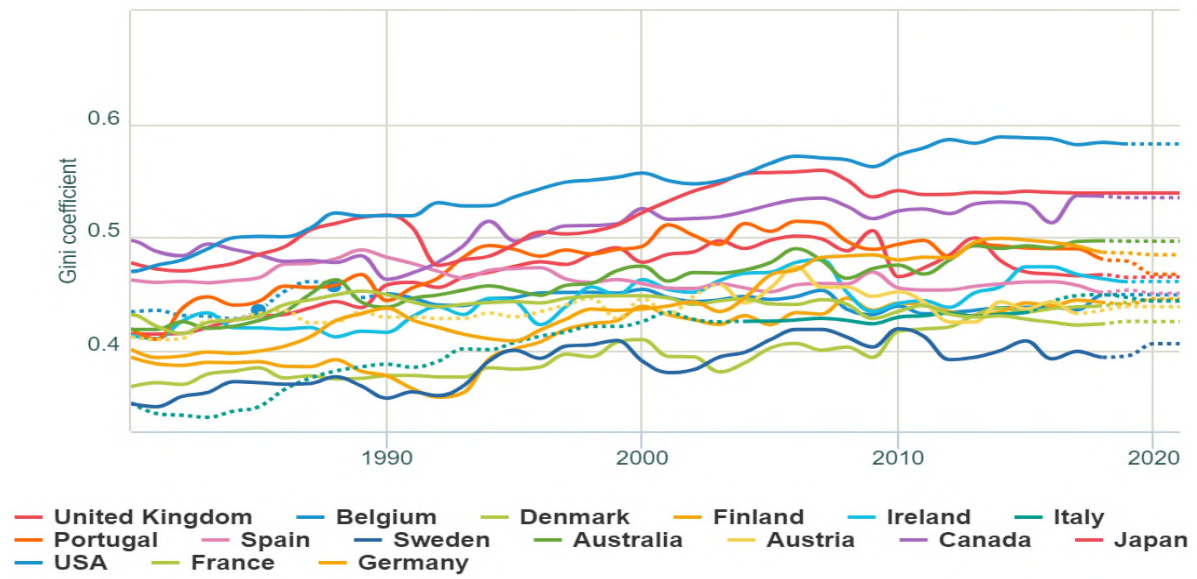


Figure 3-2 Gini index of disposable income

Appendix B – Diagnostics Tests

B.1 Heteroskedasticity Test

Source	SS	df	MS
Model	2.882838	6	0.480473
Residual	0.087026	617	0.000141
Total	2.969864	623	0.004767

Number of obs = 624
F(7, 617) = 3406.48
Prob > F = 0
R-squared = 0.9707
Adj R-squared = 0.9704
Root MSE = 0.01188

Gini	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
GiniLag1	0.979294	0.007501	130.55	0.000	0.9645627 0.9940248
Adjustment Size	0.000062	0.000484	0.13	0.898	-0.0008882 0.0010125
Inflation	-0.000063	0.000143	-0.44	0.658	-0.0003435 0.0002171
Unemployment	0.000084	0.000126	0.67	0.505	-0.0001637 0.0003322
Trade	-0.000036	0.000014	-2.53	0.012	-0.0000643 -8.08E-06
GDPG	0.000570	0.000207	2.76	0.006	0.0001644 0.0009761
C	0.009962	0.003675	2.71	0.007	0.0027446 0.0171797

White's test for Ho: homoskedasticity against Ha: unrestricted heteroskedasticity			
chi2(27) = 37.34			
Prob > chi2 = 0.0889			
Source	chi2	df	p
Heteroskedasticity	37.34	27	0.0889
Skewness	4.35	6	0.6301
Kurtosis	2.04	1	0.1537
Total	43.72	34	0.1228

Variable	VIF	1/VIF
Trade	1.23	0.811044
AdjSize	1.22	0.818455
GiniLag1	1.18	0.845576
Unemployment	1.14	0.879143
GDPG	1.11	0.900592
Inflation	1.08	0.929604
Mean VIF	1.16	

B.2 Correlation Test

	Gini	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
Gini	1						
Adjustment Size	-0.0782	1					
Inflation	-0.1716	-0.042	1				
Unemployment	-0.0623	0.3335	0.0494	1			
Interest Rate	-0.2604	-0.0851	0.8123	0.1696	1		
Trade	-0.3306	0.1216	-0.1464	0.0677	-0.2053	1	
GDPG	0.026	-0.2362	-0.0175	-0.0449	0.0606	0.1675	1

	Labour Income Share	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
Labour Income Share	1						
Adjustment Size	-0.1353	1					
Inflation	0.1205	-0.019	1				
Unemployment	-0.1638	0.3344	0.0728	1			
Interest Rate	0.0645	-0.0709	0.8052	0.1851	1		
Trade	-0.0446	0.1191	-0.1375	0.0622	-0.2065	1	
GDPG	-0.3011	-0.2386	-0.0134	-0.0473	0.0689	0.1657	1

	TOP1	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
TOP1	1						
Adjustment Size	0.0505	1					
Inflation	-0.0426	-0.019	1				
Unemployment	0.0648	0.3344	0.0728	1			
Interest Rate	-0.0079	-0.0709	0.8052	0.1851	1		
Trade	-0.0399	0.1191	-0.1375	0.0622	-0.2065	1	
GDPG	0.2256	-0.2386	-0.0134	-0.0473	0.0689	0.1657	

	TOP10	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
TOP10	1						
Adjustment Size	0.0131	1					
Inflation	-0.017	-0.019	1				
Unemployment	0.0372	0.3344	0.0728	1			
Interest Rate	0.0083	-0.0709	0.8052	0.1851	1		
Trade	-0.0602	0.1191	-0.1375	0.0622	-0.2065	1	
GDPG	0.1776	-0.2386	-0.0134	-0.0473	0.0689	0.1657	1

B.2.1 Correlation Test contd.

	BOTTOM40	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
BOTTOM40	1						
Adjustment Size	0.0674	1					
Inflation	0.1008	-0.042	1				
Unemployment	0.0199	0.3335	0.0494	1			
Interest Rate	0.1626	-0.0851	0.8123	0.1696	1		
Trade	0.3429	0.1216	-0.1464	0.0677	-0.2053	1	
GDPG	-0.0254	-0.2362	-0.0175	-0.0449	0.0606	0.1675	1

	BOTTOM50	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
BOTTOM50	1						
Adjustment Size	0.0838	1					
Inflation	0.1166	-0.042	1				
Unemployment	0.0614	0.3335	0.0494	1			
Interest Rate	0.1837	-0.0851	0.8123	0.1696	1		
Trade	0.3958	0.1216	-0.1464	0.0677	-0.2053	1	
GDPG	-0.0364	-0.2362	-0.0175	-0.0449	0.0606	0.1675	1

	Palma Ratio	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
Palma Ratio	1						
Adjustment Size	-0.012	1					
Inflation	-0.0225	-0.0422	1				
Unemployment	0.19	0.3298	0.0182	1			
Interest Rate	-0.0065	-0.1043	0.8062	0.1049	1		
Trade	0.0516	0.1057	-0.201	-0.0272	-0.3126	1	
GDPG	0.0349	-0.2515	-0.0312	-0.0576	0.0635	0.2235	1

	TOP10BOTTOM50	Adjustment Size	Inflation	Unemployment	Interest Rate	Trade	GDPG
TOP10BOTTOM50	1						
Adjustment Size	-0.1143	1					
Inflation	-0.1778	-0.042	1				
Unemployment	-0.166	0.3335	0.0494	1			
Interest Rate	-0.2603	-0.0851	0.8123	0.1696	1		
Trade	-0.3966	0.1216	-0.1464	0.0677	-0.2053	1	
GDPG	0.0349	-0.2362	-0.0175	-0.0449	0.0606	0.1675	1

B.3 Unit Root Test

Panel unit root test: Summary					Panel unit root test: Summary				
Series: GINI					Series: D(LABOUR INCOME SHARE)				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.51736	0.0646	16	608	Levin, Lin & Chu t*	-6.29714	0.0000	16	592
Breitung t-stat	-2.07013	0.0192	16	592	Breitung t-stat	-3.6233	0.0001	16	576
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.12975	0.0166	16	608	Im, Pesaran and Shin W-stat	-9.22653	0.0000	16	592
ADF - Fisher Chi-square	50.1213	0.0217	16	608	ADF - Fisher Chi-square	145.879	0.0000	16	592
PP - Fisher Chi-square	82.1281	0.0000	16	624	PP - Fisher Chi-square	535.936	0.0000	16	608
Panel unit root test: Summary					Panel unit root test: Summary				
Series: D(TOP1)					Series: D(DTOP10)				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.8655	0.0000	16	592	Levin, Lin & Chu t*	-15.5822	0.0000	16	576
Breitung t-stat	-13.0478	0.0000	16	576	Breitung t-stat	-15.0518	0.0000	16	560
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.1571	0.0000	16	592	Im, Pesaran and Shin W-stat	-27.8668	0.0000	16	576
ADF - Fisher Chi-square	244.894	0.0000	16	592	ADF - Fisher Chi-square	566.703	0.0000	16	576
PP - Fisher Chi-square	1021.23	0.0000	16	608	PP - Fisher Chi-square	3573.96	0.0000	16	592

B.3.1 Unit Root Tests contd.

Panel unit root test: Summary					Panel unit root test: Summary				
Series: BOTTOM 40					Series: D(BOTTOM 50)				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	- 2.96427	0.0015	16	608	Levin, Lin & Chu t*	-11.1698	0.0000	16	592
Breitung t-stat	- 1.69336	0.0452	16	592	Breitung t-stat	-11.7174	0.0000	16	576
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	- 2.84993	0.0022	16	608	Im, Pesaran and Shin W-stat	-15.1784	0.0000	16	592
ADF - Fisher Chi-square	61.3837	0.0013	16	608	ADF - Fisher Chi-square	258.18	0.0000	16	592
PP - Fisher Chi-square	128.087	0.0000	16	624	PP - Fisher Chi-square	592.76	0.0000	16	608
Panel unit root test: Summary					Panel unit root test: Summary				
Series: D(PALMA RATIO)					Series: TOP10BOTTOM50				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	- 2.42184	0.0077	14	518	Levin, Lin & Chu t*	-2.04611	0.0204	16	608
					Breitung t-stat	-3.28565	0.0005	16	592
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	- 5.08139	0.0000	14	518	Im, Pesaran and Shin W-stat	-2.24899	0.0123	16	608
ADF - Fisher Chi-square	93.4705	0.0000	14	518	ADF - Fisher Chi-square	50.4356	0.0202	16	608
PP - Fisher Chi-square	255.6	0.0000	14	532	PP - Fisher Chi-square	95.7041	0.0000	16	624

B.3.2 Unit Root Tests contd.

Panel unit root test: Summary					Panel unit root test: Summary				
Series: INFLATION					Series: UNEMPLOYMENT				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-	-	-	-	Levin, Lin & Chu t*	-	-	-	-
Levin, Lin & Chu t*	8.49019	0.0000	16	608	Levin, Lin & Chu t*	2.35007	0.0094	16	608
Breitung t-stat	-	-	-	-	Breitung t-stat	-	-	-	-
Breitung t-stat	0.50784	0.3058	16	592	Breitung t-stat				
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-	-	-	-	Im, Pesaran and Shin W-stat	-	-	-	-
Im, Pesaran and Shin W-stat	8.24649	0.0000	16	608	Im, Pesaran and Shin W-stat				
ADF - Fisher Chi-square	127.741	0.0000	16	608	ADF - Fisher Chi-square	61.0894	0.0015	16	608
PP - Fisher Chi-square	149.723	0.0000	16	624	PP - Fisher Chi-square	36.4819	0.2681	16	624
Panel unit root test: Summary					Panel unit root test: Summary				
Series: GDPGROWTH					Series: TRADE				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-	-	-	-	Levin, Lin & Chu t*	-	-	-	-
Levin, Lin & Chu t*	9.75486	0.0000	16	608	Levin, Lin & Chu t*	3.51434	0.0002	16	608
Breitung t-stat	-	-	-	-	Breitung t-stat	-	-	-	-
Breitung t-stat	-9.655	0.0000	16	592	Breitung t-stat	2.78929	0.0026	16	592
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-	-	-	-	Im, Pesaran and Shin W-stat	-	-	-	-
Im, Pesaran and Shin W-stat	9.41811	0.0000	16	608	Im, Pesaran and Shin W-stat	1.95662	0.0252	16	608
ADF - Fisher Chi-square	143.856	0.0000	16	608	ADF - Fisher Chi-square	42.7242	0.0975	16	608
PP - Fisher Chi-square	168.857	0.0000	16	624	PP - Fisher Chi-square	31.2476	0.5045	16	624

B.3.3 Unit Root Tests contd.

Panel unit root test: Summary					Panel unit root test: Summary					Panel unit root test: Summary				
Series: ADJUSTMENT SIZE					Series: SPEND					Series: TAX				
Sample: 1980 2019					Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects				
User-specified lags: 1					User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.35663	0.0000	16	608	Levin, Lin & Chu t*	-5.0086	0.0000	16	608	Levin, Lin & Chu t*	-8.3649	0.0000	16	608
Breitung t-stat	-7.15198	0.0000	16	592	Breitung t-stat	-7.6539	0.0000	16	592					
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.75641	0.0000	16	608	Im, Pesaran and Shin W-stat	-5.9607	0.0000	16	608	Im, Pesaran and Shin W-stat	-7.8563	0.0000	16	608
ADF - Fisher Chi-square	91.6395	0.0000	16	608	ADF - Fisher Chi-square	95.3922	0.0000	16	608	ADF - Fisher Chi-square	126.028	0.0000	16	608
PP - Fisher Chi-square	84.7569	0.0000	16	624	PP - Fisher Chi-square	89.4776	0.0000	16	624	PP - Fisher Chi-square	179.106	0.0000	16	624

B.4 Cross Section Dependency Test

Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals			
Equation: GINI				Equation: D(TOP1)				Equation: D(TOP10)			
Periods included: 39				Periods included: 38				Periods included: 38			
Cross-sections included: 16				Cross-sections included: 16				Cross-sections included: 16			
Total panel observations: 624				Total panel observations: 608				Total panel observations: 608			
Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	136.2313	120	0.1477	Breusch-Pagan LM	7.699391	120	1.0000	Breusch-Pagan LM	6.258771	120	1.0000
Pesaran scaled LM	1.047724		0.2948	Pesaran scaled LM	-7.248973		0.0000	Pesaran scaled LM	-7.341965		0.0000
Pesaran CD	0.796537		0.4257	Pesaran CD	0.213058		0.8313	Pesaran CD	-0.194458		0.8458
Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in residuals				Null hypothesis: No cross-section dependence (correlation) in residuals			
Equation: D(LABOUR INCOME SHARE)				Equation: BOTTOM40				Equation: D(BOTTOM50)			
Periods included: 38				Periods included: 39				Periods included: 38			
Cross-sections included: 16				Cross-sections included: 16				Cross-sections included: 16			
Total panel observations: 608				Total panel observations: 624				Total panel observations: 608			
Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	10.98396	120	1.0000	Breusch-Pagan LM	127.636	120	0.2996	Breusch-Pagan LM	119.8198	120	0.4875
Pesaran scaled LM	-7.036955		0.0000	Pesaran scaled LM	0.492901		0.6221	Pesaran scaled LM	-0.011634		0.9907
Pesaran CD	0.071913		0.9427	Pesaran CD	-0.703798		0.4816	Pesaran CD	-0.115176		0.9083
Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals			
Equation: D(PALMA RATIO)				Equation: TOP10BOTTOM50				Equation: TOP10BOTTOM50			
Periods included: 38				Periods included: 39				Periods included: 39			
Cross-sections included: 14				Cross-sections included: 16				Cross-sections included: 16			
Total panel observations: 532				Total panel observations: 624				Total panel observations: 624			
Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	29.06131	91	1.0000	Breusch-Pagan LM	2.298522	120	1.0000	Breusch-Pagan LM	2.298522	120	1.0000
Pesaran scaled LM	-4.591201		0.0000	Pesaran scaled LM	-7.597598		0.0000	Pesaran scaled LM	-7.597598		0.0000
Pesaran CD	0.352427		0.7245	Pesaran CD	-0.272466		0.7853	Pesaran CD	-0.272466		0.7853

Appendix C – Full Country sample estimation results

C.1 Panel ARDL model results

Dependent Variable: D(GINI)					Dependent Variable: D(GINI)					Dependent Variable: D(GINI)				
Method: ARDL					Method: ARDL					Method: ARDL				
Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	0.00523	0.00201	2.60360	0.0098	SPEND	0.00418	0.00358	1.16692	0.2444	TAX	0.00638	0.00303	2.10312	0.0371
INFLATION	-0.00462	0.00081	-5.68033	0.0000	INFLATION	-0.00523	0.00094	-5.55965	0.0000	INFLATION	0.00239	0.00051	4.69392	0.0000
GDPG	0.02466	0.00171	14.41125	0.0000	GDPG	0.02154	0.00216	9.96062	0.0000	GDPG	0.01996	0.00122	16.41520	0.0000
TRADE	0.00182	0.00009	20.80944	0.0000	TRADE	0.00184	0.00010	19.20986	0.0000	TRADE	0.00217	0.00009	23.19705	0.0000
UNEMPLOYMENT	0.00732	0.00074	9.93590	0.0000	UNEMPLOYMENT	0.00756	0.00083	9.06894	0.0000	UNEMPLOYMENT	0.00675	0.00049	13.67457	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.10699	0.0859	-1.2456	0.2142	COINTEQ01	-0.13150	0.0741	-1.7749	0.0772	COINTEQ01	-0.31863	0.1521	-2.0942	0.0379
D(GINI(-1))	-0.34414	0.1146	-3.0022	0.0030	D(GINI(-1))	-0.38006	0.1094	-3.4749	0.0006	D(GINI(-1))	-0.38222	0.1407	-2.7172	0.0073
D(GINI(-2))	-0.17859	0.1378	-1.2960	0.1962	D(GINI(-2))	-0.16029	0.1327	-1.2076	0.2284	D(GINI(-2))	-0.14813	0.1583	-0.9355	0.3510
D(GINI(-3))	-0.05822	0.0976	-0.5965	0.5514	D(GINI(-3))	-0.05850	0.0957	-0.6113	0.5416	D(GINI(-3))	-0.00997	0.1517	-0.0658	0.9476
D(ADJSIZE)	-0.00538	0.0022	-2.4706	0.0142	D(SPENDING)	-0.00402	0.0023	-1.7653	0.0788	D(TAX)	-0.01726	0.0089	-1.9483	0.0532
D(ADJSIZE(-1))	0.00024	0.0020	0.1211	0.9038	D(SPENDING(-1))	0.00214	0.0028	0.7603	0.4478	D(TAX(-1))	-0.00570	0.0066	-0.8654	0.3882
D(ADJSIZE(-2))	-0.00139	0.0023	-0.5991	0.5497	D(SPENDING(-2))	0.00108	0.0039	0.2793	0.7803	D(TAX(-2))	-0.00370	0.0087	-0.4261	0.6706
D(ADJSIZE(-3))	-0.00046	0.0016	-0.2812	0.7788	D(SPENDING(-3))	-0.00206	0.0021	-0.9973	0.3196	D(TAX(-3))	0.00072	0.0043	0.1678	0.8669
D(INFLATION)	0.00291	0.0009	3.1486	0.0019	D(INFLATION)	0.00299	0.0006	4.9630	0.0000	D(INFLATION)	0.00192	0.0017	1.1550	0.2499
D(INFLATION(-1))	-0.00073	0.0009	-0.7725	0.4406	D(INFLATION(-1))	-0.00057	0.0008	-0.7211	0.4716	D(INFLATION(-1))	-0.00172	0.0010	-1.7704	0.0786
D(INFLATION(-2))	0.00008	0.0011	0.0680	0.9458	D(INFLATION(-2))	-0.00011	0.0009	-0.1192	0.9052	D(INFLATION(-2))	-0.00405	0.0019	-2.1243	0.0352
D(INFLATION(-3))	0.00181	0.0016	1.1178	0.2648	D(INFLATION(-3))	0.00110	0.0013	0.8394	0.4021	D(INFLATION(-3))	0.00082	0.0016	0.5131	0.6086
D(GDPG)	-0.00102	0.0020	-0.5187	0.6045	D(GDPG)	-0.00073	0.0016	-0.4588	0.6468	D(GDPG)	-0.00433	0.0029	-1.5135	0.1322
D(GDPG(-1))	-0.00048	0.0016	-0.2979	0.7660	D(GDPG(-1))	-0.00062	0.0013	-0.4804	0.6314	D(GDPG(-1))	-0.00503	0.0024	-2.0879	0.0385
D(GDPG(-2))	0.00016	0.0009	0.1829	0.8550	D(GDPG(-2))	0.00010	0.0007	0.1353	0.8925	D(GDPG(-2))	-0.00168	0.0014	-1.1703	0.2437
D(GDPG(-3))	-0.00004	0.0005	-0.0722	0.9425	D(GDPG(-3))	-0.00015	0.0004	-0.3563	0.7219	D(GDPG(-3))	-0.00059	0.0009	-0.6693	0.5043
D(TRADE)	-0.00093	0.0004	-2.3398	0.0201	D(TRADE)	-0.00105	0.0003	-3.2022	0.0016	D(TRADE)	-0.00025	0.0006	-0.4070	0.6846
D(TRADE(-1))	0.00053	0.0005	1.1512	0.2508	D(TRADE(-1))	0.00036	0.0004	0.9581	0.3390	D(TRADE(-1))	0.00005	0.0005	0.0905	0.9280
D(TRADE(-2))	-0.00036	0.0004	-0.9322	0.3522	D(TRADE(-2))	-0.00038	0.0004	-1.0148	0.3112	D(TRADE(-2))	0.00028	0.0006	0.4511	0.6526
D(TRADE(-3))	-0.00014	0.0004	-0.3104	0.7566	D(TRADE(-3))	0.00002	0.0004	0.0607	0.9516	D(TRADE(-3))	-0.00023	0.0004	-0.5360	0.5927
D(UNEMPLOYMENT)	0.00094	0.0013	0.7535	0.4519	D(UNEMPLOYMENT)	0.00161	0.0013	1.2683	0.2059	D(UNEMPLOYMENT)	-0.00092	0.0027	-0.3360	0.7373
D(UNEMPLOYMENT(-1))	0.00619	0.0025	2.4685	0.0143	D(UNEMPLOYMENT(-1))	0.00481	0.0017	2.8941	0.0042	D(UNEMPLOYMENT(-1))	0.00197	0.0014	1.4117	0.1600
D(UNEMPLOYMENT(-2))	-0.00166	0.0019	-0.8764	0.3817	D(UNEMPLOYMENT(-2))	-0.00140	0.0015	-0.9596	0.3382	D(UNEMPLOYMENT(-2))	0.00349	0.0039	0.8942	0.3726
D(UNEMPLOYMENT(-3))	0.00028	0.0015	0.1888	0.8504	D(UNEMPLOYMENT(-3))	-0.00017	0.0012	-0.1395	0.8892	D(UNEMPLOYMENT(-3))	-0.00070	0.0021	-0.3297	0.7421
C	0.01793	0.0108	1.6560	0.0991	C	0.02346	0.0095	2.4625	0.0145	C	0.04189	0.0190	2.2095	0.0286
Mean dependent var	0.00123	S.D. dependent var	0.0119		Mean dependent var	0.00123	S.D. dependent var	0.0119		Mean dependent var	0.00123	S.D. dependent var	0.0119	
S.E. of regression	0.00924	Akaike info criterion	5.8112		S.E. of regression	0.00976	Akaike info criterion	5.7517		S.E. of regression	0.00852	Akaike info criterion	6.0256	
Sum squared resid	0.02007	Schwarz criterion	2.9879		Sum squared resid	0.02239	Schwarz criterion	2.9284		Sum squared resid	0.01118	Schwarz criterion	2.6377	
Log likelihood	2264.569	Hannan-Quinn criter.	4.7153		Log likelihood	2245.548	Hannan-Quinn criter.	4.6559		Log likelihood	2414.188	Hannan-Quinn criter.	4.7106	

C.1.1 Panel ARDL model results contd.

Dependent Variable: D(LABOUR SHARE)					Dependent Variable: D(LABOUR SHARE)					Dependent Variable: D(LABOUR SHARE)				
Method: ARDL					Method: ARDL					Method: ARDL				
Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(1, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(2, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-2.3106	0.2074	-11.1409	0.0000	SPEND	-3.9813	0.3233	-12.3135	0.0000	TAX	11.5121	1.3188	8.7291	0.0000
INFLATION	-0.2005	0.0905	-2.2157	0.0275	INFLATION	0.0427	0.0818	0.5220	0.6021	INFLATION	1.2871	0.0990	12.9988	0.0000
GDPG	-2.6039	0.2106	-12.3654	0.0000	GDPG	-2.6358	0.2499	-10.5479	0.0000	GDPG	2.6508	0.2565	10.3364	0.0000
TRADE	-0.1778	0.0100	-17.7187	0.0000	TRADE	-0.1758	0.0086	-20.3746	0.0000	TRADE	0.4303	0.0654	6.5849	0.0000
UNEMPLOYMENT	0.1240	0.0974	1.2726	0.2042	UNEMPLOYMENT	0.4425	0.0912	4.8545	0.0000	UNEMPLOYMENT	0.6150	0.0765	8.0383	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.13706	0.05206	-2.63261	0.0089	COINTEQ01	-0.12899	0.05461	-2.36210	0.0189	COINTEQ01	-0.10181	0.09640	-1.05613	0.2920
D(ADJSIZE)	0.36779	0.14524	2.53225	0.0119	D(LABOUR SHARE(-1))	0.02575	0.09273	0.27772	0.7814	D(LABOUR SHARE(-1))	0.19972	0.07460	2.67715	0.0079
D(ADJSIZE(-1))	0.21408	0.17332	1.23519	0.2178	D(SPEND)	0.40934	0.26348	1.55358	0.1215	D(LABOUR SHARE(-2))	0.17468	0.08496	2.05599	0.0409
D(ADJSIZE(-2))	0.06538	0.15718	0.41597	0.6777	D(SPEND(-1))	0.19984	0.29219	0.68393	0.4946	D(LABOUR SHARE(-3))	0.04461	0.09676	0.46104	0.6452
D(ADJSIZE(-3))	0.14359	0.15228	0.94297	0.3465	D(SPEND(-2))	0.17698	0.22477	0.78741	0.4317	D(TAX)	0.38927	0.59161	0.65798	0.5112
D(INFLATION)	0.06524	0.08273	0.78865	0.4310	D(SPEND(-3))	0.21749	0.23195	0.93766	0.3493	D(TAX(-1))	0.84430	0.72624	1.16256	0.2462
D(INFLATION(-1))	-0.09401	0.08399	-1.11928	0.2640	D(INFLATION)	0.04846	0.08425	0.57516	0.5657	D(TAX(-2))	0.63019	0.49109	1.28325	0.2007
D(INFLATION(-2))	0.09532	0.05816	1.63903	0.1023	D(INFLATION(-1))	-0.07111	0.09587	-0.74177	0.4589	D(TAX(-3))	-0.00030	0.52262	-0.00057	0.9995
D(INFLATION(-3))	-0.03492	0.06211	-0.56215	0.5745	D(INFLATION(-2))	0.03323	0.05624	0.59080	0.5552	D(INFLATION)	-0.15514	0.14586	-1.06363	0.2886
D(GDPG)	0.00810	0.13998	0.05787	0.9539	D(INFLATION(-3))	0.00765	0.05456	0.14012	0.8887	D(INFLATION(-1))	-0.19572	0.14080	-1.39006	0.1658
D(GDPG(-1))	0.10485	0.10581	0.99097	0.3225	D(GDPG)	-0.01465	0.14536	-0.10076	0.9198	D(INFLATION(-2))	-0.01196	0.10555	-0.11334	0.9099
D(GDPG(-2))	0.09736	0.07527	1.29347	0.1969	D(GDPG(-1))	0.05712	0.09809	0.58234	0.5608	D(INFLATION(-3))	-0.11015	0.10664	-1.03294	0.3027
D(GDPG(-3))	0.01491	0.03968	0.37577	0.7074	D(GDPG(-2))	0.07981	0.07325	1.08952	0.2769	D(GDPG)	-0.57616	0.24471	-2.35445	0.0194
D(TRADE)	-0.00946	0.02976	-0.31803	0.7507	D(GDPG(-3))	-0.00694	0.03667	-0.18923	0.8501	D(GDPG(-1))	-0.26483	0.21025	-1.25959	0.2091
D(TRADE(-1))	0.04700	0.03748	1.25415	0.2108	D(TRADE)	-0.00527	0.03745	-0.14069	0.8882	D(GDPG(-2))	-0.15892	0.15396	-1.03219	0.3030
D(TRADE(-2))	-0.02373	0.02126	-1.11595	0.2654	D(TRADE(-1))	0.04540	0.03622	1.25361	0.2111	D(GDPG(-3))	-0.13779	0.07144	-1.92876	0.0550
D(TRADE(-3))	-0.02034	0.02082	-0.97694	0.3294	D(TRADE(-2))	0.00900	0.02087	0.43123	0.6666	D(TRADE)	0.00991	0.02338	0.42397	0.6720
D(UNEMPLOYMENT)	-0.21718	0.12206	-1.77927	0.0763	D(TRADE(-3))	-0.02046	0.02588	-0.79067	0.4298	D(TRADE(-1))	0.01057	0.04494	0.23520	0.8143
D(UNEMPLOYMENT(-1))	-0.32778	0.18679	-1.75482	0.0804	D(UNEMPLOYMENT)	-0.32500	0.12460	-2.60835	0.0096	D(TRADE(-2))	-0.04702	0.03244	-1.44941	0.1486
D(UNEMPLOYMENT(-2))	-0.27615	0.13061	-2.11430	0.0354	D(UNEMPLOYMENT(-1))	-0.29182	0.19483	-1.49787	0.1353	D(TRADE(-3))	-0.01955	0.03202	-0.61067	0.5420
D(UNEMPLOYMENT(-3))	-0.14859	0.20290	-0.73234	0.4646	D(UNEMPLOYMENT(-2))	-0.20809	0.15025	-1.38498	0.1672	D(UNEMPLOYMENT)	-0.35382	0.16385	-2.15942	0.0318
C	12.91608	4.98098	2.59308	0.0100	D(UNEMPLOYMENT(-3))	-0.17853	0.18190	-0.98146	0.3273	D(UNEMPLOYMENT(-1))	-0.04650	0.13429	-0.34625	0.7295
					C	11.74307	5.08784	2.30807	0.0218	D(UNEMPLOYMENT(-2))	-0.20521	0.13771	-1.49012	0.1375
Mean dependent var	-0.04896	S.D. dependent var	1.4047		Mean dependent var	-0.04896	S.D. dependent var	1.4047		D(UNEMPLOYMENT(-3))	0.14306	0.25776	0.55501	0.5794
S.E. of regression	0.76258	Akaike info criterion	2.3554		S.E. of regression	0.74915	Akaike info criterion	2.2977		C	4.27415	3.85789	1.10790	0.2690
Sum squared resid	164.57120	Schwarz criterion	4.8441		Sum squared resid	149.84830	Schwarz criterion	4.8979		Mean dependent var	-0.04896	S.D. dependent var	1.4047	
Log likelihood	-396.74120	Hannan-Quinn criter.	3.3214		Log likelihood	-362.26200	Hannan-Quinn criter.	3.3070		S.E. of regression	0.73797	Akaike info criterion	2.2764	
										Sum squared resid	127.97930	Schwarz criterion	5.0997	
										Log likelihood	-323.44550	Hannan-Quinn criter.	3.3722	

C.1.2 Panel ARDL model results contd.

Dependent Variable: D(TOP1)					Dependent Variable: D(TOP1)					Dependent Variable: D(TOP1)				
Method: ARDL					Method: ARDL					Method: ARDL				
Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-0.00224	0.0016	-1.3777	0.1696	SPEND	0.003739	0.001659	2.253797	0.0251	TAX	-0.0086	0.0042	-2.0560	0.0409
INFLATION	-0.00079	0.0007	-1.1559	0.2489	INFLATION	-0.001463	0.000444	-3.298425	0.0011	INFLATION	-0.0009	0.0008	-1.1574	0.2483
GDPG	0.00394	0.0016	2.5209	0.0124	GDPG	0.007984	0.001096	7.287956	0.0000	GDPG	0.0023	0.0018	1.3141	0.1901
TRADE	0.00082	0.0002	4.3757	0.0000	TRADE	0.001517	0.000096	15.743510	0.0000	TRADE	0.0004	0.0001	2.8327	0.0050
UNEMPLOYMENT	0.00781	0.0014	5.4684	0.0000	UNEMPLOYMENT	0.004055	0.000680	5.959400	0.0000	UNEMPLOYMENT	0.0121	0.0029	4.1521	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.11138	0.0334	-3.3341	0.0010	COINTEQ01	-0.15651	0.0524	-2.9855	0.0031	COINTEQ01	-0.04996	0.0480	-1.0415	0.2987
D(TOP1(-1))	-0.26625	0.0715	-3.7256	0.0002	D(TOP1(-1))	-0.26582	0.0869	-3.0600	0.0025	D(TOP1(-1))	-0.26522	0.0775	-3.4220	0.0007
D(TOP1(-2))	-0.16682	0.0862	-1.9353	0.0542	D(TOP1(-2))	-0.14987	0.0964	-1.5543	0.1215	D(TOP1(-2))	-0.25007	0.0831	-3.0092	0.0029
D(TOP1(-3))	-0.00500	0.0788	-0.0635	0.9494	D(TOP1(-3))	0.01124	0.0908	0.1238	0.9016	D(TOP1(-3))	-0.01341	0.0668	-0.2007	0.8411
D(ADJSIZE)	-0.00278	0.0018	-1.5109	0.1322	D(SPEND)	-0.00217	0.0016	-1.3730	0.1711	D(TAX)	-0.00532	0.0036	-1.4964	0.1359
D(ADJSIZE(-1))	0.00003	0.0012	0.0252	0.9799	D(SPEND(-1))	-0.00029	0.0020	-0.1447	0.8851	D(TAX(-1))	-0.00359	0.0027	-1.3340	0.1835
D(ADJSIZE(-2))	-0.00007	0.0014	-0.0519	0.9587	D(SPEND(-2))	0.00106	0.0024	0.4436	0.6578	D(TAX(-2))	-0.00076	0.0025	-0.3004	0.7641
D(ADJSIZE(-3))	-0.00062	0.0008	-0.7925	0.4289	D(SPEND(-3))	-0.00094	0.0011	-0.8324	0.4060	D(TAX(-3))	-0.00242	0.0019	-1.2996	0.1950
D(INFLATION)	0.00200	0.0006	3.1579	0.0018	D(INFLATION)	0.00194	0.0005	3.9261	0.0001	D(INFLATION)	0.00131	0.0006	2.2210	0.0273
D(INFLATION(-1))	-0.00040	0.0005	-0.8298	0.4075	D(INFLATION(-1))	-0.00028	0.0004	-0.7000	0.4846	D(INFLATION(-1))	-0.00071	0.0006	-1.1563	0.2488
D(INFLATION(-2))	-0.00104	0.0006	-1.6244	0.1056	D(INFLATION(-2))	-0.00088	0.0005	-1.9414	0.0534	D(INFLATION(-2))	-0.00065	0.0007	-0.9842	0.3260
D(INFLATION(-3))	0.00111	0.0008	1.4383	0.1517	D(INFLATION(-3))	0.00093	0.0006	1.5698	0.1178	D(INFLATION(-3))	0.00061	0.0010	0.5958	0.5519
D(GDPG)	0.00122	0.0004	3.2480	0.0013	D(GDPG)	0.00103	0.0006	1.6397	0.1024	D(GDPG)	0.00158	0.0004	3.7700	0.0002
D(GDPG(-1))	0.00103	0.0005	2.0286	0.0436	D(GDPG(-1))	0.00114	0.0006	1.8442	0.0664	D(GDPG(-1))	0.00123	0.0008	1.5959	0.1119
D(GDPG(-2))	0.00050	0.0007	0.7424	0.4586	D(GDPG(-2))	0.00063	0.0005	1.2040	0.2298	D(GDPG(-2))	0.00107	0.0007	1.6398	0.1024
D(GDPG(-3))	-0.00003	0.0004	-0.0698	0.9444	D(GDPG(-3))	0.00007	0.0003	0.1939	0.8464	D(GDPG(-3))	0.00009	0.0004	0.2279	0.8199
D(TRADE)	-0.00053	0.0002	-2.3608	0.0191	D(TRADE)	-0.00070	0.0002	-3.1090	0.0021	D(TRADE)	-0.00040	0.0002	-1.9278	0.0551
D(TRADE(-1))	0.00030	0.0003	0.8927	0.3729	D(TRADE(-1))	0.00036	0.0004	0.9884	0.3240	D(TRADE(-1))	0.00029	0.0004	0.7549	0.4511
D(TRADE(-2))	0.00006	0.0002	0.2957	0.7677	D(TRADE(-2))	0.00008	0.0002	0.3425	0.7323	D(TRADE(-2))	-0.00006	0.0002	-0.2275	0.8202
D(TRADE(-3))	-0.00030	0.0002	-1.5359	0.1259	D(TRADE(-3))	-0.00020	0.0002	-0.9756	0.3303	D(TRADE(-3))	-0.00037	0.0002	-1.5457	0.1235
D(UNEMPLOYMENT)	-0.00060	0.0008	-0.7753	0.4389	D(UNEMPLOYMENT)	0.00069	0.0011	0.6409	0.5222	D(UNEMPLOYMENT)	-0.00038	0.0013	-0.2995	0.7648
D(UNEMPLOYMENT(-1))	0.00218	0.0009	2.3535	0.0194	D(UNEMPLOYMENT(-1))	0.00236	0.0008	3.0228	0.0028	D(UNEMPLOYMENT(-1))	0.00094	0.0017	0.5447	0.5865
D(UNEMPLOYMENT(-2))	-0.00260	0.0017	-1.5724	0.1172	D(UNEMPLOYMENT(-2))	-0.00316	0.0020	-1.5635	0.1193	D(UNEMPLOYMENT(-2))	-0.00130	0.0011	-1.1747	0.2413
D(UNEMPLOYMENT(-3))	-0.00227	0.0013	-1.8119	0.0713	D(UNEMPLOYMENT(-3))	-0.00155	0.0017	-0.9248	0.3560	D(UNEMPLOYMENT(-3))	-0.00407	0.0015	-2.7476	0.0065
C	0.00004	0.0028	0.0133	0.9894	C	-0.00401	0.0036	-1.0998	0.2725	C	0.00410	0.0035	1.1718	0.2425
Mean dependent var	0.00086	S.D. dependent var	0.0077		Mean dependent var	0.00086	S.D. dependent var	0.0077		Mean dependent var	0.00086	S.D. dependent var	0.0077	
S.E. of regression	0.00549	Akaike info criterion	-6.5914		S.E. of regression	0.00587	Akaike info criterion	-6.5321		S.E. of regression	0.00542	Akaike info criterion	-6.5940	
Sum squared resid	0.00709	Schwarz criterion	-3.7681		Sum squared resid	0.00810	Schwarz criterion	-3.7089		Sum squared resid	0.00691	Schwarz criterion	-3.7707	
Log likelihood	2514.236	Hannan-Quinn criter.	-5.4955		Log likelihood	2495.280	Hannan-Quinn criter.	-5.4363		Log likelihood	2515.076	Hannan-Quinn criter.	-5.4981	

C.1.3 Panel ARDL model results contd.

Dependent Variable: D(BOT40)					Dependent Variable: D(BOT40)					Dependent Variable: D(BOT40)				
Method: ARDL					Method: ARDL					Method: ARDL				
Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(3, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 576 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	0.012498	0.001537	8.129284	0.0000	SPEND	0.015773	0.002500	6.308361	0.0000	TAX	0.0322	0.0029	11.2766	0.0000
INFLATION	0.003065	0.000246	12.470500	0.0000	INFLATION	0.002988	0.000311	9.608216	0.0000	INFLATION	0.0019	0.0002	8.0699	0.0000
GDPG	0.002752	0.000335	8.222082	0.0000	GDPG	0.003898	0.000485	8.029572	0.0000	GDPG	0.0033	0.0004	8.1825	0.0000
TRADE	-0.000190	0.000037	-5.167575	0.0000	TRADE	-0.000437	0.000043	-10.100110	0.0000	TRADE	-0.0004	0.0000	-9.4263	0.0000
UNEMPINTP	0.002068	0.000212	9.743431	0.0000	UNEMPINTP	0.002777	0.000263	10.563110	0.0000	UNEMPINTP	0.0013	0.0003	4.6954	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.10322	0.0736	-1.4030	0.1619	COINTEQ01	-0.15271	0.0813	-1.8792	0.0615	COINTEQ01	-0.16284	0.0888	-1.8343	0.0679
D(BOT40(-1))	-0.24327	0.0803	-3.0310	0.0027	D(BOT40(-1))	-0.23664	0.0904	-2.6163	0.0095	D(BOT40(-1))	-0.18844	0.0893	-2.1109	0.0358
D(BOT40(-2))	-0.11994	0.1006	-1.1917	0.2345	D(BOT40(-2))	-0.06158	0.1077	-0.5719	0.5680	D(BOT40(-2))	-0.07854	0.1002	-0.7842	0.4337
D(ADJSIZE)	0.00023	0.0007	0.3330	0.7394	D(BOT40(-3))	0.12162	0.0495	2.4583	0.0147	D(BOT40(-3))	0.11871	0.0663	1.7909	0.0746
D(ADJSIZE(-1))	-0.00064	0.0010	-0.6449	0.5196	D(SPENDING)	0.00020	0.0013	0.1568	0.8755	D(TAX)	-0.00231	0.0028	-0.8375	0.4032
D(ADJSIZE(-2))	-0.00123	0.0008	-1.5745	0.1166	D(SPENDING(-1))	-0.00076	0.0013	-0.5664	0.5716	D(TAX(-1))	-0.00274	0.0020	-1.3720	0.1714
D(ADJSIZE(-3))	-0.00022	0.0005	-0.4747	0.6354	D(SPENDING(-2))	-0.00150	0.0015	-1.0289	0.3046	D(TAX(-2))	-0.00271	0.0026	-1.0552	0.2924
D(INFLATION)	-0.00080	0.0005	-1.6982	0.0907	D(SPENDING(-3))	-0.00039	0.0008	-0.4787	0.6326	D(TAX(-3))	-0.00218	0.0007	-2.9580	0.0034
D(INFLATION(-1))	0.00070	0.0004	1.7486	0.0816	D(INFLATION)	-0.00088	0.0004	-2.3153	0.0215	D(INFLATION)	-0.00031	0.0005	-0.6306	0.5289
D(INFLATION(-2))	0.00014	0.0003	0.4308	0.6670	D(INFLATION(-1))	0.00059	0.0004	1.5044	0.1338	D(INFLATION(-1))	0.00049	0.0004	1.3022	0.1941
D(INFLATION(-3))	0.00009	0.0005	0.2022	0.8399	D(INFLATION(-2))	0.00039	0.0003	1.2073	0.2285	D(INFLATION(-2))	0.00090	0.0003	3.5861	0.0004
D(GDPG)	-0.00008	0.0003	-0.2816	0.7785	D(INFLATION(-3))	0.00014	0.0004	0.3991	0.6901	D(INFLATION(-3))	0.00016	0.0004	0.3732	0.7093
D(GDPG(-1))	0.00003	0.0003	0.0974	0.9225	D(GDPG)	-0.00031	0.0004	-0.8717	0.3842	D(GDPG)	-0.00017	0.0004	-0.4268	0.6699
D(GDPG(-2))	0.00025	0.0003	0.9419	0.3471	D(GDPG(-1))	0.00004	0.0004	0.0894	0.9288	D(GDPG(-1))	0.00005	0.0005	0.1027	0.9183
D(GDPG(-3))	0.00013	0.0002	0.5961	0.5516	D(GDPG(-2))	0.00020	0.0002	0.8582	0.3916	D(GDPG(-2))	0.00009	0.0003	0.2787	0.7807
D(TRADE)	0.00020	0.0002	1.0958	0.2742	D(GDPG(-3))	0.00004	0.0002	0.2846	0.7762	D(GDPG(-3))	0.00011	0.0002	0.5739	0.5666
D(TRADE(-1))	-0.00008	0.0002	-0.5169	0.6057	D(TRADE)	0.00017	0.0001	1.3190	0.1884	D(TRADE)	0.00014	0.0002	0.8004	0.4243
D(TRADE(-2))	0.00020	0.0001	2.0575	0.0407	D(TRADE(-1))	0.00001	0.0002	0.0758	0.9396	D(TRADE(-1))	0.00007	0.0002	0.4286	0.6686
D(TRADE(-3))	0.00009	0.0001	0.6675	0.5051	D(TRADE(-2))	0.00015	0.0001	1.0881	0.2777	D(TRADE(-2))	0.00010	0.0001	0.8916	0.3735
D(UNEMPINTP)	0.00074	0.0005	1.5565	0.1209	D(TRADE(-3))	0.00011	0.0001	0.8491	0.3967	D(TRADE(-3))	0.00009	0.0001	0.7403	0.4599
D(UNEMPINTP(-1))	-0.00167	0.0008	-2.1204	0.0350	D(UNEMPINTP)	0.00010	0.0004	0.2415	0.8093	D(UNEMPINTP)	0.00054	0.0007	0.8266	0.4093
D(UNEMPINTP(-2))	0.00046	0.0006	0.7726	0.4405	D(UNEMPINTP(-1))	-0.00141	0.0008	-1.7558	0.0804	D(UNEMPINTP(-1))	-0.00045	0.0005	-0.8762	0.3818
D(UNEMPINTP(-3))	-0.00080	0.0009	-0.9383	0.3490	D(UNEMPINTP(-2))	-0.00019	0.0007	-0.2496	0.8031	D(UNEMPINTP(-2))	0.00006	0.0006	0.0976	0.9223
C	0.01521	0.0111	1.3751	0.1703	D(UNEMPINTP(-3))	-0.00092	0.0010	-0.9277	0.3545	D(UNEMPINTP(-3))	-0.00052	0.0008	-0.6344	0.5264
Mean dependent var	-0.00043	S.D. dependent var	0.0056		C	0.02645	0.0142	1.8616	0.0639	C	0.03112	0.0174	1.7919	0.0744
S.E. of regression	0.00409	Akaike info criterion	-7.4484		Mean dependent var	-0.00043	S.D. dependent var	0.0056		Mean dependent var	-0.00043	S.D. dependent var	0.0056	
Sum squared resid	0.00420	Schwarz criterion	-4.7367		S.E. of regression	0.00414	Akaike info criterion	-7.3941		S.E. of regression	0.00397	Akaike info criterion	-7.3874	
Log likelihood	2772.487	Hannan-Quinn criter.	-6.3958		Sum squared resid	0.00403	Schwarz criterion	-4.5708		Sum squared resid	0.00371	Schwarz criterion	-4.5642	
					Log likelihood	2771.112	Hannan-Quinn criter.	-6.2983		Log likelihood	2768.977	Hannan-Quinn criter.	-6.2916	

C.1.4 Panel ARDL model results contd.

Dependent Variable: D(PALMA RATIO)					Dependent Variable: D(PALMA RATIO)					Dependent Variable: D(PALMA RATIO)				
Method: ARDL					Method: ARDL					Method: ARDL				
Sample: 1984 2019 Included observations: 504 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 504 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Sample: 1984 2019 Included observations: 504 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
TAX	-0.50025	0.05957	-8.39762	0.0000	ADJSIZE	0.10002	0.04335	2.30712	0.0221	SPEND	0.92102	0.18902	4.87272	0.0000
INFLATION	0.01915	0.00588	3.25678	0.0013	INFLATION	-0.00044	0.00790	-0.05603	0.9554	INFLATION	0.02338	0.01455	1.60675	0.1097
GDPG	0.07510	0.01104	6.80412	0.0000	GDPG	0.01881	0.01629	1.15451	0.2497	GDPG	-0.02041	0.02545	-0.80193	0.4236
TRADE	0.00677	0.00117	5.78927	0.0000	TRADE	0.00618	0.00078	7.93369	0.0000	TRADE	0.00220	0.00163	1.34946	0.1788
UNEMPLOYMENT	0.12420	0.00777	15.99274	0.0000	UNEMPLOYMENT	0.06550	0.01000	6.54864	0.0000	UNEMPLOYMENT	0.05091	0.01480	3.43981	0.0007
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.03095	0.0100	-3.0876	0.0023	COINTEQ01	-0.03944	0.0134	-2.9389	0.0037	COINTEQ01	-0.03205	0.0135	-2.3659	0.0190
D(PALMA RATIO(-1))	-0.00141	0.1519	-0.0093	0.9926	D(PALMA RATIO(-1))	-0.05854	0.1606	-0.3645	0.7159	D(PALMA RATIO(-1))	-0.00941	0.1835	-0.0513	0.9592
D(PALMA RATIO(-2))	0.29335	0.1802	1.6275	0.1051	D(PALMA RATIO(-2))	0.26648	0.2136	1.2476	0.2137	D(PALMA RATIO(-2))	0.27918	0.2503	1.1155	0.2660
D(PALMA RATIO(-3))	0.91982	0.6261	1.4690	0.1433	D(PALMA RATIO(-3))	0.93877	0.6572	1.4285	0.1548	D(PALMA RATIO(-3))	0.92524	0.6866	1.3475	0.1794
D(TAX)	0.01973	0.0109	1.8104	0.0717	D(ADJSIZE)	0.00421	0.0040	1.0563	0.2922	D(SPEND)	-0.00758	0.0076	-0.9975	0.3198
D(TAX(-1))	0.00674	0.0136	0.4943	0.6216	D(ADJSIZE(-1))	0.00138	0.0063	0.2179	0.8277	D(SPEND(-1))	-0.00806	0.0055	-1.4667	0.1441
D(TAX(-2))	0.00929	0.0079	1.1784	0.2400	D(ADJSIZE(-2))	-0.00068	0.0052	-0.1325	0.8947	D(SPEND(-2))	-0.00512	0.0080	-0.6428	0.5211
D(TAX(-3))	0.00707	0.0037	1.8925	0.0598	D(ADJSIZE(-3))	0.00428	0.0035	1.2115	0.2272	D(SPEND(-3))	-0.00759	0.0094	-0.8045	0.4221
D(INFLATION)	0.00045	0.0013	0.3401	0.7341	D(INFLATION)	-0.00033	0.0016	-0.2112	0.8329	D(INFLATION)	-0.00138	0.0019	-0.7324	0.4648
D(INFLATION(-1))	0.00067	0.0025	0.2631	0.7927	D(INFLATION(-1))	0.00089	0.0027	0.3282	0.7431	D(INFLATION(-1))	-0.00129	0.0015	-0.8540	0.3942
D(INFLATION(-2))	0.00455	0.0024	1.9150	0.0569	D(INFLATION(-2))	0.00543	0.0030	1.7978	0.0738	D(INFLATION(-2))	0.00326	0.0024	1.3866	0.1672
D(INFLATION(-3))	0.00309	0.0015	2.0414	0.0425	D(INFLATION(-3))	0.00260	0.0017	1.5386	0.1255	D(INFLATION(-3))	0.00195	0.0016	1.2433	0.2153
D(GDPG)	0.00067	0.0013	0.5044	0.6145	D(GDPG)	0.00051	0.0009	0.5934	0.5536	D(GDPG)	0.00097	0.0011	0.8426	0.4005
D(GDPG(-1))	0.00039	0.0017	0.2242	0.8228	D(GDPG(-1))	0.00025	0.0019	0.1287	0.8977	D(GDPG(-1))	-0.00031	0.0014	-0.2313	0.8173
D(GDPG(-2))	0.00097	0.0017	0.5574	0.5779	D(GDPG(-2))	0.00213	0.0021	1.0195	0.3093	D(GDPG(-2))	0.00195	0.0015	1.2698	0.2057
D(GDPG(-3))	0.00013	0.0011	0.1168	0.9072	D(GDPG(-3))	0.00057	0.0011	0.5310	0.5960	D(GDPG(-3))	0.00089	0.0011	0.7808	0.4359
D(TRADE)	-0.00004	0.0006	-0.0609	0.9515	D(TRADE)	0.00026	0.0007	0.4028	0.6875	D(TRADE)	-0.00038	0.0009	-0.4315	0.6666
D(TRADE(-1))	0.00005	0.0008	0.0631	0.9498	D(TRADE(-1))	0.00036	0.0008	0.4466	0.6557	D(TRADE(-1))	0.00046	0.0008	0.5670	0.5714
D(TRADE(-2))	-0.00153	0.0005	-3.0603	0.0025	D(TRADE(-2))	-0.00171	0.0006	-2.6315	0.0092	D(TRADE(-2))	-0.00193	0.0008	-2.4034	0.0172
D(TRADE(-3))	-0.00102	0.0005	-1.9169	0.0566	D(TRADE(-3))	-0.00088	0.0006	-1.5300	0.1277	D(TRADE(-3))	-0.00104	0.0005	-1.9643	0.0509
D(UNEMPLOYMENT)	0.00158	0.0021	0.7679	0.4434	D(UNEMPLOYMENT)	0.00134	0.0018	0.7532	0.4523	D(UNEMPLOYMENT)	0.00255	0.0019	1.3266	0.1862
D(UNEMPLOYMENT(-1))	-0.00211	0.0020	-1.0692	0.2862	D(UNEMPLOYMENT(-1))	-0.00138	0.0029	-0.4807	0.6313	D(UNEMPLOYMENT(-1))	-0.00037	0.0034	-0.1068	0.9151
D(UNEMPLOYMENT(-2))	-0.00316	0.0020	-1.5601	0.1203	D(UNEMPLOYMENT(-2))	-0.00397	0.0031	-1.2768	0.2032	D(UNEMPLOYMENT(-2))	-0.00281	0.0031	-0.9050	0.3666
D(UNEMPLOYMENT(-3))	0.00087	0.0015	0.5695	0.5696	D(UNEMPLOYMENT(-3))	0.00076	0.0022	0.3404	0.7339	D(UNEMPLOYMENT(-3))	-0.00110	0.0026	-0.4175	0.6768
C	-0.02504	0.0229	-1.0912	0.2764	C	-0.00865	0.0232	-0.3738	0.7090	C	-0.00180	0.0252	-0.0714	0.9431
Mean dependent var	-0.00460	S.D. dependent var	0.0450	-	Mean dependent var	-0.00460	S.D. dependent var	0.0450	-	Mean dependent var	-0.00460	S.D. dependent var	0.0450	-
S.E. of regression	0.01581	Akaike info criterion	5.0532	-	S.E. of regression	0.01613	Akaike info criterion	-5.0159	-	S.E. of regression	0.01618	Akaike info criterion	-5.0206	-
Sum squared resid	0.05174	Schwarz criterion	2.3171	-	Sum squared resid	0.05021	Schwarz criterion	-2.1719	-	Sum squared resid	0.05054	Schwarz criterion	-2.1766	-
Log likelihood	1774.952	Hannan-Quinn criter.	3.9850	-	Log likelihood	1778.456	Hannan-Quinn criter.	-3.9055	-	Log likelihood	1779.796	Hannan-Quinn criter.	-3.9103	-

Appendix D – Driscoll Kraay Fixed Effects model results

D.1 Driscoll Kraay model results

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 624 Number = 16 F(6, 38) = 577.45 Prob > F = 0 within R-squared = 0.7824					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 624 Number = 16 F(6, 38) = 566.00 Prob > F = 0 within R-squared = 0.7824					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 624 Number = 16 F(6, 38) = 544.98 Prob > F = 0 within R-squared = 0.7822				
Adjustment Size Model					Spend Model					Tax Model																			
Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t
GiniLag1	0.83138	0.03265	25.46	0.0000	GiniLag1	0.83069	0.03266	25.43	0.0000	GiniLag1	0.83280	0.03181	26.18	0.0000	GiniLag1	0.83280	0.03181	26.18	0.0000	GiniLag1	0.83280	0.03181	26.18	0.0000	GiniLag1	0.83280	0.03181	26.18	0.0000
Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-
Unemployment	0.00052	0.00038	-1.36	0.1820	Unemployment	0.00085	0.00054	-1.56	0.1280	Unemployment	0.00072	0.00094	-0.77	0.4490	Unemployment	0.00072	0.00094	-0.77	0.4490	Unemployment	0.00072	0.00094	-0.77	0.4490	Unemployment	0.00072	0.00094	-0.77	0.4490
Inflation	0.00028	0.00013	2.13	0.0400	Inflation	0.00029	0.00013	2.27	0.0290	Inflation	0.00024	0.00013	1.83	0.0750	Inflation	0.00024	0.00013	1.83	0.0750	Inflation	0.00024	0.00013	1.83	0.0750	Inflation	0.00024	0.00013	1.83	0.0750
Trade	0.00042	0.00016	-2.72	0.0100	Trade	0.00043	0.00016	-2.74	0.0090	Trade	0.00041	0.00015	-2.75	0.0090	Trade	0.00041	0.00015	-2.75	0.0090	Trade	0.00041	0.00015	-2.75	0.0090	Trade	0.00041	0.00015	-2.75	0.0090
GDPG	0.00006	0.00004	1.65	0.1060	GDPG	0.00006	0.00004	1.7	0.0980	GDPG	0.00006	0.00003	1.63	0.1120	GDPG	0.00006	0.00003	1.63	0.1120	GDPG	0.00006	0.00003	1.63	0.1120	GDPG	0.00006	0.00003	1.63	0.1120
C	0.00035	0.00021	1.72	0.0940	C	0.00036	0.00021	1.74	0.0900	C	0.00037	0.00019	1.89	0.0660	C	0.00037	0.00019	1.89	0.0660	C	0.00037	0.00019	1.89	0.0660	C	0.00037	0.00019	1.89	0.0660
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 9.94 Prob > F = 0 within R-squared = 0.2211					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 10.28 Prob > F = 0 within R-squared = 0.2300					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 9.42 Prob > F = 0 within R-squared = 0.2076				
Adjustment Size Model					Spend Model					Tax Model																			
Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t
Labour Share Lag1	0.03237	0.11388	0.28	0.7780	Labour Share Lag1	0.02959	0.11357	0.26	0.7960	Labour Share Lag1	0.03764	0.11464	0.33	0.7450	Labour Share Lag1	0.03764	0.11464	0.33	0.7450	Labour Share Lag1	0.03764	0.11464	0.33	0.7450	Labour Share Lag1	0.03764	0.11464	0.33	0.7450
Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-	Adjustment Size	-	-	-	-
Unemployment	0.18735	0.07232	-2.59	0.0140	Unemployment	0.36382	0.12906	-2.82	0.0080	Unemployment	0.16024	0.13336	-1.2	0.2370	Unemployment	0.16024	0.13336	-1.2	0.2370	Unemployment	0.16024	0.13336	-1.2	0.2370	Unemployment	0.16024	0.13336	-1.2	0.2370
Inflation	0.13609	0.03241	-4.2	0.0000	Inflation	0.12755	0.03155	-4.04	0.0000	Inflation	0.15643	0.03626	-4.31	0.0000	Inflation	0.15643	0.03626	-4.31	0.0000	Inflation	0.15643	0.03626	-4.31	0.0000	Inflation	0.15643	0.03626	-4.31	0.0000
Trade	0.03426	0.02875	1.19	0.2410	Trade	0.03220	0.02942	1.09	0.2810	Trade	0.03423	0.02755	1.24	0.2220	Trade	0.03423	0.02755	1.24	0.2220	Trade	0.03423	0.02755	1.24	0.2220	Trade	0.03423	0.02755	1.24	0.2220
GDPG	0.00326	0.00523	0.62	0.5380	GDPG	0.00398	0.00518	0.77	0.4480	GDPG	0.00174	0.00545	0.32	0.7520	GDPG	0.00174	0.00545	0.32	0.7520	GDPG	0.00174	0.00545	0.32	0.7520	GDPG	0.00174	0.00545	0.32	0.7520
C	-	-	-	-	C	-	-	-	-	C	-	-	-	-	C	-	-	-	-	C	-	-	-	-	C	-	-	-	-
C	0.23023	0.05629	-4.09	0.0000	C	0.22913	0.05553	-4.13	0.0000	C	0.21943	0.05762	-3.81	0.0010	C	0.21943	0.05762	-3.81	0.0010	C	0.21943	0.05762	-3.81	0.0010	C	0.21943	0.05762	-3.81	0.0010
C	1.34954	0.56102	2.41	0.0210	C	1.25066	0.54592	2.29	0.0280	C	1.53187	0.60507	2.53	0.0160	C	1.53187	0.60507	2.53	0.0160	C	1.53187	0.60507	2.53	0.0160	C	1.53187	0.60507	2.53	0.0160

D.1.1 Full Sample results contd.

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 11.03 Prob > F = 0 within R-squared = 0.1251					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 11.22 Prob > F = 0 within R-squared = 0.1295					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 12.83 Prob > F = 0 within R-squared = 0.1203				
Adjustment Size Model					Spend Model					Tax Model																			
TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t															
TOP1 Lag1	-0.19901	0.04572	-4.35	0.0000	TOP1 Lag1	-0.19983	0.04532	-4.41	0.7450	TOP1 Lag1	-0.19779	0.04602	-4.3	0.0000															
Adjustment Size	0.00058	0.00032	1.80	0.0800	Spend	0.00122	0.00051	2.4	0.0220	Tax	0.00032	0.00061	0.53	0.5960															
Unemployment	0.00045	0.00012	3.78	0.0010	Unemployment	0.00041	0.00012	3.52	0.0010	Unemployment	0.00052	0.00012	4.43	0.0000															
Inflation	0.00001	0.00010	0.07	0.9420	Inflation	0.00001	0.00010	0.13	0.8940	Inflation	0.00001	0.00010	0.09	0.9270															
Trade	0.000004	0.00002	0.22	0.8250	Trade	0.000001	0.00002	0.05	0.9580	Trade	0.00001	0.00002	0.51	0.6110															
GDPG	0.00106	0.00024	4.40	0.0000	GDPG	0.00106	0.00023	4.54	0.0000	GDPG	0.00102	0.00025	4.06	0.0000															
C	-0.00563	0.00216	-2.61	0.0130	C	-0.00522	0.00212	-2.46	0.0190	C	-0.00627	0.00221	-2.83	0.0070															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 13.68 Prob > F = 0 within R-squared = 0.0968					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 13.53 Prob > F = 0 within R-squared = 0.0979					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 608 Number = 16 F(6, 37) = 13.39 Prob > F = 0 within R-squared = 0.0964				
Adjustment Size Model					Spend Model					Tax Model																			
TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t															
TOP10 Lag1	-0.19734	0.05116	-3.86	0.0000	TOP10 Lag1	-0.19728	0.05100	-3.87	0.0000	TOP1 Lag1	-0.19757	0.05104	-3.87	0.0000															
Adjustment Size	0.00021	0.00035	0.61	0.5470	Spend	0.00064	0.00056	1.13	0.2660	Tax	-0.00020	0.00069	-0.28	0.7790															
Unemployment	0.00055	0.00016	3.52	0.0010	Unemployment	0.00051	0.00015	3.49	0.0010	Unemployment	0.00059	0.00015	3.88	0.0000															
Inflation	0.00017	0.00016	1.04	0.3040	Inflation	0.00017	0.00017	1.03	0.3070	Inflation	0.00017	0.00016	1.09	0.2830															
Trade	0.000005	0.00002	0.21	0.8310	Trade	0.000002	0.00002	0.09	0.9270	Trade	0.000008	0.00002	0.36	0.7190															
GDPG	0.00110	0.00022	5.09	0.0000	GDPG	0.00111	0.00021	5.25	0.0000	GDPG	0.00107	0.00022	4.89	0.0000															
C	-0.00622	0.00206	-3.02	0.0050	C	-0.00588	0.00206	-2.86	0.0070	C	-0.00657	0.00201	-3.26	0.0020															

D.1.2 Driscoll Kraay model results contd.

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 624 Number = 16 F(6, 38) = 452.57 Prob > F = 0 within R-squared = 0.7399					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 624 Number = 16 F(6, 38) = 420.88 Prob > F = 0 within R-squared = 0.7401					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 624 Number = 16 F(6, 38) = 485.03 Prob > F = 0 within R-squared = 0.7393				
Adjustment Size Model					Spend Model					Tax Model																			
BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t
BOT40 Lag1	0.80642	0.04084	19.75	0.0000	BOT40 Lag1	0.80547	0.04075	19.76	0.0000	BOT40 Lag1	0.80841	0.04018	20.12	0.0000	BOT40 Lag1	0.80841	0.04018	20.12	0.0000	BOT40 Lag1	0.80841	0.04018	20.12	0.0000	BOT40 Lag1	0.80841	0.04018	20.12	0.0000
Adjustment Size	0.00036	0.00020	1.77	0.0850	Spend	0.00060	0.00030	2.02	0.0510	Tax	0.00047	0.00050	0.95	0.3470	Adjustment Size	0.00036	0.00020	1.77	0.0850	Spend	0.00060	0.00030	2.02	0.0510	Tax	0.00047	0.00050	0.95	0.3470
Unemployment	0.00011	0.00007	-1.49	0.1430	Unemployment	0.00011	0.00006	-1.78	0.0830	Unemployment	0.00008	0.00008	-0.99	0.3270	Unemployment	0.00011	0.00007	-1.49	0.1430	Unemployment	0.00011	0.00007	-1.49	0.1430	Unemployment	0.00011	0.00007	-1.49	0.1430
Inflation	0.00012	0.00006	1.84	0.0730	Inflation	0.00012	0.00007	1.89	0.0670	Inflation	0.00011	0.00006	1.8	0.0800	Inflation	0.00012	0.00006	1.84	0.0730	Inflation	0.00012	0.00006	1.84	0.0730	Inflation	0.00012	0.00006	1.84	0.0730
Trade	0.00003	0.00002	-1.51	0.1390	Trade	0.00003	0.00002	-1.58	0.1220	Trade	0.00003	0.00002	-1.43	0.1600	Trade	0.00003	0.00002	-1.51	0.1390	Trade	0.00003	0.00002	-1.51	0.1390	Trade	0.00003	0.00002	-1.51	0.1390
GDPG	0.00000	0.00011	0.03	0.9760	GDPG	0.00000	0.00012	-0.03	0.9780	GDPG	0.00001	0.00010	-0.08	0.9350	GDPG	0.00000	0.00011	0.03	0.9760	GDPG	0.00000	0.00012	-0.03	0.9780	GDPG	0.00001	0.00010	-0.08	0.9350
C	0.03467	0.00797	4.35	0.0000	C	0.03492	0.00791	4.42	0.0000	C	0.03403	0.00777	4.38	0.0000	C	0.03467	0.00797	4.35	0.0000	C	0.03492	0.00791	4.42	0.0000	C	0.03403	0.00777	4.38	0.0000
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 546 Number = 14 F(6, 37) = 5156.88 Prob > F = 0 within R-squared = 0.9963					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 546 Number = 14 F(6, 37) = 4862.23 Prob > F = 0 within R-squared = 0.9963					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 546 Number = 14 F(6, 37) = 4187.59 Prob > F = 0 within R-squared = 0.9963				
Adjustment Size Model					Spend Model					Tax Model																			
Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t
Palma Ratio Lag1	0.96994	0.00790	122.71	0.0000	Palma Ratio Lag1	0.97016	0.00796	121.82	0.0000	Palma Ratio Lag1	0.96986	0.00773	125.44	0.0000	Palma Ratio Lag1	0.96994	0.00790	122.71	0.0000	Palma Ratio Lag1	0.97016	0.00796	121.82	0.0000	Palma Ratio Lag1	0.96986	0.00773	125.44	0.0000
Adjustment Size	0.00037	0.00103	-0.36	0.7190	Spend	0.00054	0.00189	0.29	0.7770	Tax	0.00230	0.00215	-1.07	0.2920	Adjustment Size	0.00037	0.00103	-0.36	0.7190	Spend	0.00054	0.00189	0.29	0.7770	Tax	0.00230	0.00215	-1.07	0.2920
Unemployment	0.00001	0.00043	-0.02	0.9870	Unemployment	0.00012	0.00044	-0.27	0.7860	Unemployment	0.00006	0.00038	0.15	0.8810	Unemployment	0.00001	0.00043	-0.02	0.9870	Unemployment	0.00012	0.00044	-0.27	0.7860	Unemployment	0.00006	0.00038	0.15	0.8810
Inflation	0.00046	0.00021	2.22	0.0320	Inflation	0.00045	0.00020	2.24	0.0310	Inflation	0.00047	0.00021	2.23	0.0320	Inflation	0.00046	0.00021	2.22	0.0320	Inflation	0.00045	0.00020	2.24	0.0310	Inflation	0.00047	0.00021	2.23	0.0320
Trade	0.00005	0.00005	0.87	0.3890	Trade	0.00004	0.00005	0.69	0.4930	Trade	0.00005	0.00005	0.96	0.3410	Trade	0.00005	0.00005	0.87	0.3890	Trade	0.00004	0.00005	0.69	0.4930	Trade	0.00005	0.00005	0.96	0.3410
GDPG	0.00004	0.00037	-0.12	0.9080	GDPG	0.00002	0.00035	0.06	0.9550	GDPG	0.00013	0.00038	-0.35	0.7310	GDPG	0.00004	0.00037	-0.12	0.9080	GDPG	0.00002	0.00035	0.06	0.9550	GDPG	0.00013	0.00038	-0.35	0.7310
C	0.03007	0.01073	2.8	0.0080	C	0.03084	0.01063	2.9	0.0060	C	0.02978	0.01086	2.74	0.0090	C	0.03007	0.01073	2.8	0.0080	C	0.03084	0.01063	2.9	0.0060	C	0.02978	0.01086	2.74	0.0090

Appendix E – Pooled OLS model results

E.1 Pooled OLS model results

Dependent Variable: GINI Method: Panel Least Squares Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: GINI Method: Panel Least Squares Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: GINI Method: Panel Least Squares Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624				
Adjustment Size Model					Spend Model					Tax Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
GINILAG1	0.97929	0.00750	130.5510	0.0000	GINILAG1	0.97935	0.00751	130.4862	0.0000	C	0.00995	0.00368	2.7056	0.0070
INFLATION	-0.00006	0.00014	-0.4427	0.6581	SPEND	0.00019	0.00076	0.2468	0.8052	GINILAG1	0.97928	0.00750	130.5512	0.0000
UNEMPLOYMENT	0.00008	0.00013	0.6670	0.5050	INFLATION	-0.00006	0.00014	-0.4256	0.6706	INFLATION	-0.00006	0.00014	-0.4442	0.6570
TRADE	-0.00004	0.00001	-2.5285	0.0117	UNEMPLOYMENT	0.00008	0.00013	0.6347	0.5258	UNEMPLOYMENT	0.00009	0.00012	0.7389	0.4603
GDPG	0.00057	0.00021	2.7594	0.0060	TRADE	-0.00004	0.00001	-2.5449	0.0112	TRADE	-0.00004	0.00001	-2.5101	0.0123
ADJUSTMENT SIZE	0.00006	0.00048	0.1284	0.8979	GDPG	0.00057	0.00020	2.8098	0.0051	GDPG	0.00056	0.00021	2.7140	0.0068
C	0.00996	0.00368	2.7106	0.0069	C	0.00995	0.00368	2.7070	0.0070	TAX	-0.00006	0.00099	-0.0588	0.9531
R-squared	0.9707	Mean dependent var	0.3910		R-squared	0.9707	Mean dependent var	0.3910		R-squared	0.9707	Mean dependent var	0.3910	
Adjusted R-squared	0.9704	S.D. dependent var	0.0690		Adjusted R-squared	0.9704	S.D. dependent var	0.0690		Adjusted R-squared	0.9704	S.D. dependent var	0.0690	
S.E. of regression	0.0119	Akaike info criterion	6.0174	-	S.E. of regression	0.0119	Akaike info criterion	6.0175	-	S.E. of regression	0.0119	Akaike info criterion	6.0174	-
Sum squared resid	0.0870	Schwarz criterion	5.9676	-	Sum squared resid	0.0870	Schwarz criterion	5.9677	-	Sum squared resid	0.0870	Schwarz criterion	5.9676	-
Log likelihood	1884.4250	Hannan-Quinn criter.	5.9981	-	Log likelihood	1884.4480	Hannan-Quinn criter.	5.9981	-	Log likelihood	1884.4190	Hannan-Quinn criter.	5.9980	-
F-statistic	3406.4830	Durbin-Watson stat	2.4491		F-statistic	3406.7350	Durbin-Watson stat	2.4500		F-statistic	3406.4090	Durbin-Watson stat	2.4481	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			

E.1.1 Pooled OLS model results contd.

Dependent Variable: LABOUR SHARE Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: LABOUR SHARE Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: LABOUR SHARE Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608							
Adjustment Size Model					Spend Model					Tax Model							
Variable		Coefficient	Std. Error	t-Statistic	Prob.	Variable		Coefficient	Std. Error	t-Statistic	Prob.	Variable		Coefficient	Std. Error	t-Statistic	Prob.
C	0.4402	0.1090	4.0381	0.0001	C	0.4473	0.1073	4.1680	0.0000	C	0.4634	0.1138	4.0732	0.0001			
DLABLAG1	0.1091	0.0373	2.9221	0.0036	DLABLAG1	0.0970	0.0367	2.6427	0.0084	DLABLAG1	0.1235	0.0383	3.2241	0.0013			
INFLATION	0.0386	0.0114	3.3745	0.0008	INFLATION	0.0370	0.0114	3.2599	0.0012	INFLATION	0.0342	0.0127	2.6930	0.0073			
UNEMPLOYMENT	-0.0298	0.0077	-3.8593	0.0001	UNEMPLOYMENT	-0.0285	0.0076	-3.7419	0.0002	UNEMPLOYMENT	-0.0383	0.0084	-4.5323	0.0000			
TRADE	0.0023	0.0008	2.8115	0.0051	TRADE	0.0024	0.0008	3.0526	0.0024	TRADE	0.0016	0.0009	1.8742	0.0614			
GDPG	-0.1778	0.0187	-9.4951	0.0000	GDPG	-0.1817	0.0184	-9.8725	0.0000	GDPG	-0.1629	0.0190	-8.5911	0.0000			
ADJUSTMENT SIZE	-0.2019	0.0285	-7.0719	0.0000	SPEND	-0.3815	0.0444	-8.5900	0.0000	TAX	-0.1880	0.0616	-3.0503	0.0024			
Weighted Statistics																	
R-squared	0.2184	Mean dependent var		-0.0366	R-squared	0.2492	Mean dependent var		-0.0413	R-squared	0.1725	Mean dependent var		-0.0362			
Adjusted R-squared	0.2106	S.D. dependent var		1.1269	Adjusted R-squared	0.2417	S.D. dependent var		1.1498	Adjusted R-squared	0.1642	S.D. dependent var		1.0952			
S.E. of regression	0.9996	Sum squared resid		600.4632	S.E. of regression	1.0001	Sum squared resid		601.0851	S.E. of regression	0.9981	Sum squared resid		598.7722			
F-statistic	27.9961	Durbin-Watson stat		1.8638	F-statistic	33.2424	Durbin-Watson stat		1.8670	F-statistic	20.8772	Durbin-Watson stat		1.8557			
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000						
Unweighted Statistics																	
R-squared	0.1755	Mean dependent var		-0.0582	R-squared	0.1889	Mean dependent var		-0.0582	R-squared	0.1541	Mean dependent var		-0.0582			
Sum squared resid	987.0014	Durbin-Watson stat		1.7828	Sum squared resid	971.0034	Durbin-Watson stat		1.7666	Sum squared resid	1012.6710	Durbin-Watson stat		1.7963			

E.1.2 Pooled OLS model results contd.

Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608				
Adjustment Size Model					Spend Model					Tax Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0009	0.0007	-1.2791	0.2014	C	-0.0010	0.0007	-1.4325	0.1525	C	-0.0007	0.0007	-0.9112	0.3626
TOP1LAG1	-0.1773	0.0375	-4.7240	0.0000	TOP1LAG1	-0.1849	0.0371	-4.9885	0.0000	TOP1LAG1	-0.1706	0.0383	-4.4555	0.0000
INFLATION	0.0000	0.0001	0.0358	0.9715	INFLATION	0.0000	0.0001	0.6972	0.4859	INFLATION	0.0000	0.0001	-0.3916	0.6955
UNEMPLOYMENT	0.0001	0.0001	1.3124	0.1899	UNEMPLOYMENT	0.0001	0.0001	1.0615	0.2889	UNEMPLOYMENT	0.0001	0.0001	1.9792	0.0482
TRADE	0.0000	0.0000	-3.7449	0.0002	TRADE	0.0000	0.0000	-3.8074	0.0002	TRADE	0.0000	0.0000	-3.5123	0.0005
GDPG	0.0009	0.0001	9.6941	0.0000	GDPG	0.0009	0.0001	10.5625	0.0000	GDPG	0.0008	0.0001	7.9962	0.0000
ADJUSTMENT SIZE	0.0009	0.0002	5.2417	0.0000	SPEND	0.0018	0.0003	6.5774	0.0000	TAX	0.0008	0.0004	2.2291	0.0262
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.1619	Mean dependent var		0.1188	R-squared	0.1915	Mean dependent var		0.1237	R-squared	0.1194	Mean dependent var		0.1053
Adjusted R-squared	0.1536	S.D. dependent var		1.0946	Adjusted R-squared	0.1834	S.D. dependent var		1.1146	Adjusted R-squared	0.1107	S.D. dependent var		1.0669
S.E. of regression	1.0002	Sum squared resid		601.2012	S.E. of regression	0.9993	Sum squared resid		600.1542	S.E. of regression	1.0011	Sum squared resid		602.2972
F-statistic	19.3534	Durbin-Watson stat		2.0517	F-statistic	23.7239	Durbin-Watson stat		2.0558	F-statistic	13.5869	Durbin-Watson stat		2.0492
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.0995	Mean dependent var		0.0009	R-squared	0.1066	Mean dependent var		0.0009	R-squared	0.0903	Mean dependent var		0.0009
Sum squared resid	0.0312	Durbin-Watson stat		2.0358	Sum squared resid	0.0310	Durbin-Watson stat		2.0329	Sum squared resid	0.0315	Durbin-Watson stat		2.0385

E.1.3 Pooled OLS model results contd.

Dependent Variable: TOP10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: TOP10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: TOP10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Periods included: 38 Cross-sections included: 16 Total panel (balanced) observations: 608				
Adjustment Size Model					Spend Model					Tax Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0001	0.0009	0.0857	0.9317	C	0.0000	0.0008	0.0306	0.9756	C	0.0000	0.0009	-0.0020	0.9984
TOP10LAG1	-0.1900	0.0379	-5.0133	0.0000	TOP10LAG1	-0.1932	0.0376	-5.1390	0.0000	TOP10LAG1	-0.1838	0.0383	-4.8054	0.0000
INFLATION	0.0002	0.0001	2.0114	0.0447	INFLATION	0.0002	0.0001	2.2490	0.0249	INFLATION	0.0002	0.0001	1.8180	0.0696
UNEMPLOYMENT	0.0000	0.0001	0.0118	0.9906	UNEMPLOYMENT	0.0000	0.0001	-0.1599	0.8730	UNEMPLOYMENT	0.0001	0.0001	0.7344	0.4630
TRADE	0.0000	0.0000	-3.4512	0.0006	TRADE	0.0000	0.0000	-3.5036	0.0005	TRADE	0.0000	0.0000	-3.1161	0.0019
GDPG	0.0010	0.0001	8.0649	0.0000	GDPG	0.0010	0.0001	8.5040	0.0000	GDPG	0.0009	0.0001	7.2084	0.0000
ADJUSTMENT SIZE	0.0010	0.0003	3.7818	0.0002	SPEND	0.0019	0.0004	4.8234	0.0000	TAX	0.0008	0.0005	1.4612	0.1445
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.1367	Mean dependent var		0.1616	R-squared	0.1527	Mean dependent var		0.1638	R-squared	0.1150	Mean dependent var		0.1547
Adjusted R-squared	0.1281	S.D. dependent var		1.0904	Adjusted R-squared	0.1443	S.D. dependent var		1.1018	Adjusted R-squared	0.1061	S.D. dependent var		1.0762
S.E. of regression	1.0011	Sum squared resid		602.3250	S.E. of regression	1.0006	Sum squared resid		601.6893	S.E. of regression	1.0026	Sum squared resid		604.1559
F-statistic	15.8597	Durbin-Watson stat		2.0116	F-statistic	18.0532	Durbin-Watson stat		2.0134	F-statistic	13.0103	Durbin-Watson stat		2.0102
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.0714	Mean dependent var		0.0014	R-squared	0.0744	Mean dependent var		0.0014	R-squared	0.0695	Mean dependent var		0.0014
Sum squared resid	0.0522	Durbin-Watson stat		1.9974	Sum squared resid	0.0521	Durbin-Watson stat		1.9988	Sum squared resid	0.0523	Durbin-Watson stat		2.0025

E.1.4 Pooled OLS model results contd.

Dependent Variable: BOT40 Method: Panel Least Squares Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: BOT40 Method: Panel Least Squares Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: BOT40 Method: Panel Least Squares Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624				
Adjustment Size Model					Spend Model					Tax Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.00204	0.00114	1.8017	0.0721	C	0.00205	0.00114	1.8053	0.0715	C	0.00203	0.00113	1.7873	0.0744
BOT40LAG1	0.98431	0.00632	155.6554	0.0000	BOT40LAG1	0.98426	0.00633	155.5979	0.0000	BOT40LAG1	0.98437	0.00632	155.6479	0.0000
INFLATION	-0.00007	0.00007	-1.0895	0.2763	INFLATION	-0.00007	0.00007	-1.0645	0.2875	INFLATION	-0.00007	0.00007	-1.1192	0.2635
UNEMPLOYMENT	-0.00003	0.00006	-0.5200	0.6033	UNEMPLOYMENT	-0.00003	0.00006	-0.5110	0.6095	UNEMPLOYMENT	-0.00003	0.00006	-0.4682	0.6398
TRADE	0.00001	0.00001	1.7201	0.0859	TRADE	0.00001	0.00001	1.7300	0.0841	TRADE	0.00001	0.00001	1.7456	0.0814
GDPG	-0.00011	0.00010	-1.1247	0.2611	GDPG	-0.00011	0.00010	-1.1643	0.2448	GDPG	-0.00011	0.00010	-1.1552	0.2485
ADJUSTMENT SIZE	0.00011	0.00023	0.4877	0.6260	SPEND	0.00017	0.00036	0.4729	0.6364	TAX	0.00018	0.00047	0.3792	0.7046
R-squared	0.9788	Mean dependent var	0.1688		R-squared	0.9787	Mean dependent var	0.1688		R-squared	0.9787	Mean dependent var	0.1688	
Adjusted R-squared	0.9785	S.D. dependent var	0.0382		Adjusted R-squared	0.9785	S.D. dependent var	0.0382		Adjusted R-squared	0.9785	S.D. dependent var	0.0382	
S.E. of regression	0.0056	Akaike info criterion	-	7.5210	S.E. of regression	0.0056	Akaike info criterion	-	7.5209	S.E. of regression	0.0056	Akaike info criterion	-	7.5208
Sum squared resid	0.0193	Schwarz criterion	-	7.4712	Sum squared resid	0.0193	Schwarz criterion	-	7.4712	Sum squared resid	0.0194	Schwarz criterion	-	7.4710
Log likelihood	2353.5390	Hannan-Quinn criter.	-	7.5016	Log likelihood	2353.5320	Hannan-Quinn criter.	-	7.5016	Log likelihood	2353.4910	Hannan-Quinn criter.	-	7.5015
F-statistic	4736.3390	Durbin-Watson stat	2.3691		F-statistic	4736.2270	Durbin-Watson stat	2.3692		F-statistic	4735.6020	Durbin-Watson stat	2.3700	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			

E.1.5 Pooled OLS model results contd.

Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 14 Total panel (balanced) observations: 546					Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 14 Total panel (balanced) observations: 546					Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 14 Total panel (balanced) observations: 546				
Adjustment Size Model					Spend Model					Tax Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0460	0.0029	16.0884	0.0000	C	0.0463	0.0028	16.3466	0.0000	C	0.0463	0.0029	15.7599	0.0000
PALMA RATIOLAG1	0.9596	0.0015	623.6849	0.0000	PALMA RATIOLAG1	0.9596	0.0015	625.9976	0.0000	PALMA RATIOLAG1	0.9596	0.0016	610.2525	0.0000
INFLATION	0.0005	0.0001	4.0225	0.0001	INFLATION	0.0005	0.0001	3.9892	0.0001	INFLATION	0.0005	0.0001	4.0908	0.0000
UNEMPLOYMENT	0.0007	0.0001	6.2880	0.0000	UNEMPLOYMENT	0.0007	0.0001	6.2468	0.0000	UNEMPLOYMENT	0.0007	0.0001	6.1455	0.0000
TRADE	-0.0001	0.00003	-4.8832	0.0000	TRADE	-0.0001	0.00003	-5.0967	0.0000	TRADE	-0.0001	0.00003	-4.9048	0.0000
GDPG	0.0012	0.0002	6.6153	0.0000	GDPG	0.0012	0.0002	6.9918	0.0000	GDPG	0.0012	0.0002	6.5801	0.0000
ADJUSTMENT SIZE	-0.0013	0.0005	-2.8865	0.0041	SPEND	-0.0018	0.0007	-2.5673	0.0105	TAX	-0.0021	0.0010	-2.1832	0.0295
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.9991	Mean dependent var		109.5096	R-squared	0.9992	Mean dependent var		112.1923	R-squared	0.9991	Mean dependent var		104.1026
Adjusted R-squared	0.9991	S.D. dependent var		126.9216	Adjusted R-squared	0.9992	S.D. dependent var		132.3742	Adjusted R-squared	0.9991	S.D. dependent var		119.1601
S.E. of regression	0.9970	Sum squared resid		535.7740	S.E. of regression	0.9978	Sum squared resid		536.5947	S.E. of regression	0.9960	Sum squared resid		534.7115
F-statistic	104271.1000	Durbin-Watson stat		1.6218	F-statistic	107015.3000	Durbin-Watson stat		1.6232	F-statistic	98461.4800	Durbin-Watson stat		1.6159
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.9983	Mean dependent var		1.2873	R-squared	0.9983	Mean dependent var		1.2873	R-squared	0.9983	Mean dependent var		1.2873
Sum squared resid	0.5068	Durbin-Watson stat		1.2572	Sum squared resid	0.5073	Durbin-Watson stat		1.2539	Sum squared resid	0.5073	Durbin-Watson stat		1.2606

E.1.6 Pooled OLS model results contd.

Dependent Variable: MID40 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: MID40 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: MID40 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Periods included: 39 Cross-sections included: 16 Total panel (balanced) observations: 624				
Adjustment Size Model					Spend Model					Tax Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0097	0.0028	3.4723	0.0006	C	0.0094	0.0028	3.3890	0.0007	C	0.0101	0.0028	3.6013	0.0003
MID40LAG1	0.9783	0.0062	159.0657	0.0000	MID40LAG1	0.9791	0.0061	159.7931	0.0000	MID40LAG1	0.9775	0.0061	159.1360	0.0000
INFLATION	0.0001	0.0001	2.4189	0.0159	INFLATION	0.0001	0.0001	2.1112	0.0352	INFLATION	0.0001	0.0001	2.5922	0.0098
UNEMPLOYMENT	-0.000001	0.00005	-0.0135	0.9892	UNEMPLOYMENT	-0.000001	0.00005	-0.0186	0.9852	UNEMPLOYMENT	-0.00003	0.00005	-0.5294	0.5967
TRADE	0.00001	0.00001	2.0330	0.0425	TRADE	0.00001	0.00001	1.9675	0.0496	TRADE	0.00001	0.00001	1.8266	0.0682
GDPG	-0.0006	0.0001	-7.7776	0.0000	GDPG	-0.0006	0.0001	-8.0732	0.0000	GDPG	-0.0006	0.0001	-6.9315	0.0000
ADJUSTMENT SIZE	-0.0006	0.0002	-3.2301	0.0013	SPEND	-0.0011	0.0003	-3.6661	0.0003	TAX	-0.0007	0.0004	-1.8768	0.0610
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.9792	Mean dependent var	78.6759		R-squared	0.9794	Mean dependent var	78.8319		R-squared	0.9793	Mean dependent var	76.4292	
Adjusted R-squared	0.9790	S.D. dependent var	60.1563		Adjusted R-squared	0.9792	S.D. dependent var	60.0639		Adjusted R-squared	0.9791	S.D. dependent var	56.8912	
S.E. of regression	1.0003	Sum squared resid	617.4233		S.E. of regression	0.9996	Sum squared resid	616.4734		S.E. of regression	1.0007	Sum squared resid	617.8365	
F-statistic	4837.1590	Durbin-Watson stat	2.1940		F-statistic	4877.5900	Durbin-Watson stat	2.1975		F-statistic	4874.8540	Durbin-Watson stat	2.1976	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.9537	Mean dependent var	0.4561		R-squared	0.9538	Mean dependent var	0.4561		R-squared	0.9534	Mean dependent var	0.4561	
Sum squared resid	0.0268	Durbin-Watson stat	2.4308		Sum squared resid	0.0267	Durbin-Watson stat	2.4374		Sum squared resid	0.0270	Durbin-Watson stat	2.4229	

Appendix F – Large adjustment size countries estimation results

F.1 Panel ARDL model results

Dependent Variable: D(GINI) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(GINI) Method: ARDL Sample: 1982 2019 Included observations: 342 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(2, 1, 1, 1, 1, 1)					Dependent Variable: D(GINI) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	0.01153	0.0054	2.1266	0.0355	SPEND	-0.00372	0.0028	-1.3256	0.1860	TAX	0.04076	0.0118	3.4507	0.0008
INFLATION	-0.01219	0.0017	-6.9783	0.0000	INFLATION	-0.00248	0.0006	-4.2697	0.0000	INFLATION	-0.00843	0.0011	-7.4934	0.0000
GDPG	0.03374	0.0045	7.5223	0.0000	GDPG	0.00260	0.0016	1.6320	0.1038	GDPG	0.02746	0.0042	6.5073	0.0000
TRADE	0.00144	0.0001	13.8341	0.0000	TRADE	-0.00021	0.0001	-1.9687	0.0500	TRADE	0.00160	0.0001	16.0347	0.0000
UNEMPLOYMENT	0.00652	0.0008	7.9764	0.0000	UNEMPLOYMENT	0.00233	0.0008	3.0392	0.0026	UNEMPLOYMENT	0.00634	0.0011	5.9627	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.16823	0.1327	-1.2680	0.2072	COINTEQ01	-0.27088	0.0663	-4.0835	0.0001	COINTEQ01	-0.17145	0.1252	-1.3695	0.1732
D(GINI(-1))	-0.46225	0.0900	-5.1358	0.0000	D(GINI(-1))	-0.19881	0.0641	-3.1027	0.0021	D(GINI(-1))	-0.37806	0.0862	-4.3866	0.0000
D(GINI(-2))	-0.29532	0.1078	-2.7384	0.0071	D(SPEND)	-0.00219	0.0013	-1.6817	0.0937	D(GINI(-2))	-0.23678	0.1236	-1.9158	0.0576
D(GINI(-3))	-0.10453	0.1118	-0.9350	0.3516	D(INFLATION)	0.00152	0.0006	2.3406	0.0199	D(GINI(-3))	0.02885	0.1504	0.1918	0.8482
D(ADJSIZE)	-0.00368	0.0030	-1.2451	0.2155	D(GDPG)	0.00054	0.0002	2.3173	0.0212	D(TAX)	-0.00997	0.0069	-1.4413	0.1519
D(ADJSIZE(-1))	-0.00420	0.0025	-1.7123	0.0894	D(TRADE)	-0.00026	0.0002	-1.2171	0.2246	D(TAX(-1))	-0.01078	0.0076	-1.4173	0.1588
D(ADJSIZE(-2))	-0.00304	0.0017	-1.8300	0.0697	D(UNEMPLOYMENT)	0.00052	0.0012	0.4234	0.6723	D(TAX(-2))	-0.00698	0.0033	-2.1363	0.0345
D(ADJSIZE(-3))	-0.00202	0.0024	-0.8317	0.4072	C	0.10297	0.0259	3.9780	0.0001	D(TAX(-3))	-0.00776	0.0060	-1.2865	0.2006
D(INFLATION)	0.00346	0.0009	3.8220	0.0002						D(INFLATION)	0.00220	0.0005	4.2699	0.0000
D(INFLATION(-1))	-0.00131	0.0012	-1.1311	0.2602	Mean dependent var	0.0011	S.D. dependent var	0.0137		D(INFLATION(-1))	-0.00102	0.0011	-0.8927	0.3737
D(INFLATION(-2))	0.00104	0.0015	0.7064	0.4813	S.E. of regression	0.0121	Akaike info criterion	-5.6397		D(INFLATION(-2))	0.00111	0.0013	0.8783	0.3814
D(INFLATION(-3))	0.00271	0.0028	0.9577	0.3401	Sum squared resid	0.0413	Schwarz criterion	-4.8085		D(INFLATION(-3))	0.00355	0.0032	1.1108	0.2687
D(GDPG)	-0.00368	0.0034	-1.0722	0.2857	Log likelihood	1092.1420	Hannan-Quinn criter.	-5.3092		D(GDPG)	-0.00457	0.0024	-1.9088	0.0585
D(GDPG(-1))	-0.00312	0.0025	-1.2463	0.2150						D(GDPG(-1))	-0.00427	0.0022	-1.9024	0.0593
D(GDPG(-2))	-0.00007	0.0013	-0.0529	0.9579						D(GDPG(-2))	0.00020	0.0014	0.1440	0.8857
D(GDPG(-3))	-0.00095	0.0008	-1.1504	0.2523						D(GDPG(-3))	-0.00097	0.0008	-1.2592	0.2102
D(TRADE)	-0.00065	0.0003	-2.3079	0.0227						D(TRADE)	-0.00024	0.0003	-0.8325	0.4067
D(TRADE(-1))	0.00085	0.0009	0.9249	0.3568						D(TRADE(-1))	0.00050	0.0009	0.5671	0.5716
D(TRADE(-2))	-0.00043	0.0005	-0.8700	0.3860						D(TRADE(-2))	-0.00089	0.0003	-2.7903	0.0061
D(TRADE(-3))	-0.00014	0.0004	-0.3355	0.7378						D(TRADE(-3))	-0.00043	0.0006	-0.7830	0.4350
D(UNEMPLOYMENT)	0.00319	0.0025	1.2914	0.1990						D(UNEMPLOYMENT)	-0.00062	0.0023	-0.2648	0.7916
D(UNEMPLOYMENT(-1))	0.01030	0.0054	1.9227	0.0569						D(UNEMPLOYMENT(-1))	0.00708	0.0042	1.6874	0.0939
D(UNEMPLOYMENT(-2))	0.00325	0.0014	2.4060	0.0176						D(UNEMPLOYMENT(-2))	0.00327	0.0010	3.4112	0.0009
D(UNEMPLOYMENT(-3))	-0.00317	0.0014	-2.2853	0.0240						D(UNEMPLOYMENT(-3))	-0.00285	0.0015	-1.9423	0.0543
C	0.02704	0.0169	1.5973	0.1128						C	0.02754	0.0158	1.7467	0.0831
Mean dependent var	0.0009	S.D. dependent var	0.0135		Mean dependent var	0.0009	S.D. dependent var	0.0135		Mean dependent var	0.0009	S.D. dependent var	0.0135	
S.E. of regression	0.0107	Akaike info criterion	-5.4695		S.E. of regression	0.0109	Akaike info criterion	-5.3795		S.E. of regression	0.0109	Akaike info criterion	-5.3795	
Sum squared resid	0.0139	Schwarz criterion	-2.8895		Sum squared resid	0.0155	Schwarz criterion	-2.8967		Sum squared resid	0.0155	Schwarz criterion	-2.8967	
Log likelihood	1223.5030	Hannan-Quinn criter.	-4.4436		Log likelihood	1198.3060	Hannan-Quinn criter.	-4.3923		Log likelihood	1198.3060	Hannan-Quinn criter.	-4.3923	

F.1.1 Panel ARDL model results contd.

Dependent Variable: D(LABOUR SHARE) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(LABOUR SHARE) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(LABOUR SHARE) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(1, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	1.4499	1.5656	0.9261	0.3561	SPEND	-5.3894	0.7581	-7.1091	0.0000	TAX	-7.3079	0.5670	-12.8884	0.0000
INFLATION	2.1695	0.6611	3.2815	0.0013	INFLATION	-0.0125	0.0999	-0.1254	0.9004	INFLATION	-0.4936	0.0633	-7.8007	0.0000
GDPG	-6.3710	1.8301	-3.4812	0.0007	GDPG	-2.6164	0.3206	-8.1601	0.0000	GDPG	-2.8118	0.1803	-15.5941	0.0000
TRADE	-0.4941	0.1393	-3.5470	0.0005	TRADE	-0.1838	0.0137	-13.4181	0.0000	TRADE	-0.1991	0.0118	-16.8378	0.0000
UNEMPLOYMENT	6.1791	1.7633	3.5043	0.0006	UNEMPLOYMENT	0.4200	0.1209	3.4738	0.0007	UNEMPLOYMENT	-0.1400	0.0760	-1.8427	0.0673
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.0228	0.0208	-1.0982	0.2742	COINTEQ01	-0.1784	0.0811	-2.2000	0.0297	COINTEQ01	-0.1842	0.0734	-2.5105	0.0131
D(LABOUR SHARE(-1))	0.0108	0.1192	0.0904	0.9281	D(LABOUR SHARE(-1))	0.0221	0.0878	0.2513	0.8020	D(TAX)	0.8499	0.4138	2.0538	0.0417
D(LABOUR SHARE(-2))	0.1195	0.1059	1.1281	0.2614	D(LABOUR SHARE(-2))	0.1305	0.0710	1.8384	0.0685	D(TAX(-1))	0.5339	0.4705	1.1347	0.2582
D(LABOUR SHARE(-3))	-0.1797	0.1100	-1.6338	0.1047	D(LABOUR SHARE(-3))	-0.1238	0.0895	-1.3827	0.1693	D(TAX(-2))	0.7888	0.4173	1.8901	0.0606
D(ADJSIZE)	0.0243	0.2664	0.0911	0.9276	D(SPEND)	0.4940	0.4123	1.1981	0.2332	D(TAX(-3))	0.9159	0.5118	1.7895	0.0755
D(ADJSIZE(-1))	-0.2353	0.1191	-1.9753	0.0504	D(SPEND(-1))	0.2911	0.3367	0.8646	0.3890	D(INFLATION)	0.2149	0.0534	4.0203	0.0001
D(ADJSIZE(-2))	0.0088	0.0801	0.1104	0.9123	D(SPEND(-2))	0.6064	0.2975	2.0387	0.0437	D(INFLATION(-1))	-0.0394	0.1149	-0.3430	0.7320
D(ADJSIZE(-3))	0.0478	0.1227	0.3894	0.6976	D(SPEND(-3))	0.4965	0.2304	2.1554	0.0331	D(INFLATION(-2))	0.0926	0.0668	1.3871	0.1674
D(INFLATION)	0.0903	0.0659	1.3705	0.1729	D(INFLATION)	0.1500	0.0786	1.9072	0.0589	D(INFLATION(-3))	-0.0425	0.1138	-0.3734	0.7093
D(INFLATION(-1))	-0.0894	0.1222	-0.7311	0.4660	D(INFLATION(-1))	-0.0587	0.1094	-0.5366	0.5925	D(GDPG)	0.1378	0.2293	0.6008	0.5489
D(INFLATION(-2))	0.1205	0.0659	1.8291	0.0697	D(INFLATION(-2))	0.0300	0.0638	0.4698	0.6394	D(GDPG(-1))	0.1567	0.1704	0.9199	0.3590
D(INFLATION(-3))	-0.0111	0.0859	-0.1291	0.8975	D(INFLATION(-3))	-0.0273	0.0830	-0.3290	0.7428	D(GDPG(-2))	0.0644	0.0995	0.6476	0.5182
D(GDPG)	-0.2070	0.1598	-1.2951	0.1976	D(GDPG)	0.0958	0.2217	0.4321	0.6664	D(GDPG(-3))	-0.0305	0.0533	-0.5728	0.5676
D(GDPG(-1))	-0.1570	0.1062	-1.4782	0.1418	D(GDPG(-1))	0.0949	0.1503	0.6318	0.5287	D(TRADE)	0.0029	0.0263	0.1109	0.9118
D(GDPG(-2))	-0.0769	0.1065	-0.7223	0.4714	D(GDPG(-2))	0.0474	0.1001	0.4735	0.6367	D(TRADE(-1))	0.0409	0.0487	0.8394	0.4025
D(GDPG(-3))	-0.0959	0.0342	-2.8036	0.0058	D(GDPG(-3))	-0.0334	0.0451	-0.7390	0.4614	D(TRADE(-2))	-0.0021	0.0374	-0.0574	0.9543
D(TRADE)	-0.0258	0.0240	-1.0737	0.2850	D(TRADE)	-0.0099	0.0395	-0.2512	0.8021	D(TRADE(-3))	-0.0137	0.0282	-0.4862	0.6275
D(TRADE(-1))	0.0490	0.0439	1.1172	0.2660	D(TRADE(-1))	0.0416	0.0402	1.0350	0.3027	D(UNEMPLOYMENT)	-0.3281	0.1265	-2.5930	0.0104
D(TRADE(-2))	-0.0459	0.0237	-1.9416	0.0544	D(TRADE(-2))	0.0133	0.0196	0.6803	0.4976	D(UNEMPLOYMENT(-1))	-0.3018	0.2433	-1.2403	0.2167
D(TRADE(-3))	-0.0495	0.0344	-1.4388	0.1526	D(TRADE(-3))	-0.0261	0.0251	-1.0424	0.2993	D(UNEMPLOYMENT(-2))	-0.2520	0.1590	-1.5849	0.1150
D(UNEMPLOYMENT)	-0.5814	0.1828	-3.1815	0.0018	D(UNEMPLOYMENT)	-0.5210	0.1585	-3.2870	0.0013	D(UNEMPLOYMENT(-3))	0.1577	0.1154	1.3672	0.1735
D(UNEMPLOYMENT(-1))	-0.2099	0.2315	-0.9066	0.3663	D(UNEMPLOYMENT(-1))	-0.3445	0.2310	-1.4913	0.1385	C	18.1863	7.3748	2.4660	0.0147
D(UNEMPLOYMENT(-2))	-0.2261	0.2088	-1.0824	0.2811	D(UNEMPLOYMENT(-2))	-0.2069	0.2000	-1.0345	0.3030					
D(UNEMPLOYMENT(-3))	0.1639	0.1506	1.0885	0.2784	D(UNEMPLOYMENT(-3))	0.0822	0.1229	0.6687	0.5050	Mean dependent var	-0.0842	S.D. dependent var		1.4832
C	2.5034	1.7121	1.4622	0.1461	C	16.3302	7.6319	2.1397	0.0344	S.E. of regression	0.6427	Akaike info criterion		2.0204
										Sum squared resid	64.8539	Schwarz criterion		4.2118
Mean dependent var	-0.0842	S.D. dependent var	1.4832		Mean dependent var	-0.0842	S.D. dependent var	1.4832		Log likelihood	-160.6806	Hannan-Quinn criter.		2.8918
S.E. of regression	0.6932	Akaike info criterion	2.1866		S.E. of regression	0.6998	Akaike info criterion	2.1092						
Sum squared resid	62.4610	Schwarz criterion	4.6694		Sum squared resid	59.2628	Schwarz criterion	4.6892						
Log likelihood	-163.5825	Hannan-Quinn criter.	3.1738		Log likelihood	-140.6641	Hannan-Quinn criter.	3.1351						

F.1.2 Panel ARDL model results contd.

Dependent Variable: D(TOP1) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(TOP1) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(TOP1) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-0.00344	0.00160	-2.1527	0.0333	SPEND	-0.00017	0.00249	-0.0671	0.9466	TAX	-0.00643	0.00239	-2.6877	0.0082
INFLATION	0.00053	0.00060	0.8825	0.3793	INFLATION	-0.00148	0.00062	-2.3776	0.0189	INFLATION	0.00034	0.00051	0.6778	0.4992
GDPG	-0.00039	0.00172	-0.2245	0.8227	GDPG	0.00767	0.00170	4.5004	0.0000	GDPG	-0.00109	0.00172	-0.6352	0.5265
TRADE	0.00092	0.00015	6.1002	0.0000	TRADE	0.00133	0.00019	7.0372	0.0000	TRADE	0.00090	0.00015	5.8871	0.0000
UNEMPLOYMENT	0.00710	0.00082	8.6911	0.0000	UNEMPLOYMENT	0.00546	0.00089	6.1467	0.0000	UNEMPLOYMENT	0.00641	0.00074	8.6997	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.15739	0.0618	-2.5463	0.0121	COINTEQ01	-0.14936	0.0604	-2.4745	0.0146	COINTEQ01	-0.14748	0.0669	-2.2053	0.0293
D(TOP1(-1))	-0.33082	0.1143	-2.8955	0.0045	D(TOP1(-1))	-0.19894	0.1189	-1.6733	0.0967	D(TOP1(-1))	-0.34025	0.0829	-4.1062	0.0001
D(TOP1(-2))	-0.24335	0.0801	-3.0400	0.0029	D(TOP1(-2))	-0.08953	0.1146	-0.7811	0.4361	D(TOP1(-2))	-0.27061	0.0548	-4.9395	0.0000
D(TOP1(-3))	0.03791	0.1042	0.3638	0.7167	D(TOP1(-3))	0.12326	0.1294	0.9529	0.3424	D(TOP1(-3))	0.05929	0.0857	0.6917	0.4905
D(ADJSIZE)	0.00070	0.0016	0.4430	0.6585	D(SPEND)	-0.00048	0.0021	-0.2277	0.8202	D(TAX)	-0.00071	0.0040	-0.1792	0.8580
D(ADJSIZE(-1))	-0.00016	0.0011	-0.1414	0.8878	D(SPEND(-1))	0.00010	0.0010	0.1013	0.9195	D(TAX(-1))	-0.00173	0.0046	-0.3739	0.7091
D(ADJSIZE(-2))	0.00076	0.0009	0.8015	0.4244	D(SPEND(-2))	0.00015	0.0010	0.1597	0.8734	D(TAX(-2))	0.00213	0.0028	0.7665	0.4449
D(ADJSIZE(-3))	-0.00009	0.0010	-0.0925	0.9265	D(SPEND(-3))	0.00018	0.0011	0.1649	0.8693	D(TAX(-3))	-0.00118	0.0028	-0.4144	0.6793
D(INFLATION)	0.00210	0.0006	3.6483	0.0004	D(INFLATION)	0.00159	0.0004	3.6646	0.0004	D(INFLATION)	0.00187	0.0006	3.0148	0.0031
D(INFLATION(-1))	-0.00096	0.0008	-1.2483	0.2143	D(INFLATION(-1))	-0.00029	0.0003	-1.0483	0.2964	D(INFLATION(-1))	-0.00103	0.0009	-1.2109	0.2283
D(INFLATION(-2))	-0.00047	0.0006	-0.7475	0.4562	D(INFLATION(-2))	-0.00039	0.0006	-0.6436	0.5210	D(INFLATION(-2))	-0.00041	0.0007	-0.5641	0.5737
D(INFLATION(-3))	0.00149	0.0012	1.2070	0.2298	D(INFLATION(-3))	0.00132	0.0009	1.4860	0.1397	D(INFLATION(-3))	0.00177	0.0016	1.0759	0.2841
D(GDPG)	0.00134	0.0005	2.7714	0.0065	D(GDPG)	0.00051	0.0008	0.6148	0.5398	D(GDPG)	0.00124	0.0005	2.5468	0.0121
D(GDPG(-1))	0.00100	0.0007	1.3561	0.1776	D(GDPG(-1))	0.00062	0.0007	0.9071	0.3660	D(GDPG(-1))	0.00055	0.0011	0.5081	0.6123
D(GDPG(-2))	0.00124	0.0004	2.7894	0.0061	D(GDPG(-2))	0.00060	0.0005	1.1238	0.2632	D(GDPG(-2))	0.00142	0.0004	3.4005	0.0009
D(GDPG(-3))	0.00035	0.0004	0.8421	0.4014	D(GDPG(-3))	0.00025	0.0004	0.6661	0.5066	D(GDPG(-3))	0.00035	0.0004	0.9431	0.3475
D(TRADE)	-0.00058	0.0003	-2.2203	0.0283	D(TRADE)	-0.00059	0.0002	-2.8872	0.0046	D(TRADE)	-0.00052	0.0002	-2.1231	0.0358
D(TRADE(-1))	0.00015	0.0005	0.2932	0.7699	D(TRADE(-1))	-0.00002	0.0003	-0.0819	0.9349	D(TRADE(-1))	0.00011	0.0006	0.1944	0.8462
D(TRADE(-2))	0.00015	0.0002	0.7562	0.4510	D(TRADE(-2))	0.00027	0.0002	1.6091	0.1100	D(TRADE(-2))	0.00010	0.0002	0.4187	0.6762
D(TRADE(-3))	-0.00027	0.0003	-0.9818	0.3282	D(TRADE(-3))	-0.00023	0.0002	-1.0218	0.3088	D(TRADE(-3))	-0.00049	0.0004	-1.2950	0.1978
D(UNEMPLOYMENT)	-0.00003	0.0009	-0.0314	0.9750	D(UNEMPLOYMENT)	0.00058	0.0009	0.6579	0.5118	D(UNEMPLOYMENT)	-0.00126	0.0013	-0.9394	0.3494
D(UNEMPLOYMENT(-1))	0.00240	0.0022	1.0957	0.2754	D(UNEMPLOYMENT(-1))	0.00209	0.0012	1.7869	0.0763	D(UNEMPLOYMENT(-1))	0.00174	0.0015	1.1570	0.2495
D(UNEMPLOYMENT(-2))	0.00018	0.0010	0.1813	0.8565	D(UNEMPLOYMENT(-2))	0.00047	0.0007	0.6293	0.5303	D(UNEMPLOYMENT(-2))	0.00028	0.0012	0.2415	0.8096
D(UNEMPLOYMENT(-3))	-0.00371	0.0015	-2.5482	0.0121	D(UNEMPLOYMENT(-3))	-0.00312	0.0012	-2.6325	0.0095	D(UNEMPLOYMENT(-3))	-0.00354	0.0018	-1.9992	0.0478
C	-0.00630	0.0029	-2.1749	0.0316	C	-0.00956	0.0035	-2.7524	0.0068	C	-0.00399	0.0023	-1.7284	0.0865
Mean dependent var					Mean dependent var					Mean dependent var				
0.0005					0.0005					0.0005				
S.D. dependent var					S.D. dependent var					S.D. dependent var				
0.0005					0.0005					0.0005				
Akaike info criterion					Akaike info criterion					Akaike info criterion				
-6.6964					-6.5460					-6.7808				
Schwarz criterion					Schwarz criterion					Schwarz criterion				
-4.1165					-4.0632					-4.2008				
Sum squared resid					Sum squared resid					Sum squared resid				
1444.3530					1408.2740					1459.5410				
Hannan-Quinn criter.					Hannan-Quinn criter.					Hannan-Quinn criter.				
-5.6706					-5.5588					-5.7550				
Log likelihood					Log likelihood					Log likelihood				
1444.3530					1408.2740					1459.5410				

F.1.3 Panel ARDL model results contd.

Dependent Variable: D(TOP10) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(TOP10) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(TOP10) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-0.00641	0.00168	-3.8234	0.0002	SPEND	-0.00237	0.00216	-1.0957	0.2752	TAX	-0.01738	0.00366	-4.7475	0.0000
INFLATION	-0.00536	0.00071	-7.5839	0.0000	INFLATION	-0.00577	0.00055	-10.4358	0.0000	INFLATION	-0.00361	0.00076	-4.7419	0.0000
GDPG	0.00005	0.00214	0.0236	0.9812	GDPG	0.00883	0.00183	4.8203	0.0000	GDPG	-0.00960	0.00257	-3.7425	0.0003
TRADE	0.00058	0.00013	4.4757	0.0000	TRADE	0.00155	0.00014	10.9807	0.0000	TRADE	0.00008	0.00007	1.0780	0.2832
UNEMPLOYMENT	0.00622	0.00090	6.8911	0.0000	UNEMPLOYMENT	0.00637	0.00107	5.9569	0.0000	UNEMPLOYMENT	0.00827	0.00136	6.0760	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.15337	0.0902	-1.6996	0.0918	COINTEQ01	-0.15880	0.0827	-1.9206	0.0570	COINTEQ01	-0.02011	0.1042	-0.1929	0.8474
D(TOP10(-1))	-0.28578	0.1001	-2.8562	0.0050	D(TOP10(-1))	-0.25847	0.0747	-3.4587	0.0007	D(TOP10(-1))	-0.33675	0.0901	-3.7379	0.0003
D(TOP10(-2))	-0.26497	0.0759	-3.4906	0.0007	D(TOP10(-2))	-0.14333	0.1085	-1.3205	0.1890	D(TOP10(-2))	-0.33420	0.0694	-4.8158	0.0000
D(TOP10(-3))	-0.04079	0.0943	-0.4326	0.6660	D(TOP10(-3))	0.01353	0.0891	0.1518	0.8796	D(TOP10(-3))	-0.04003	0.1352	-0.2961	0.7677
D(ADJSIZE)	0.00214	0.0019	1.1268	0.2621	D(SPEND)	-0.00068	0.0022	-0.3119	0.7556	D(TAX)	-0.00016	0.0050	-0.0318	0.9747
D(ADJSIZE(-1))	-0.00003	0.0016	-0.0156	0.9876	D(SPEND(-1))	0.00006	0.0007	0.0839	0.9333	D(TAX(-1))	-0.00139	0.0036	-0.3839	0.7017
D(ADJSIZE(-2))	0.00170	0.0011	1.5671	0.1197	D(SPEND(-2))	-0.00014	0.0014	-0.0941	0.9252	D(TAX(-2))	0.00087	0.0028	0.3165	0.7521
D(ADJSIZE(-3))	-0.00025	0.0013	-0.1964	0.8446	D(SPEND(-3))	-0.00032	0.0020	-0.1607	0.8726	D(TAX(-3))	-0.00322	0.0030	-1.0569	0.2926
D(INFLATION)	0.00294	0.0010	2.9608	0.0037	D(INFLATION)	0.00225	0.0009	2.4737	0.0147	D(INFLATION)	0.00199	0.0011	1.8395	0.0683
D(INFLATION(-1))	-0.00227	0.0011	-2.1052	0.0373	D(INFLATION(-1))	-0.00121	0.0008	-1.6085	0.1102	D(INFLATION(-1))	-0.00302	0.0014	-2.1968	0.0299
D(INFLATION(-2))	0.00020	0.0008	0.2329	0.8162	D(INFLATION(-2))	0.00038	0.0008	0.4847	0.6287	D(INFLATION(-2))	0.00022	0.0008	0.2778	0.7816
D(INFLATION(-3))	0.00116	0.0014	0.8314	0.4074	D(INFLATION(-3))	0.00122	0.0013	0.9387	0.3496	D(INFLATION(-3))	0.00127	0.0021	0.6081	0.5443
D(GDPG)	0.00181	0.0006	3.1150	0.0023	D(GDPG)	0.00109	0.0011	0.9938	0.3222	D(GDPG)	0.00154	0.0005	2.9408	0.0039
D(GDPG(-1))	0.00066	0.0009	0.6921	0.4902	D(GDPG(-1))	0.00010	0.0009	0.1124	0.9107	D(GDPG(-1))	0.00004	0.0015	0.0284	0.9774
D(GDPG(-2))	0.00147	0.0008	1.9477	0.0538	D(GDPG(-2))	0.00066	0.0007	0.9839	0.3270	D(GDPG(-2))	0.00191	0.0005	3.5266	0.0006
D(GDPG(-3))	0.00015	0.0007	0.2196	0.8266	D(GDPG(-3))	-0.00028	0.0006	-0.4518	0.6522	D(GDPG(-3))	0.00001	0.0006	0.0212	0.9831
D(TRADE)	-0.00076	0.0005	-1.6135	0.1092	D(TRADE)	-0.00091	0.0004	-2.2154	0.0285	D(TRADE)	-0.00058	0.0003	-1.8737	0.0634
D(TRADE(-1))	0.00074	0.0005	1.5405	0.1260	D(TRADE(-1))	0.00041	0.0004	1.0325	0.3038	D(TRADE(-1))	0.00091	0.0007	1.3172	0.1903
D(TRADE(-2))	0.00009	0.0004	0.2545	0.7995	D(TRADE(-2))	-0.00002	0.0004	-0.0610	0.9514	D(TRADE(-2))	-0.00010	0.0003	-0.3692	0.7126
D(TRADE(-3))	0.00011	0.0003	0.4466	0.6560	D(TRADE(-3))	-0.00011	0.0002	-0.4451	0.6570	D(TRADE(-3))	-0.00012	0.0005	-0.2579	0.7969
D(UNEMPLOYMENT)	-0.00006	0.0011	-0.0613	0.9513	D(UNEMPLOYMENT)	0.00054	0.0010	0.5636	0.5740	D(UNEMPLOYMENT)	-0.00169	0.0013	-1.2839	0.2016
D(UNEMPLOYMENT(-1))	0.00415	0.0021	1.9307	0.0559	D(UNEMPLOYMENT(-1))	0.00373	0.0017	2.2233	0.0279	D(UNEMPLOYMENT(-1))	0.00425	0.0023	1.8819	0.0623
D(UNEMPLOYMENT(-2))	0.00138	0.0019	0.7361	0.4631	D(UNEMPLOYMENT(-2))	0.00085	0.0012	0.7119	0.4778	D(UNEMPLOYMENT(-2))	0.00050	0.0013	0.3941	0.6942
D(UNEMPLOYMENT(-3))	-0.00316	0.0008	-4.0269	0.0001	D(UNEMPLOYMENT(-3))	-0.00288	0.0007	-3.9498	0.0001	D(UNEMPLOYMENT(-3))	-0.00326	0.0019	-1.7513	0.0824
C	0.03213	0.0191	1.6784	0.0958	C	0.01916	0.0109	1.7645	0.0800	C	0.00495	0.0234	0.2112	0.8331
Mean dependent var	0.0009	S.D. dependent var	0.0105		Mean dependent var	0.0009	S.D. dependent var	0.0105		Mean dependent var	0.0009	S.D. dependent var	0.0105	
S.E. of regression	0.0077	Akaike info criterion	-5.9946		S.E. of regression	0.0088	Akaike info criterion	-5.8799		S.E. of regression	0.0079	Akaike info criterion	-5.9947	
Sum squared resid	0.0072	Schwarz criterion	-3.4146		Sum squared resid	0.0102	Schwarz criterion	-3.3972		Sum squared resid	0.0075	Schwarz criterion	-3.4148	
Log likelihood	1318.0190	Hannan-Quinn criter.	-4.9687		Log likelihood	1288.3900	Hannan-Quinn criter.	-4.8927		Log likelihood	1318.0480	Hannan-Quinn criter.	-4.9689	

F.1.4 Panel ARDL model results contd.

Dependent Variable: D(BOT40) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(BOT40) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(BOT40) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	0.01267	0.00273	4.6432	0.0000	SPEND	0.08803	0.23676	0.3718	0.7107	TAX	0.02371	0.00565	4.1940	0.0001
INFLATION	0.00236	0.00048	4.9570	0.0000	INFLATION	0.00629	0.01465	0.4290	0.6686	INFLATION	0.00279	0.00057	4.9211	0.0000
GDPG	0.00302	0.00175	1.7230	0.0873	GDPG	0.17935	0.52590	0.3410	0.7336	GDPG	-0.00148	0.00202	-0.7322	0.4654
TRADE	-0.00050	0.00007	-6.7864	0.0000	TRADE	0.01260	0.03594	0.3505	0.7265	TRADE	-0.00062	0.00012	-5.1892	0.0000
UNEMPLOYMENT	0.00192	0.00064	3.0082	0.0032	UNEMPLOYMENT	0.03345	0.10279	0.3254	0.7454	UNEMPLOYMENT	0.00325	0.00087	3.7286	0.0003
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.12155	0.1296	-0.9381	0.3499	COINTEQ01	0.00953	0.0057	1.6631	0.0987	COINTEQ01	-0.10149	0.1411	-0.7193	0.4733
D(BOT40(-1))	-0.31023	0.1153	-2.6908	0.0081	D(BOT40(-1))	-0.45650	0.0692	-6.5967	0.0000	D(BOT40(-1))	-0.30783	0.1339	-2.2993	0.0231
D(BOT40(-2))	-0.04595	0.1995	-0.2303	0.8182	D(BOT40(-2))	-0.29966	0.1334	-2.2459	0.0264	D(BOT40(-2))	-0.12622	0.1566	-0.8059	0.4218
D(BOT40(-3))	0.17247	0.0986	1.7498	0.0825	D(BOT40(-3))	-0.00886	0.0668	-0.1325	0.8948	D(BOT40(-3))	0.19178	0.0970	1.9778	0.0501
D(ADJSIZE)	-0.00042	0.0014	-0.2968	0.7671	D(SPEND)	0.00301	0.0009	3.4167	0.0008	D(TAX)	-0.00197	0.0035	-0.5588	0.5773
D(ADJSIZE(-1))	-0.00014	0.0014	-0.0987	0.9215	D(SPEND(-1))	0.00264	0.0010	2.7309	0.0072	D(TAX(-1))	-0.00229	0.0033	-0.6911	0.4907
D(ADJSIZE(-2))	-0.00090	0.0014	-0.6520	0.5156	D(SPEND(-2))	0.00305	0.0011	2.8072	0.0058	D(TAX(-2))	-0.00326	0.0046	-0.7066	0.4811
D(ADJSIZE(-3))	-0.00091	0.0006	-1.4977	0.1366	D(SPEND(-3))	0.00059	0.0016	0.3768	0.7069	D(TAX(-3))	-0.00221	0.0010	-2.2728	0.0247
D(INFLATION)	-0.00067	0.0008	-0.8716	0.3850	D(INFLATION)	-0.00080	0.0005	-1.5112	0.1332	D(INFLATION)	-0.00015	0.0009	-0.1609	0.8724
D(INFLATION(-1))	0.00063	0.0006	1.0505	0.2954	D(INFLATION(-1))	-0.00050	0.0007	-0.7368	0.4626	D(INFLATION(-1))	0.00062	0.0006	0.9760	0.3309
D(INFLATION(-2))	0.00039	0.0003	1.2165	0.2260	D(INFLATION(-2))	-0.00107	0.0010	-1.0584	0.2918	D(INFLATION(-2))	0.00111	0.0004	2.5032	0.0135
D(INFLATION(-3))	0.00007	0.0007	0.0964	0.9233	D(INFLATION(-3))	-0.00079	0.0008	-0.9796	0.3291	D(INFLATION(-3))	0.00063	0.0006	1.0673	0.2878
D(GDPG)	0.00015	0.0004	0.3442	0.7312	D(GDPG)	0.00161	0.0009	1.7621	0.0804	D(GDPG)	0.00083	0.0006	1.4002	0.1638
D(GDPG(-1))	0.00001	0.0007	0.0192	0.9847	D(GDPG(-1))	0.00126	0.0007	1.7454	0.0833	D(GDPG(-1))	0.00066	0.0007	0.9148	0.3620
D(GDPG(-2))	0.00013	0.0004	0.3413	0.7335	D(GDPG(-2))	0.00061	0.0004	1.4157	0.1593	D(GDPG(-2))	0.00045	0.0006	0.7769	0.4387
D(GDPG(-3))	0.00002	0.0003	0.0681	0.9458	D(GDPG(-3))	0.00045	0.0002	1.8432	0.0676	D(GDPG(-3))	0.00045	0.0003	1.4010	0.1636
D(TRADE)	0.00028	0.0001	2.0388	0.0435	D(TRADE)	0.00007	0.0002	0.3761	0.7075	D(TRADE)	0.00012	0.0002	0.6469	0.5188
D(TRADE(-1))	0.00042	0.0003	1.4668	0.1448	D(TRADE(-1))	0.00015	0.0003	0.5929	0.5543	D(TRADE(-1))	0.00043	0.0003	1.3752	0.1714
D(TRADE(-2))	0.00022	0.0002	1.0330	0.3035	D(TRADE(-2))	0.00019	0.0002	1.0061	0.3162	D(TRADE(-2))	0.00011	0.0002	0.5651	0.5730
D(TRADE(-3))	0.00009	0.0003	0.3437	0.7316	D(TRADE(-3))	0.00024	0.0002	0.9837	0.3271	D(TRADE(-3))	-0.00007	0.0002	-0.4123	0.6808
D(UNEMPLOYMENT)	0.00025	0.0006	0.4014	0.6888	D(UNEMPLOYMENT)	-0.00064	0.0005	-1.4076	0.1616	D(UNEMPLOYMENT)	0.00083	0.0010	0.8171	0.4154
D(UNEMPLOYMENT(-1))	-0.00161	0.0009	-1.7457	0.0832	D(UNEMPLOYMENT(-1))	-0.00383	0.0016	-2.3622	0.0197	D(UNEMPLOYMENT(-1))	-0.00068	0.0008	-0.8401	0.4024
D(UNEMPLOYMENT(-2))	-0.00148	0.0012	-1.2059	0.2300	D(UNEMPLOYMENT(-2))	-0.00113	0.0006	-2.0325	0.0441	D(UNEMPLOYMENT(-2))	-0.00084	0.0009	-0.8943	0.3728
D(UNEMPLOYMENT(-3))	-0.00089	0.0017	-0.5165	0.6064	D(UNEMPLOYMENT(-3))	-0.00056	0.0008	-0.7308	0.4662	D(UNEMPLOYMENT(-3))	-0.00102	0.0015	-0.6915	0.4905
C	0.03235	0.0286	1.1316	0.2599	C	0.01042	0.0080	1.3040	0.1946	C	0.03079	0.0333	0.9245	0.3570
Mean dependent var					Mean dependent var					Mean dependent var				
-0.0004					-0.0004					-0.0004				
S.D. dependent var					S.D. dependent var					S.D. dependent var				
0.0068					0.0068					0.0068				
S.E. of regression					S.E. of regression					S.E. of regression				
0.0049					0.0058					0.0048				
Akaike info criterion					Akaike info criterion					Akaike info criterion				
-6.8682					-6.7805					-6.8694				
Schwarz criterion					Schwarz criterion					Schwarz criterion				
-4.3854					-4.2977					-4.3867				
Sum squared resid					Sum squared resid					Sum squared resid				
1466.2780					1450.4860					1466.5000				
Hannan-Quinn criter.					Hannan-Quinn criter.					Hannan-Quinn criter.				
-5.8810					-5.7933					-5.8822				
Log likelihood					Log likelihood					Log likelihood				
1466.2780					1450.4860					1466.5000				

F.1.5 Panel ARDL model results contd.

Dependent Variable: D(PALMA RATIO) Method: ARDL Sample: 1984 2019 Included observations: 288 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(PALMA RATIO) Method: ARDL Sample: 1984 2019 Included observations: 288 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(PALMA RATIO) Method: ARDL Sample: 1984 2019 Included observations: 288 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ADJSIZE	-0.06807	0.01545	-4.4067	0.0000	SPEND	-0.04101	0.20722	-0.1979	0.8435	TAX	0.25343	0.27424	0.9241	0.3573
INFLATION	0.01026	0.00642	1.5990	0.1125	INFLATION	0.07950	0.02001	3.9722	0.0001	INFLATION	0.07379	0.01677	4.4011	0.0000
GDPG	0.05006	0.01373	3.6457	0.0004	GDPG	-0.04266	0.10499	-0.4063	0.6853	GDPG	-0.05467	0.11008	-0.4966	0.6204
TRADE	0.01216	0.00080	15.2398	0.0000	TRADE	0.02910	0.00855	3.4016	0.0009	TRADE	0.02877	0.00899	3.1990	0.0018
UNEMPLOYMENT	0.08225	0.00677	12.1458	0.0000	UNEMPLOYMENT	-0.02378	0.03604	-0.6599	0.5106	UNEMPLOYMENT	-0.06807	0.03672	-1.8536	0.0663
COINTEQ01	-0.02569	0.0100	-2.5671	0.0115	COINTEQ01	-0.01390	0.0060	-2.3152	0.0224	COINTEQ01	-0.01052	0.0065	-1.6083	0.1105
D(PALMA RATIO(-1))	-0.24904	0.1628	-1.5298	0.1288	D(PALMA RATIO(-1))	-0.28002	0.1626	-1.7219	0.0877	D(PALMA RATIO(-1))	-0.17706	0.1741	-1.0169	0.3113
D(PALMA RATIO(-2))	0.55116	0.2438	2.2604	0.0257	D(PALMA RATIO(-2))	0.62221	0.2799	2.2233	0.0281	D(PALMA RATIO(-2))	0.53352	0.3182	1.6765	0.0963
D(PALMA RATIO(-3))	1.38720	1.1152	1.2439	0.2160	D(PALMA RATIO(-3))	1.51128	1.1706	1.2911	0.1992	D(PALMA RATIO(-3))	1.52814	1.1839	1.2908	0.1993
D(ADJSIZE)	0.00473	0.0032	1.4707	0.1441	D(SPENDING)	0.00212	0.0054	0.3902	0.6971	D(TAX)	0.01094	0.0125	0.8780	0.3818
D(ADJSIZE(-1))	-0.00014	0.0028	-0.0490	0.9610	D(SPENDING(-1))	-0.00385	0.0040	-0.9698	0.3342	D(TAX(-1))	-0.00813	0.0073	-1.1089	0.2698
D(ADJSIZE(-2))	0.00302	0.0037	0.8158	0.4163	D(SPENDING(-2))	0.00055	0.0071	0.0776	0.9383	D(TAX(-2))	0.00471	0.0087	0.5446	0.5871
D(ADJSIZE(-3))	0.00265	0.0023	1.1540	0.2509	D(SPENDING(-3))	0.00125	0.0034	0.3700	0.7121	D(TAX(-3))	0.00037	0.0061	0.0610	0.9515
D(INFLATION)	-0.00122	0.0019	-0.6525	0.5154	D(INFLATION)	-0.00223	0.0022	-1.0208	0.3095	D(INFLATION)	-0.00055	0.0015	-0.3676	0.7139
D(INFLATION(-1))	-0.00242	0.0014	-1.7605	0.0810	D(INFLATION(-1))	-0.00268	0.0013	-2.1052	0.0374	D(INFLATION(-1))	-0.00289	0.0017	-1.7318	0.0860
D(INFLATION(-2))	0.00229	0.0016	1.4744	0.1431	D(INFLATION(-2))	-0.00019	0.0020	-0.0986	0.9216	D(INFLATION(-2))	0.00169	0.0017	0.9665	0.3358
D(INFLATION(-3))	0.00216	0.0023	0.9331	0.3527	D(INFLATION(-3))	0.00100	0.0017	0.5895	0.5567	D(INFLATION(-3))	0.00081	0.0019	0.4308	0.6674
D(GDPG)	0.00122	0.0014	0.8441	0.4004	D(GDPG)	0.00194	0.0014	1.3427	0.1820	D(GDPG)	0.00242	0.0015	1.6545	0.1007
D(GDPG(-1))	0.00031	0.0014	0.2207	0.8258	D(GDPG(-1))	-0.00125	0.0016	-0.7961	0.4276	D(GDPG(-1))	0.00051	0.0016	0.3251	0.7457
D(GDPG(-2))	0.00159	0.0014	1.1175	0.2661	D(GDPG(-2))	-0.00004	0.0012	-0.0357	0.9716	D(GDPG(-2))	0.00049	0.0010	0.4860	0.6279
D(GDPG(-3))	-0.00020	0.0014	-0.1397	0.8891	D(GDPG(-3))	-0.00008	0.0013	-0.0594	0.9527	D(GDPG(-3))	0.00097	0.0013	0.7687	0.4436
D(TRADE)	-0.00070	0.0005	-1.3040	0.1948	D(TRADE)	-0.00037	0.0009	-0.4008	0.6893	D(TRADE)	-0.00054	0.0006	-0.8499	0.3972
D(TRADE(-1))	-0.00028	0.0009	-0.3284	0.7432	D(TRADE(-1))	0.00041	0.0006	0.6599	0.5106	D(TRADE(-1))	-0.00033	0.0009	-0.3445	0.7311
D(TRADE(-2))	-0.00136	0.0006	-2.1163	0.0365	D(TRADE(-2))	-0.00045	0.0005	-0.9746	0.3318	D(TRADE(-2))	-0.00147	0.0007	-2.1337	0.0350
D(TRADE(-3))	-0.00070	0.0005	-1.4534	0.1488	D(TRADE(-3))	-0.00060	0.0005	-1.1107	0.2690	D(TRADE(-3))	-0.00028	0.0006	-0.4400	0.6608
D(UNEMPLOYMENT)	0.00003	0.0019	0.0144	0.9885	D(UNEMPLOYMENT)	0.00068	0.0022	0.3046	0.7613	D(UNEMPLOYMENT)	-0.00045	0.0017	-0.2608	0.7947
D(UNEMPLOYMENT(-1))	0.00201	0.0021	0.9555	0.3413	D(UNEMPLOYMENT(-1))	0.00187	0.0021	0.9052	0.3672	D(UNEMPLOYMENT(-1))	0.00212	0.0022	0.9710	0.3336
D(UNEMPLOYMENT(-2))	-0.00668	0.0030	-2.2523	0.0262	D(UNEMPLOYMENT(-2))	-0.00162	0.0023	-0.7005	0.4850	D(UNEMPLOYMENT(-2))	-0.00212	0.0028	-0.7579	0.4501
D(UNEMPLOYMENT(-3))	-0.00167	0.0021	-0.8115	0.4187	D(UNEMPLOYMENT(-3))	0.00066	0.0023	0.2824	0.7781	D(UNEMPLOYMENT(-3))	-0.00020	0.0016	-0.1217	0.9033
C	-0.05478	0.0387	-1.4146	0.1599	C	-0.04744	0.0386	-1.2274	0.2222	C	-0.04100	0.0397	-1.0320	0.3042
Mean dependent var	0.0029	S.D. dependent var	0.0440		Mean dependent var	0.0029	S.D. dependent var	0.0440		Mean dependent var	0.0029	S.D. dependent var	0.0440	
S.E. of regression	0.0177	Akaike info criterion	-5.1617		S.E. of regression	0.0172	Akaike info criterion	-4.9406		S.E. of regression	0.0158	Akaike info criterion	-4.9424	
Sum squared resid	0.0365	Schwarz criterion	-2.7531		Sum squared resid	0.0345	Schwarz criterion	-2.5320		Sum squared resid	0.0289	Schwarz criterion	-2.5339	
Log likelihood	1033.4510	Hannan-Quinn criter.	-4.2000		Log likelihood	997.9602	Hannan-Quinn criter.	-3.9789		Log likelihood	998.2556	Hannan-Quinn criter.	-3.9807	

Appendix G – Large adjustment countries Driscoll Kraay Fixed Effects model results

G.1 Driscoll Kraay Fixed Effects model results

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 351 Number = 9 F(6, 38) =211.76 Prob > F = 0. within R-squared = 0.6975					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 351 Number = 9 F(6, 38) =213.40 Prob > F = 0. within R-squared = 0.6984					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 351 Number = 9 F(6, 38) =220.02 Prob > F = 0. within R-squared = 0.6976				
Adjustment Size Model					Spend Model					Tax Model																			
Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t															
GiniLag1	0.75704	0.04128	18.34	0.0000	GiniLag1	0.75355	0.04188	17.99	0.0000	GiniLag1	0.75773	0.04057	18.68	0.0000															
Adjustment Size	-	-	-	-	Spend	-	-	-	-	Tax	-	-	-	-															
Unemployment	0.00026	0.00041	-0.63	0.5310	Unemployment	0.00105	0.00058	-1.82	0.0760	Unemployment	0.00059	0.00098	0.6	0.5510															
Inflation	0.00032	0.00013	2.42	0.0210	Inflation	0.00039	0.00011	3.42	0.0010	Inflation	0.00024	0.00015	1.62	0.1130															
Trade	-	-	-	-	Trade	-	-	-	-	Trade	-	-	-	-															
GDPG	0.00053	0.00018	-2.91	0.0060	GDPG	0.00054	0.00018	-2.96	0.0050	GDPG	0.00053	0.00018	-2.98	0.0050															
C	0.00004	0.00003	1.15	0.2590	C	0.00005	0.00003	1.33	0.1910	C	0.00003	0.00003	0.99	0.3310															
	0.00030	0.00024	1.25	0.2180		0.00027	0.00025	1.06	0.2960		0.00038	0.00022	1.71	0.0950															
	0.08326	0.01494	5.57	0.0000		0.08368	0.01502	5.57	0.0000		0.08372	0.01508	5.55	0.0000															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) =6.3 Prob > F = 0.0001 within R-squared = 0.2469					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) =6.28 Prob > F = 0.0001 within R-squared = 0.2582					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) =5.92 Prob > F = 0.0002 within R-squared = 0.2163				
Adjustment Size Model					Spend Model					Tax Model																			
Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t															
Labour Share Lag1	0.01265	0.12194	0.1	0.9180	Labour Share Lag1	0.00716	0.12026	0.06	0.9530	Labour Share Lag1	0.02729	0.12461	0.22	0.8280															
Adjustment Size	-	-	-	-	Spend	-	-	-	-	Tax	-	-	-	-															
Unemployment	0.28282	0.07609	-3.72	0.0010	Unemployment	0.50127	0.14082	-3.56	0.0010	Unemployment	0.34380	0.13619	-2.52	0.0160															
Inflation	0.08564	0.03364	-2.55	0.0150	Inflation	0.07666	0.03236	-2.37	0.0230	Inflation	0.11440	0.04041	-2.83	0.0070															
Trade	0.04951	0.03186	1.55	0.1290	Trade	0.04646	0.03291	1.41	0.1660	Trade	0.04906	0.03029	1.62	0.1140															
GDPG	0.01126	0.00468	2.41	0.0210	GDPG	0.01184	0.00474	2.5	0.0170	GDPG	0.00913	0.00481	1.9	0.0650															
C	-	-	-	-	C	-	-	-	-	C	-	-	-	-															
	0.22543	0.05771	-3.91	0.0000		0.21967	0.05764	-3.81	0.0010		0.21003	0.05718	-3.67	0.0010															
	0.26329	0.60924	0.43	0.6680		0.13793	0.58532	0.24	0.8150		0.57587	0.68481	0.84	0.4060															

G.1.1 Driscoll Kraay Fixed Effects model results contd.

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) =7.57 Prob > F = 0 within R-squared = 0.1300					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) =8.24 Prob > F = 0.0001 within R-squared = 0.1349					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) = 7.71 Prob > F = 0.0000 within R-squared = 0.1222				
Adjustment Size Model					Spend Model					Tax Model																			
TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t															
	-					-					-																		
TOP1 Lag1	0.25505	0.05637	-4.52	0.0000	TOP1 Lag1	0.25692	0.05561	-4.62	0.0000	TOP1 Lag1	0.25197	0.05715	-4.41	0.0000															
Adjustment Size	0.00071	0.00037	1.89	0.0670	Spend	0.00137	0.00057	2.42	0.0200	Tax	0.00067	0.00067	0.99	0.3280															
Unemployment	0.00042	0.00012	3.6	0.0010	Unemployment	0.00038	0.00011	3.37	0.0020	Unemployment	0.00050	0.00012	4.34	0.0000															
Inflation	0.00004	0.00010	0.36	0.7220	Inflation	0.00004	0.00010	0.42	0.6740	Inflation	0.00004	0.00010	0.4	0.6940															
Trade	-				Trade	-				Trade	-																		
Trade	0.00001	0.00002	-0.33	0.7460	Trade	0.00001	0.00002	-0.44	0.6600	Trade	0.00000	0.00002	-0.02	0.9820															
GDPG	0.00086	0.00027	3.16	0.0030	GDPG	0.00085	0.00026	3.32	0.0020	GDPG	0.00081	0.00028	2.9	0.0060															
C	-				C	-				C	-																		
C	0.00510	0.00243	-2.1	0.0430	C	0.00463	0.00243	-1.91	0.0650	C	0.00600	0.00238	-2.51	0.0160															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) = 8.00 Prob > F = 0.000 within R-squared = 0.1074					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) =8.46 Prob > F = 0.0000 within R-squared = 0.1081					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 37) = 7.56 Prob > F = 0.0000 within R-squared = 0.1056				
Adjustment Size Model					Spend Model					Tax Model																			
TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t															
	-					-					-																		
TOP10 Lag1	0.24481	0.06466	-3.79	0.0010	TOP10 Lag1	0.24503	0.06424	-3.81	0.0010	TOP10 Lag1	0.24440	0.06490	-3.77	0.0010															
Adjustment Size	0.00051	0.00043	1.17	0.2510	Spend	0.00090	0.00069	1.31	0.1990	Tax	0.00062	0.00079	0.78	0.4410															
Unemployment	0.00048	0.00015	3.24	0.0030	Unemployment	0.00046	0.00014	3.25	0.0020	Unemployment	0.00053	0.00015	3.65	0.0010															
Inflation	0.00026	0.00017	1.48	0.1480	Inflation	0.00026	0.00018	1.49	0.1450	Inflation	0.00026	0.00017	1.49	0.1440															
Trade	0.00000	0.00003	-0.09	0.9270	Trade	0.00000	0.00003	-0.13	0.8980	Trade	0.00000	0.00003	0.05	0.9580															
GDPG	0.00099	0.00025	4.05	0.0000	GDPG	0.00098	0.00024	4.15	0.0000	GDPG	0.00097	0.00025	3.93	0.0000															
C	-				C	-				C	-																		
C	0.00628	0.00294	-2.14	0.0390	C	0.00606	0.00298	-2.03	0.0490	C	0.00686	0.00282	-2.43	0.0200															

G.1.2 Driscoll Kraay Fixed Effects model results contd.

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 351 Number = 9 F(6, 38) = 236.00 Prob > F = 0.0000 within R-squared = 0.6612					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 351 Number = 9 F(6, 38) = 234.55 Prob > F = 0.0000 within R-squared = 0.6622					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 342 Number = 9 F(6, 38) = 236.70 Prob > F = 0.0000 within R-squared = 0.6607				
Adjustment Size Model					Spend Model					Tax Model																			
BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t															
BOT40 Lag1	0.74095	0.05448	13.6	0.0000	BOT40 Lag1	0.73838	0.05456	13.53	0.0000	BOT40 Lag1	0.74225	0.05415	13.71	0.0000															
Adjustment	0.00022	0.00020	1.1	0.2790	Spend	0.00062	0.00029	2.11	0.0410	Tax	-	0.00009	0.00051	-0.17	0.8670														
Unemployment	-	0.00009	0.00008	-1.14	0.2630	Unemployment	-	0.00012	0.00007	-1.86	0.0700	Unemployment	-	0.00005	0.00009	-0.52	0.6040												
Inflation	0.00020	0.00010	2.04	0.0490	Inflation	0.00021	0.00010	2.07	0.0450	Inflation	0.00020	0.00010	2.04	0.0490															
Trade	-	0.00002	0.00002	-1.05	0.3010	Trade	-	0.00002	0.00002	-1.2	0.2390	Trade	-	0.00002	0.00002	-0.9	0.3730												
GDPG	0.00004	0.00013	0.33	0.7450	GDPG	0.00005	0.00014	0.38	0.7030	GDPG	0.00001	0.00012	0.06	0.9520															
C	0.04962	0.01107	4.48	0.0000	C	0.05048	0.01104	4.57	0.0000	C	0.04897	0.01091	4.49	0.0000															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 312 Number = 8 F(6, 38) = 3481.91 Prob > F = 0.0000 within R-squared = 0.9965					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 312 Number = 8 F(6, 38) = 3804.23 Prob > F = 0.0000 within R-squared = 0.9965					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 312 Number = 8 F(6, 38) = 3505.90 Prob > F = 0.0000 within R-squared = 0.9965				
Adjustment Size Model					Spend Model					Tax Model																			
Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t															
Palma Ratio Lag1	0.96965	0.00835	116.08	0.0000	Palma Ratio Lag1	0.96963	0.00837	115.88	0.0000	Palma Ratio Lag1	0.96951	0.00836	116.03	0.0000															
Adjustment Size	0.00158	0.00161	0.98	0.3330	Spend	0.00212	0.00242	0.87	0.3870	Tax	0.00303	0.00346	0.88	0.3870															
Unemployment	-	0.00027	0.00065	-0.42	0.6750	Unemployment	-	0.00024	0.00065	-0.38	0.7090	Unemployment	-	0.00018	0.00058	-0.31	0.7590												
Inflation	0.00014	0.00021	0.68	0.5020	Inflation	0.00016	0.00020	0.76	0.4540	Inflation	0.00013	0.00022	0.61	0.5480															
Trade	-	0.00003	0.00006	-0.55	0.5840	Trade	-	0.00003	0.00006	-0.49	0.6280	Trade	-	0.00002	0.00006	-0.45	0.6540												
GDPG	0.00069	0.00055	1.27	0.2130	GDPG	0.00061	0.00053	1.15	0.2560	GDPG	0.00069	0.00052	1.32	0.1930															
C	0.03648	0.01214	3	0.0050	C	0.03637	0.01158	3.14	0.0030	C	0.03543	0.01227	2.89	0.0060															

Appendix H - Small adjustment size countries estimation results

H.1 Panel ARDL model results

Dependent Variable: D(GINI) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(3, 4, 4, 4, 4)					Dependent Variable: D(GINI) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(GINI) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)							
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*			
Long Run Equation					Long Run Equation					Long Run Equation							
ADJSIZE	-0.04934	0.00772	-6.3946	0.0000	SPEND	0.00787	0.00856	0.9199	0.3599	TAX	-0.02553	0.01319	-1.9354	0.0558			
INFLATION	-0.00225	0.00113	-1.9910	0.0490	INFLATION	-0.00668	0.00299	-2.2323	0.0278	INFLATION	-0.00753	0.00264	-2.8595	0.0052			
GDPG	-0.00615	0.00192	-3.1978	0.0018	GDPG	0.01010	0.00393	2.5705	0.0116	GDPG	0.05941	0.01958	3.0344	0.0031			
TRADE	0.00145	0.00021	7.0479	0.0000	TRADE	0.00247	0.00058	4.2739	0.0000	TRADE	0.00851	0.00350	2.4326	0.0168			
UNEMPLOYMENT	0.00021	0.00133	0.1545	0.8775	UNEMPLOYMENT	0.01910	0.00325	5.8786	0.0000	UNEMPLOYMENT	0.02512	0.01037	2.4230	0.0172			
Short Run Equation					Short Run Equation					Short Run Equation							
COINTEQ01	-0.19225	0.0458	-4.1962	0.0001	COINTEQ01	-0.07074	0.0612	-1.1563	0.2503	COINTEQ01	0.02548	0.0430	0.5928	0.5546			
D(GINI(-1))	-0.18705	0.1344	-1.3914	0.1670	D(GINI(-1))	-0.36309	0.1773	-2.0475	0.0432	D(GINI(-1))	-0.37485	0.2053	-1.8260	0.0708			
D(GINI(-2))	-0.12576	0.1704	-0.7379	0.4622	D(GINI(-2))	-0.18586	0.2147	-0.8657	0.3887	D(GINI(-2))	-0.22755	0.2630	-0.8653	0.3890			
D(ADJSIZE)	-0.00093	0.0042	-0.2224	0.8244	D(GINI(-3))	-0.03693	0.1235	-0.2990	0.7656	D(GINI(-3))	-0.15174	0.1479	-1.0257	0.3075			
D(ADJSIZE(-1))	0.00931	0.0031	3.0421	0.0030	D(SPENDING)	-0.00122	0.0041	-0.2991	0.7655	D(TAX)	-0.01492	0.0062	-2.3911	0.0187			
D(ADJSIZE(-2))	0.00169	0.0047	0.3633	0.7171	D(SPENDING(-1))	0.00635	0.0056	1.1346	0.2593	D(TAX(-1))	-0.00917	0.0057	-1.6140	0.1097			
D(ADJSIZE(-3))	0.00385	0.0020	1.8933	0.0610	D(SPENDING(-2))	0.00779	0.0078	0.9993	0.3201	D(TAX(-2))	-0.00869	0.0076	-1.1494	0.2531			
D(INFLATION)	0.00222	0.0019	1.1759	0.2423	D(SPENDING(-3))	-0.00313	0.0033	-0.9621	0.3383	D(TAX(-3))	0.00188	0.0032	0.5794	0.5637			
D(INFLATION(-1))	-0.00042	0.0013	-0.3279	0.7436	D(INFLATION)	0.00343	0.0011	3.0516	0.0029	D(INFLATION)	0.00360	0.0013	2.6915	0.0083			
D(INFLATION(-2))	-0.00272	0.0009	-2.8780	0.0048	D(INFLATION(-1))	-0.00038	0.0013	-0.2940	0.7693	D(INFLATION(-1))	-0.00002	0.0016	-0.0134	0.9894			
D(INFLATION(-3))	0.00030	0.0013	0.2406	0.8104	D(INFLATION(-2))	-0.00135	0.0009	-1.5055	0.1354	D(INFLATION(-2))	-0.00299	0.0011	-2.7942	0.0062			
D(GDPG)	0.00189	0.0009	2.0240	0.0455	D(INFLATION(-3))	-0.00037	0.0015	-0.2407	0.8103	D(INFLATION(-3))	-0.00066	0.0017	-0.3801	0.7047			
D(GDPG(-1))	0.00094	0.0006	1.7126	0.0897	D(GDPG)	0.00144	0.0014	1.0587	0.2923	D(GDPG)	0.00338	0.0033	1.0109	0.3145			
D(GDPG(-2))	-0.00038	0.0006	-0.6725	0.5027	D(GDPG(-1))	0.00170	0.0010	1.7368	0.0855	D(GDPG(-1))	0.00369	0.0028	1.3359	0.1846			
D(GDPG(-3))	0.00001	0.0008	0.0128	0.9898	D(GDPG(-2))	0.00092	0.0006	1.4693	0.1449	D(GDPG(-2))	0.00228	0.0018	1.2833	0.2024			
D(TRADE)	-0.00101	0.0008	-1.2898	0.1999	D(GDPG(-3))	0.00044	0.0005	0.9049	0.3677	D(GDPG(-3))	0.00165	0.0008	2.0809	0.0400			
D(TRADE(-1))	0.00065	0.0004	1.5729	0.1187	D(TRADE)	-0.00118	0.0005	-2.4462	0.0162	D(TRADE)	-0.00134	0.0007	-1.8662	0.0649			
D(TRADE(-2))	0.00009	0.0005	0.1738	0.8623	D(TRADE(-1))	0.00083	0.0005	1.6722	0.0976	D(TRADE(-1))	0.00103	0.0005	2.1539	0.0337			
D(TRADE(-3))	-0.00009	0.0005	-0.1842	0.8542	D(TRADE(-2))	-0.00017	0.0007	-0.2362	0.8138	D(TRADE(-2))	0.00059	0.0006	1.0020	0.3188			
D(UNEMPLOYMENT)	-0.00253	0.0021	-1.1974	0.2338	D(TRADE(-3))	0.00032	0.0007	0.4311	0.6673	D(TRADE(-3))	0.00009	0.0009	0.1050	0.9166			
D(UNEMPLOYMENT(-1))	0.00443	0.0029	1.5006	0.1364	D(UNEMPLOYMENT)	0.00250	0.0023	1.0906	0.2781	D(UNEMPLOYMENT)	0.00199	0.0018	1.1251	0.2632			
D(UNEMPLOYMENT(-2))	-0.00729	0.0026	-2.7989	0.0061	D(UNEMPLOYMENT(-1))	0.00228	0.0010	2.2223	0.0285	D(UNEMPLOYMENT(-1))	0.00239	0.0014	1.7462	0.0838			
D(UNEMPLOYMENT(-3))	0.00372	0.0029	1.2716	0.2063	D(UNEMPLOYMENT(-2))	-0.00650	0.0024	-2.7585	0.0069	D(UNEMPLOYMENT(-2))	-0.00367	0.0023	-1.6315	0.1059			
C	0.07893	0.0201	3.9293	0.0002	D(UNEMPLOYMENT(-3))	-0.00002	0.0018	-0.0083	0.9934	D(UNEMPLOYMENT(-3))	0.00044	0.0023	0.1894	0.8502			
Mean dependent var	0.0017	S.D. dependent var			0.0095	Mean dependent var	0.0017	S.D. dependent var			0.0095	Mean dependent var	0.0017	S.D. dependent var			0.0095
S.E. of regression	0.0059	Akaike info criterion			-6.3868	S.E. of regression	0.0065	Akaike info criterion			-6.2809	S.E. of regression	0.0064	Akaike info criterion			-6.3920
Sum squared resid	0.0037	Schwarz criterion			-4.1410	Sum squared resid	0.0042	Schwarz criterion			-3.9443	Sum squared resid	0.0041	Schwarz criterion			-4.0553
Log likelihood	1067.1490	Hannan-Quinn criter.			-5.4860	Log likelihood	1059.3260	Hannan-Quinn criter.			-5.3437	Log likelihood	1074.8750	Hannan-Quinn criter.			-5.4547

H.1.1 Panel ARDL model results contd.

Dependent Variable: D(LABOUR SHARE) Method: ARDL Sample: 1983 2019 Included observations: 259 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION UNEMPLOYMENT TRADE GDPG Fixed regressors: Number of models evaluated: 16 Selected Model: ARDL(3, 1, 1, 1, 1, 1)					Dependent Variable: D(LABOUR SHARE) Method: ARDL Sample: 1983 2019 Included observations: 259 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION UNEMPLOYMENT TRADE GDPG Fixed regressors: Number of models evaluated: 16 Selected Model: ARDL(3, 1, 1, 1, 1, 1)					Dependent Variable: D(LABOUR SHARE) Method: ARDL Sample: 1982 2019 Included observations: 266 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION UNEMPLOYMENT TRADE GDPG Fixed regressors: Number of models evaluated: 16 Selected Model: ARDL(2, 1, 1, 1, 1, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-2.96351	1.60337	-1.8483	0.0659	SPEND	-3.98513	2.76670	-1.4404	0.1512	TAX	-1.24297	2.73340	-0.4547	0.6497
INFLATION	0.29742	0.97831	0.3040	0.7614	INFLATION	0.49000	0.86491	0.5665	0.5716	INFLATION	2.47499	0.46341	5.3408	0.0000
UNEMPLOYMENT	3.42743	0.48313	7.0942	0.0000	UNEMPLOYMENT	3.43440	0.48948	7.0164	0.0000	UNEMPLOYMENT	3.24794	0.50245	6.4642	0.0000
TRADE	0.86324	0.09235	9.3480	0.0000	TRADE	0.82761	0.08015	10.3253	0.0000	TRADE	0.78744	0.07842	10.0408	0.0000
GDPG	-0.62100	1.44485	-0.4298	0.6678	GDPG	-0.44358	1.39492	-0.3180	0.7508	GDPG	0.97915	1.42959	0.6849	0.4941
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	0.00769	0.0171	0.4499	0.6532	COINTEQ01	0.01504	0.0204	0.7378	0.4614	COINTEQ01	-0.00572	0.0178	-0.3210	0.7485
D(LABOUR SHARE(-1))	0.26895	0.1323	2.0332	0.0432	D(LABOUR SHARE(-1))	0.25563	0.1391	1.8377	0.0675	D(LABOUR SHARE(-1))	0.32804	0.1258	2.6082	0.0097
D(LABOUR SHARE(-2))	-0.07838	0.0639	-1.2257	0.2216	D(LABOUR SHARE(-2))	-0.08067	0.0652	-1.2375	0.2172	D(TAX)	0.28121	0.1078	2.6086	0.0097
D(ADJSIZE)	0.09310	0.3215	0.2896	0.7724	D(SPENDING)	-0.06771	0.6831	-0.0991	0.9211	D(INFLATION)	0.02160	0.1030	0.2096	0.8342
D(INFLATION)	0.00000	0.0644	-0.0001	0.9999	D(INFLATION)	0.03276	0.0608	0.5392	0.5903	D(UNEMPLOYMENT)	-0.06236	0.1256	-0.4965	0.6200
D(UNEMPLOYMENT)	0.01775	0.2023	0.0877	0.9302	D(UNEMPLOYMENT)	0.04547	0.2282	0.1992	0.8423	D(TRADE)	-0.05957	0.0513	-1.1616	0.2466
D(TRADE)	-0.03564	0.0439	-0.8121	0.4176	D(TRADE)	-0.03906	0.0449	-0.8700	0.3853	D(GDPG)	-0.34366	0.0414	-8.2964	0.0000
D(GDPG)	-0.34104	0.0502	-6.7977	0.0000	D(GDPG)	-0.33223	0.0452	-7.3460	0.0000					
Mean dependent var	-0.0216	S.D. dependent var		1.3206	Mean dependent var	-0.0216	S.D. dependent var		1.3206	Mean dependent var	-0.0085	S.D. dependent var		1.3261
S.E. of regression	0.8983	Akaike info criterion		2.5321	S.E. of regression	0.8718	Akaike info criterion		2.5226	S.E. of regression	0.9482	Akaike info criterion		2.6457
Sum squared resid	176.7319	Schwarz criterion		3.3240	Sum squared resid	166.4602	Schwarz criterion		3.3145	Sum squared resid	203.1852	Schwarz criterion		3.3467
Log likelihood	-293.4936	Hannan-Quinn criter.		2.8497	Log likelihood	-292.1641	Hannan-Quinn criter.		2.8402	Log likelihood	-316.4015	Hannan-Quinn criter.		2.9269

H.1.2 Panel ARDL model results contd.

Dependent Variable: D(TOP1) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(TOP1) Method: ARDL Sample: 1984 2019 Included observations: 324 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(TOP1) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-0.08059	0.01552	-5.1941	0.0000	SPEND	-0.00017	0.00249	-0.0671	0.9466	TAX	-0.28107	0.08320	-3.3784	0.0010
INFLATION	-0.00591	0.00227	-2.6075	0.0105	INFLATION	-0.00148	0.00062	-2.3776	0.0189	INFLATION	-0.00330	0.00260	-1.2694	0.2072
GDPG	0.01709	0.00711	2.4021	0.0181	GDPG	0.00767	0.00170	4.5004	0.0000	GDPG	0.02045	0.01198	1.7076	0.0908
TRADE	0.00226	0.00052	4.3110	0.0000	TRADE	0.00133	0.00019	7.0372	0.0000	TRADE	0.00117	0.00044	2.6803	0.0086
UNEMPLOYMENT	0.01880	0.00545	3.4518	0.0008	UNEMPLOYMENT	0.00546	0.00089	6.1467	0.0000	UNEMPLOYMENT	0.01432	0.00686	2.0864	0.0395
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.08454	0.0200	-4.2204	0.0001	COINTEQ01	-0.14936	0.0604	-2.4745	0.0146	COINTEQ01	-0.07441	0.0202	-3.6899	0.0004
D(TOP1(-1))	-0.40952	0.0943	-4.3407	0.0000	D(TOP1(-1))	-0.19894	0.1189	-1.6733	0.0967	D(TOP1(-1))	-0.44146	0.1056	-4.1820	0.0001
D(TOP1(-2))	-0.25389	0.1720	-1.4761	0.1430	D(TOP1(-2))	-0.08953	0.1146	-0.7811	0.4361	D(TOP1(-2))	-0.32167	0.1709	-1.8819	0.0628
D(TOP1(-3))	-0.15699	0.1015	-1.5469	0.1250	D(TOP1(-3))	0.12326	0.1294	0.9529	0.3424	D(TOP1(-3))	-0.19212	0.1062	-1.8092	0.0734
D(ADJSIZE)	-0.00195	0.0037	-0.5254	0.6004	D(SPENDING)	-0.00048	0.0021	-0.2277	0.8202	D(TAX)	0.00438	0.0066	0.6612	0.5100
D(ADJSIZE(-1))	0.00479	0.0029	1.6330	0.1056	D(SPENDING(-1))	0.00010	0.0010	0.1013	0.9195	D(TAX(-1))	0.00765	0.0048	1.5886	0.1153
D(ADJSIZE(-2))	0.00155	0.0033	0.4745	0.6362	D(SPENDING(-2))	0.00015	0.0010	0.1597	0.8734	D(TAX(-2))	0.00533	0.0049	1.0871	0.2796
D(ADJSIZE(-3))	0.00110	0.0016	0.6724	0.5029	D(SPENDING(-3))	0.00018	0.0011	0.1649	0.8693	D(TAX(-3))	0.00320	0.0020	1.6211	0.1082
D(INFLATION)	0.00241	0.0014	1.7812	0.0779	D(INFLATION)	0.00159	0.0004	3.6646	0.0004	D(INFLATION)	0.00145	0.0015	0.9939	0.3227
D(INFLATION(-1))	-0.00024	0.0009	-0.2798	0.7802	D(INFLATION(-1))	-0.00029	0.0003	-1.0483	0.2964	D(INFLATION(-1))	-0.00030	0.0009	-0.3316	0.7409
D(INFLATION(-2))	-0.00231	0.0010	-2.3740	0.0195	D(INFLATION(-2))	-0.00039	0.0006	-0.6436	0.5210	D(INFLATION(-2))	-0.00222	0.0009	-2.3594	0.0202
D(INFLATION(-3))	0.00021	0.0009	0.2344	0.8152	D(INFLATION(-3))	0.00132	0.0009	1.4860	0.1397	D(INFLATION(-3))	-0.00026	0.0007	-0.3666	0.7147
D(GDPG)	0.00127	0.0006	2.2318	0.0279	D(GDPG)	0.00051	0.0008	0.6148	0.5398	D(GDPG)	0.00123	0.0009	1.4131	0.1607
D(GDPG(-1))	0.00130	0.0008	1.6993	0.0924	D(GDPG(-1))	0.00062	0.0007	0.9071	0.3660	D(GDPG(-1))	0.00155	0.0009	1.7538	0.0825
D(GDPG(-2))	-0.00019	0.0014	-0.1343	0.8935	D(GDPG(-2))	0.00060	0.0005	1.1238	0.2632	D(GDPG(-2))	0.00017	0.0013	0.1316	0.8955
D(GDPG(-3))	-0.00042	0.0009	-0.4385	0.6620	D(GDPG(-3))	0.00025	0.0004	0.6661	0.5066	D(GDPG(-3))	-0.00035	0.0008	-0.4231	0.6732
D(TRADE)	-0.00064	0.0005	-1.2807	0.2032	D(TRADE)	-0.00059	0.0002	-2.8872	0.0046	D(TRADE)	-0.00047	0.0005	-0.8606	0.3915
D(TRADE(-1))	0.00076	0.0006	1.2185	0.2259	D(TRADE(-1))	-0.00002	0.0003	-0.0819	0.9349	D(TRADE(-1))	0.00080	0.0005	1.6252	0.1073
D(TRADE(-2))	0.00022	0.0005	0.4172	0.6775	D(TRADE(-2))	0.00027	0.0002	1.6091	0.1100	D(TRADE(-2))	0.00006	0.0005	0.1331	0.8944
D(TRADE(-3))	-0.00018	0.0004	-0.4987	0.6191	D(TRADE(-3))	-0.00023	0.0002	-1.0218	0.3088	D(TRADE(-3))	-0.00026	0.0004	-0.7453	0.4578
D(UNEMPLOYMENT)	-0.00069	0.0016	-0.4351	0.6644	D(UNEMPLOYMENT)	0.00058	0.0009	0.6579	0.5118	D(UNEMPLOYMENT)	-0.00059	0.0019	-0.3120	0.7557
D(UNEMPLOYMENT(-1))	0.00186	0.0011	1.6808	0.0959	D(UNEMPLOYMENT(-1))	0.00209	0.0012	1.7869	0.0763	D(UNEMPLOYMENT(-1))	0.00100	0.0008	1.2809	0.2032
D(UNEMPLOYMENT(-2))	-0.00637	0.0029	-2.1997	0.0301	D(UNEMPLOYMENT(-2))	0.00047	0.0007	0.6293	0.5303	D(UNEMPLOYMENT(-2))	-0.00579	0.0026	-2.1883	0.0310
D(UNEMPLOYMENT(-3))	0.00001	0.0028	0.0041	0.9968	D(UNEMPLOYMENT(-3))	-0.00312	0.0012	-2.6325	0.0095	D(UNEMPLOYMENT(-3))	-0.00125	0.0034	-0.3704	0.7119
C	-0.00657	0.0027	-2.4175	0.0174	C	-0.00956	0.0035	-2.7524	0.0068	C	-0.00237	0.0020	-1.1876	0.2378
Mean dependent var	0.0013	S.D. dependent var	0.0073		Mean dependent var	0.0005	S.D. dependent var	0.0080		Mean dependent var	0.0013	S.D. dependent var	0.0073	
S.E. of regression	0.0052	Akaike info criterion	-6.7729		S.E. of regression	0.0062	Akaike info criterion	-6.5460		S.E. of regression	0.0051	Akaike info criterion	-6.7338	
Sum squared resid	0.0027	Schwarz criterion	-4.4363		Sum squared resid	0.0050	Schwarz criterion	-4.0632		Sum squared resid	0.0026	Schwarz criterion	-4.3971	
Log likelihood	1128.2070	Hannan-Quinn criter.	-5.8357		Log likelihood	1408.2740	Hannan-Quinn criter.	-5.5588		Log likelihood	1122.7290	Hannan-Quinn criter.	-5.7965	

H.1.3 Panel ARDL model results contd.

Dependent Variable: D(TOP10) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(3, 4, 4, 4, 4)					Dependent Variable: D(TOP10) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(3, 4, 4, 4, 4)					Dependent Variable: D(TOP10) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	-0.07380	0.01376	-5.3627	0.0000	SPEND	-0.13726	0.04054	-3.3858	0.0010	TAX	-0.21618	0.04742	-4.5589	0.0000
INFLATION	-0.00141	0.000226	-0.6246	0.5336	INFLATION	-0.00377	0.00320	-1.1782	0.2413	INFLATION	-0.00792	0.00113	-6.9926	0.0000
GDPG	-0.00146	0.000416	-0.3496	0.7273	GDPG	0.01291	0.00933	1.3841	0.1692	GDPG	-0.00734	0.00422	-1.7395	0.0850
TRADE	0.00190	0.00041	4.6103	0.0000	TRADE	0.00259	0.00089	2.9178	0.0043	TRADE	0.00053	0.00035	1.5171	0.1324
UNEMPLOYMENT	0.01237	0.00422	2.9311	0.0041	UNEMPLOYMENT	0.02734	0.01033	2.6468	0.0094	UNEMPLOYMENT	0.00317	0.00291	1.0918	0.2776
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.11107	0.0198	-5.6126	0.0000	COINTEQ01	-0.07395	0.0152	-4.8806	0.0000	COINTEQ01	-0.15610	0.0513	-3.0409	0.0030
D(TOP10(-1))	-0.17354	0.1401	-1.2382	0.2183	D(TOP10(-1))	-0.26834	0.0970	-2.7664	0.0067	D(TOP10(-1))	-0.27782	0.0800	-3.4736	0.0008
D(TOP10(-2))	-0.22007	0.1289	-1.7071	0.0907	D(TOP10(-2))	-0.20448	0.1059	-1.9314	0.0561	D(TOP10(-2))	-0.24534	0.1204	-2.0375	0.0442
D(ADJSIZE)	-0.00353	0.0040	-0.8835	0.3790	D(SPENDING)	0.00105	0.0059	0.1788	0.8584	D(TOP10(-3))	0.04082	0.0889	0.4593	0.6470
D(ADJSIZE(-1))	0.00836	0.0046	1.7987	0.0749	D(SPENDING(-1))	0.00964	0.0057	1.6839	0.0951	D(TAX)	0.00612	0.0045	1.3582	0.1775
D(ADJSIZE(-2))	0.00103	0.0065	0.1575	0.8752	D(SPENDING(-2))	0.00719	0.0081	0.8860	0.3776	D(TAX(-1))	0.00678	0.0050	1.3498	0.1801
D(ADJSIZE(-3))	0.00418	0.0033	1.2700	0.2068	D(SPENDING(-3))	0.00223	0.0050	0.4465	0.6562	D(TAX(-2))	0.00793	0.0082	0.9656	0.3366
D(INFLATION)	0.00267	0.0017	1.5942	0.1138	D(INFLATION)	0.00261	0.0011	2.4370	0.0165	D(TAX(-3))	0.00843	0.0041	2.0523	0.0427
D(INFLATION(-1))	-0.00103	0.0013	-0.7671	0.4447	D(INFLATION(-1))	-0.00086	0.0013	-0.6441	0.5209	D(INFLATION)	0.00131	0.0019	0.6775	0.4996
D(INFLATION(-2))	-0.00189	0.0011	-1.7102	0.0901	D(INFLATION(-2))	-0.00096	0.0009	-1.1204	0.2651	D(INFLATION(-1))	-0.00037	0.0012	-0.3022	0.7632
D(INFLATION(-3))	0.00086	0.0010	0.8375	0.4042	D(INFLATION(-3))	0.00070	0.0008	0.8873	0.3769	D(INFLATION(-2))	-0.00258	0.0012	-2.1655	0.0327
D(GDPG)	0.00234	0.0007	3.4812	0.0007	D(GDPG)	0.00149	0.0007	2.1541	0.0335	D(INFLATION(-3))	-0.00030	0.0010	-0.2958	0.7680
D(GDPG(-1))	0.00108	0.0004	2.6432	0.0094	D(GDPG(-1))	0.00062	0.0005	1.3048	0.1947	D(GDPG)	0.00301	0.0009	3.5226	0.0006
D(GDPG(-2))	-0.00066	0.0010	-0.6788	0.4987	D(GDPG(-2))	0.00006	0.0005	0.1219	0.9032	D(GDPG(-1))	0.00261	0.0006	4.2987	0.0000
D(GDPG(-3))	-0.00058	0.0006	-0.9479	0.3453	D(GDPG(-3))	-0.00072	0.0005	-1.3346	0.1848	D(GDPG(-2))	0.00106	0.0011	0.9592	0.3398
D(TRADE)	-0.00102	0.0006	-1.6473	0.1024	D(TRADE)	-0.00054	0.0005	-1.2013	0.2323	D(GDPG(-3))	0.00058	0.0008	0.6957	0.4882
D(TRADE(-1))	0.00134	0.0008	1.7155	0.0891	D(TRADE(-1))	0.00151	0.0007	2.0766	0.0402	D(TRADE)	-0.00042	0.0007	-0.5918	0.5553
D(TRADE(-2))	0.00027	0.0007	0.3994	0.6904	D(TRADE(-2))	0.00002	0.0008	0.0294	0.9766	D(TRADE(-1))	0.00092	0.0006	1.4429	0.1522
D(TRADE(-3))	0.00015	0.0004	0.3572	0.7217	D(TRADE(-3))	0.00034	0.0004	0.7871	0.4330	D(TRADE(-2))	0.00036	0.0005	0.7935	0.4294
D(UNEMPLOYMENT)	-0.00120	0.0016	-0.7434	0.4589	D(UNEMPLOYMENT)	0.00012	0.0022	0.0541	0.9569	D(TRADE(-3))	-0.00013	0.0003	-0.4045	0.6867
D(UNEMPLOYMENT(-1))	0.00234	0.0027	0.8628	0.3902	D(UNEMPLOYMENT(-1))	0.00094	0.0007	1.2870	0.2009	D(UNEMPLOYMENT)	0.00126	0.0021	0.5954	0.5529
D(UNEMPLOYMENT(-2))	-0.00761	0.0045	-1.6910	0.0937	D(UNEMPLOYMENT(-2))	-0.00568	0.0031	-1.8365	0.0691	D(UNEMPLOYMENT(-1))	-0.00057	0.0015	-0.3837	0.7020
D(UNEMPLOYMENT(-3))	0.00437	0.0044	0.9912	0.3238	D(UNEMPLOYMENT(-3))	0.00167	0.0030	0.5556	0.5796	D(UNEMPLOYMENT(-2))	-0.00516	0.0031	-1.6624	0.0996
C	0.02532	0.0074	3.4143	0.0009	C	0.00866	0.0056	1.5510	0.1238	D(UNEMPLOYMENT(-3))	0.00075	0.0027	0.2762	0.7830
										C	0.05542	0.0174	3.1839	0.0019
Mean dependent var	0.0019	S.D. dependent var		0.0084	Mean dependent var	0.0019	S.D. dependent var		0.0084	Mean dependent var	0.0019	S.D. dependent var		0.0084
S.E. of regression	0.0055	Akaike info criterion		-6.6036	S.E. of regression	0.0066	Akaike info criterion		-6.3057	S.E. of regression	0.0057	Akaike info criterion		-6.4617
Sum squared resid	0.0033	Schwarz criterion		-4.3579	Sum squared resid	0.0046	Schwarz criterion		-4.0599	Sum squared resid	0.0033	Schwarz criterion		-4.1250
Log likelihood	1097.5100	Hannan-Quinn criter.		-5.7029	Log likelihood	1055.7980	Hannan-Quinn criter.		-5.4049	Log likelihood	1084.6380	Hannan-Quinn criter.		-5.5245

H.1.4 Panel ARDL model results contd.

Dependent Variable: D(BOT40) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(3, 4, 4, 4, 4)					Dependent Variable: D(BOT40) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: EPISODUM C Number of models evaluated: 16 Selected Model: ARDL(3, 4, 4, 4, 4)					Dependent Variable: D(BOT40) Method: ARDL Sample: 1984 2019 Included observations: 252 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: EPISODUM C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)							
Variable		Coefficient	Std. Error	t-Statistic	Prob.*	Variable		Coefficient	Std. Error	t-Statistic	Prob.*	Variable		Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation						Long Run Equation						Long Run Equation					
ADJSIZE		-0.01231	0.00554	-2.2223	0.0284	SPEND		-0.00361	0.00285	-1.2658	0.2085	TAX		-0.01204	0.00553	-2.1790	0.0319
INFLATION		0.00343	0.00062	5.5567	0.0000	INFLATION		0.00715	0.00083	8.6709	0.0000	INFLATION		0.00762	0.00098	7.8236	0.0000
GDPG		0.00834	0.00180	4.6350	0.0000	GDPG		0.00019	0.00058	0.3347	0.7385	GDPG		0.00007	0.00062	0.1119	0.9112
TRADE		0.00199	0.00049	4.0939	0.0001	TRADE		0.00049	0.00013	3.7768	0.0003	TRADE		0.00047	0.00017	2.7855	0.0065
UNEMPLOYMENT		0.00624	0.00143	4.3733	0.0000	UNEMPLOYMENT		-0.00061	0.00057	-1.0688	0.2877	UNEMPLOYMENT		0.00098	0.00077	1.2680	0.2080
Short Run Equation						Short Run Equation						Short Run Equation					
COINTEQ01		0.01991	0.0640	0.3111	0.7563	COINTEQ01		-0.07764	0.1032	-0.7522	0.4537	COINTEQ01		-0.06143	0.1007	-0.6102	0.5432
D(BOT40(-1))		-0.14644	0.1374	-1.0659	0.2889	D(BOT40(-1))		-0.26234	0.1776	-1.4772	0.1428	D(BOT40(-1))		-0.24269	0.2067	-1.1742	0.2433
D(BOT40(-2))		-0.10704	0.1814	-0.5901	0.5563	D(BOT40(-2))		-0.10776	0.1572	-0.6855	0.4946	D(BOT40(-2))		-0.22751	0.1884	-1.2078	0.2302
D(ADJSIZE)		0.00309	0.0014	2.1610	0.0329	D(SPENDING)		0.00175	0.0017	1.0188	0.3108	D(BOT40(-3))		0.00100	0.0933	0.0107	0.9915
D(ADJSIZE(-1))		-0.00001	0.0012	-0.0124	0.9901	D(SPENDING(-1))		-0.00108	0.0021	-0.5060	0.6140	D(TAX)		0.00323	0.0012	2.7122	0.0080
D(ADJSIZE(-2))		0.00009	0.0021	0.0430	0.9658	D(SPENDING(-2))		-0.00232	0.0022	-1.0508	0.2959	D(TAX(-1))		0.00206	0.0016	1.2544	0.2128
D(ADJSIZE(-3))		0.00027	0.0007	0.3757	0.7079	D(SPENDING(-3))		0.00024	0.0017	0.1384	0.8902	D(TAX(-2))		0.00230	0.0019	1.1939	0.2356
D(INFLATION)		-0.00059	0.0008	-0.7342	0.4644	D(INFLATION)		-0.00132	0.0003	-4.9481	0.0000	D(TAX(-3))		-0.00017	0.0007	-0.2480	0.8047
D(INFLATION(-1))		0.00049	0.0003	1.4960	0.1376	D(INFLATION(-1))		0.00021	0.0005	0.4268	0.6704	D(INFLATION)		-0.00046	0.0005	-0.9845	0.3274
D(INFLATION(-2))		0.00075	0.0004	2.0138	0.0465	D(INFLATION(-2))		0.00021	0.0003	0.7202	0.4731	D(INFLATION(-1))		0.00027	0.0005	0.5320	0.5960
D(INFLATION(-3))		0.00011	0.0005	0.2252	0.8223	D(INFLATION(-3))		0.00044	0.0004	1.1259	0.2629	D(INFLATION(-2))		0.00050	0.0002	2.1642	0.0330
D(GDPG)		-0.00006	0.0006	-0.1036	0.9177	D(GDPG)		-0.00031	0.0004	-0.7159	0.4757	D(INFLATION(-3))		0.00003	0.0005	0.0557	0.9557
D(GDPG(-1))		0.00031	0.0004	0.8018	0.4244	D(GDPG(-1))		0.00007	0.0003	0.2303	0.8183	D(GDPG)		-0.00028	0.0004	-0.6625	0.5093
D(GDPG(-2))		0.00057	0.0005	1.1405	0.2566	D(GDPG(-2))		0.00033	0.0004	0.9059	0.3672	D(GDPG(-1))		0.00002	0.0004	0.0503	0.9600
D(GDPG(-3))		0.00015	0.0004	0.3754	0.7081	D(GDPG(-3))		0.00003	0.0003	0.1335	0.8940	D(GDPG(-2))		0.00027	0.0004	0.6563	0.5132
D(TRADE)		0.00016	0.0004	0.4387	0.6618	D(TRADE)		0.00011	0.0002	0.4535	0.6512	D(GDPG(-3))		0.00010	0.0003	0.2988	0.7658
D(TRADE(-1))		-0.00030	0.0003	-1.1661	0.2462	D(TRADE(-1))		-0.00028	0.0002	-1.5406	0.1266	D(TRADE)		-0.00002	0.0003	-0.0598	0.9525
D(TRADE(-2))		0.00014	0.0002	0.7437	0.4587	D(TRADE(-2))		0.00014	0.0002	0.9300	0.3546	D(TRADE(-1))		-0.00026	0.0002	-1.3222	0.1893
D(TRADE(-3))		0.00014	0.0002	0.7724	0.4416	D(TRADE(-3))		-0.00016	0.0002	-0.6739	0.5019	D(TRADE(-2))		0.00008	0.0002	0.4909	0.6246
D(UNEMPLOYMENT)		0.00205	0.0016	1.2429	0.2166	D(UNEMPLOYMENT)		0.00106	0.0012	0.9085	0.3658	D(TRADE(-3))		0.00000	0.0002	-0.0229	0.9818
D(UNEMPLOYMENT(-1))		-0.00138	0.0009	-1.6101	0.1103	D(UNEMPLOYMENT(-1))		-0.00004	0.0010	-0.0390	0.9690	D(UNEMPLOYMENT)		0.00082	0.0013	0.6370	0.5257
D(UNEMPLOYMENT(-2))		0.00222	0.0007	3.2853	0.0014	D(UNEMPLOYMENT(-2))		0.00053	0.0008	0.6421	0.5223	D(UNEMPLOYMENT(-1))		0.00014	0.0011	0.1263	0.8997
D(UNEMPLOYMENT(-3))		-0.00098	0.0007	-1.4575	0.1479	D(UNEMPLOYMENT(-3))		0.00032	0.0011	0.2979	0.7664	D(UNEMPLOYMENT(-2))		0.00098	0.0007	1.4452	0.1518
C		0.00229	0.0020	1.1340	0.2593	C		0.00170	0.0109	0.1561	0.8763	D(UNEMPLOYMENT(-3))		0.00009	0.0010	0.0884	0.9298
												C		0.00125	0.0109	0.1148	0.9089
Mean dependent var		-0.0005	S.D. dependent var	0.0035		Mean dependent var		-0.0005	S.D. dependent var	0.0035		Mean dependent var		-0.0005	S.D. dependent var	0.0035	
S.E. of regression		0.0022	Akaike info criterion	-8.1338		S.E. of regression		0.0022	Akaike info criterion	-8.2305		S.E. of regression		0.0023	Akaike info criterion	-8.0796	
Sum squared resid		0.0005	Schwarz criterion	-5.8880		Sum squared resid		0.0005	Schwarz criterion	-5.8939		Sum squared resid		0.0005	Schwarz criterion	-5.6520	
Log likelihood		1311.7250	Hannan-Quinn criter.	-7.2330		Log likelihood		1332.2720	Hannan-Quinn criter.	-7.2933		Sum squared resid		0.0005	Schwarz criterion	-5.6520	
												Log likelihood		1318.1390	Hannan-Quinn criter.	-7.1057	

H.1.5 Panel ARDL model results contd.

Dependent Variable: D(PALMA RATIO) Method: ARDL Sample: 1984 2019 Included observations: 216 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): ADJSIZE INFLATION UNEMPLOYMENT TRADE GDPG Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(PALMA RATIO) Method: ARDL Sample: 1984 2019 Included observations: 216 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): SPEND INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: EPISODUM C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)					Dependent Variable: D(PALMA RATIO) Method: ARDL Sample: 1984 2019 Included observations: 216 Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC) Dynamic regressors (4 lags, automatic): TAX INFLATION GDPG TRADE UNEMPLOYMENT Fixed regressors: C Number of models evaluated: 16 Selected Model: ARDL(4, 4, 4, 4, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation					Long Run Equation					Long Run Equation				
ADJSIZE	0.68900	0.50178	1.3731	0.1733	SPEND	-2.08688	0.45602	-4.5763	0.0000	TAX	0.80020	0.51891	1.5421	0.1267
INFLATION	0.18307	0.11721	1.5619	0.1220	INFLATION	0.40271	0.07510	5.3621	0.0000	INFLATION	0.24059	0.07680	3.1328	0.0024
UNEMPLOYMENT	0.28606	0.14069	2.0333	0.0451	GDPG	-0.25725	0.10809	-2.3800	0.0197	GDPG	-0.15950	0.14732	-1.0827	0.2820
TRADE	-0.01110	0.01142	-0.9723	0.3336	TRADE	-0.01750	0.00651	-2.6891	0.0087	TRADE	-0.00816	0.00833	-0.9797	0.3300
GDPG	-0.34870	0.24815	-1.4052	0.1636	UNEMPLOYMENT	0.29770	0.05076	5.8654	0.0000	UNEMPLOYMENT	0.32976	0.06760	4.8784	0.0000
Short Run Equation					Short Run Equation					Short Run Equation				
COINTEQ01	-0.00452	0.0055	-0.8285	0.4097	COINTEQ01	-0.00528	0.0077	-0.6861	0.4947	COINTEQ01	-0.00664	0.0058	-1.1455	0.2552
D(PALMA RATIO(-1))	0.09055	0.3042	0.2977	0.7666	D(PALMA RATIO(-1))	0.19384	0.3280	0.5910	0.5562	D(PALMA RATIO(-1))	0.09404	0.2864	0.3284	0.7434
D(PALMA RATIO(-2))	-0.18195	0.2771	-0.6565	0.5132	D(PALMA RATIO(-2))	-0.25641	0.2828	-0.9066	0.3673	D(PALMA RATIO(-2))	-0.10505	0.2224	-0.4724	0.6378
D(PALMA RATIO(-3))	0.25805	0.2682	0.9620	0.3388	D(PALMA RATIO(-3))	-0.10787	0.3036	-0.3553	0.7233	D(PALMA RATIO(-3))	0.13929	0.1640	0.8491	0.3982
D(ADJSIZE)	0.00556	0.0119	0.4676	0.6413	D(SPENDING)	0.02319	0.0227	1.0239	0.3090	D(TAX)	-0.01265	0.0133	-0.9507	0.3444
D(ADJSIZE(-1))	-0.00046	0.0140	-0.0329	0.9738	D(SPENDING(-1))	0.01432	0.0118	1.2160	0.2276	D(TAX(-1))	-0.01367	0.0250	-0.5470	0.5858
D(ADJSIZE(-2))	-0.01249	0.0081	-1.5519	0.1244	D(SPENDING(-2))	0.00942	0.0253	0.3724	0.7106	D(TAX(-2))	-0.02803	0.0120	-2.3369	0.0218
D(ADJSIZE(-3))	0.00509	0.0084	0.6019	0.5488	D(SPENDING(-3))	-0.01044	0.0223	-0.4685	0.6407	D(TAX(-3))	-0.00851	0.0063	-1.3464	0.1817
D(INFLATION)	0.00021	0.0027	0.0758	0.9398	D(INFLATION)	-0.00047	0.0039	-0.1216	0.9035	D(INFLATION)	-0.00164	0.0032	-0.5059	0.6142
D(INFLATION(-1))	0.00694	0.0061	1.1406	0.2572	D(INFLATION(-1))	0.00084	0.0039	0.2123	0.8324	D(INFLATION(-1))	0.00599	0.0054	1.1048	0.2723
D(INFLATION(-2))	0.00957	0.0067	1.4266	0.1573	D(INFLATION(-2))	0.00644	0.0057	1.1313	0.2613	D(INFLATION(-2))	0.00571	0.0058	0.9886	0.3256
D(INFLATION(-3))	0.00330	0.0025	1.3279	0.1877	D(INFLATION(-3))	0.00130	0.0018	0.7050	0.4829	D(INFLATION(-3))	0.00277	0.0010	2.6636	0.0092
D(UNEMPLOYMENT)	0.00589	0.0048	1.2396	0.2185	D(GDPG)	-0.00068	0.0021	-0.3285	0.7434	D(GDPG)	0.00302	0.0018	1.6356	0.1056
D(UNEMPLOYMENT(-1))	-0.00601	0.0050	-1.2059	0.2312	D(GDPG(-1))	-0.00096	0.0027	-0.3586	0.7208	D(GDPG(-1))	0.00220	0.0037	0.5937	0.5543
D(UNEMPLOYMENT(-2))	-0.00087	0.0057	-0.1530	0.8788	D(GDPG(-2))	0.00082	0.0031	0.2622	0.7938	D(GDPG(-2))	0.00156	0.0048	0.3236	0.7470
D(UNEMPLOYMENT(-3))	0.00392	0.0048	0.8183	0.4155	D(GDPG(-3))	0.00236	0.0019	1.2672	0.2088	D(GDPG(-3))	0.00153	0.0015	1.0336	0.3042
D(TRADE)	0.00098	0.0014	0.6891	0.4926	D(TRADE)	-0.00002	0.0022	-0.0107	0.9915	D(TRADE)	0.00076	0.0010	0.7383	0.4623
D(TRADE(-1))	0.00088	0.0018	0.5019	0.6170	D(TRADE(-1))	0.00099	0.0009	1.1489	0.2540	D(TRADE(-1))	-0.00029	0.0014	-0.2105	0.8338
D(TRADE(-2))	-0.00169	0.0008	-2.1479	0.0345	D(TRADE(-2))	-0.00174	0.0019	-0.9114	0.3648	D(TRADE(-2))	-0.00178	0.0013	-1.3963	0.1662
D(TRADE(-3))	-0.00100	0.0009	-1.0686	0.2882	D(TRADE(-3))	-0.00077	0.0009	-0.8263	0.4111	D(TRADE(-3))	-0.00206	0.0010	-1.9848	0.0504
D(GDPG)	0.00374	0.0023	1.6491	0.1028	D(UNEMPLOYMENT)	0.00596	0.0059	1.0189	0.3113	D(UNEMPLOYMENT)	0.00657	0.0066	0.9979	0.3211
D(GDPG(-1))	0.00299	0.0043	0.6942	0.4894	D(UNEMPLOYMENT(-1))	-0.00284	0.0087	-0.3261	0.7452	D(UNEMPLOYMENT(-1))	-0.00998	0.0064	-1.5598	0.1225
D(GDPG(-2))	0.00312	0.0044	0.7058	0.4822	D(UNEMPLOYMENT(-2))	0.00198	0.0079	0.2515	0.8021	D(UNEMPLOYMENT(-2))	-0.00050	0.0049	-0.1021	0.9189
D(GDPG(-3))	0.00183	0.0014	1.3315	0.1865	D(UNEMPLOYMENT(-3))	0.00537	0.0050	1.0764	0.2850	D(UNEMPLOYMENT(-3))	0.00581	0.0038	1.5494	0.1249
C	0.01113	0.0092	1.2045	0.2317	C	0.00780	0.0108	0.7216	0.4727	C	0.00303	0.0050	0.6094	0.5439
Mean dependent var	-0.0146	S.D. dependent var	0.0444		Mean dependent var	-0.0146	S.D. dependent var	0.0444		Mean dependent var	-0.0146	S.D. dependent var	0.0444	
S.E. of regression	0.0157	Akaike info criterion	-5.0113		S.E. of regression	0.0154	Akaike info criterion	-5.2123		S.E. of regression	0.0162	Akaike info criterion	-4.9362	
Sum squared resid	0.0211	Schwarz criterion	-2.7701		Sum squared resid	0.0190	Schwarz criterion	-2.8843		Sum squared resid	0.0227	Schwarz criterion	-2.6950	
Log likelihood	758.8634	Hannan-Quinn criter.	-4.1084		Log likelihood	789.0857	Hannan-Quinn criter.	-4.2744		Log likelihood	749.8139	Hannan-Quinn criter.	-4.0333	

Appendix I – Small adjustment size countries Driscoll Kraay Fixed Effects model results

I.1 Driscoll Kraay Fixed Effects model results

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 273 Number = 7 F(6, 38) = 669.73 Prob > F = 0.0000 within R-squared = 0.8844					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 273 Number = 7 F(6, 38) = 691.47 Prob > F = 0.0000 within R-squared = 0.8820					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 273 Number = 7 F(6, 38) = 748.92 Prob > F = 0.0000 within R-squared = 0.8867				
Adjustment Size Model					Spend Model					Tax Model																			
Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t	Gini	Coef.	Drisc/Kraay Std. Err	t	P>t															
GiniLag1	0.84722	0.03381	25.06	0.0000	GiniLag1	0.85424	0.03263	26.18	0.0000	GiniLag1	0.84943	0.03245	26.18	0.0000															
Adjustment Size	-	-	-	-	Spend	-	-	-	-	Tax	-	-	-	-															
Unemployment	0.00244	0.00096	-2.54	0.0150	Unemployment	0.00168	0.00156	-1.08	0.2880	Unemployment	0.00650	0.00160	-4.05	0.0000															
Inflation	0.00031	0.00027	1.16	0.2540	Inflation	0.00026	0.00027	0.95	0.3480	Inflation	0.00030	0.00026	1.16	0.2530															
Trade	-	-	-	-	Trade	-	-	-	-	Trade	-	-	-	-															
GDPG	0.00064	0.00021	-3.07	0.0040	GDPG	0.00064	0.00022	-2.96	0.0050	GDPG	0.00057	0.00020	-2.85	0.0070															
C	0.00027	0.00009	2.91	0.0060	C	0.00026	0.00009	2.91	0.0060	C	0.00026	0.00009	2.96	0.0050															
	0.00062	0.00019	3.27	0.0020		0.00064	0.00019	3.45	0.0010		0.00061	0.00018	3.48	0.0010															
	0.05391	0.01202	4.48	0.0000		0.05154	0.01180	4.37	0.0000		0.05357	0.01183	4.53	0.0000															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 37.65 Prob > F = 0.0000 within R-squared = 0.3164					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 36.02 Prob > F = 0.0000 within R-squared = 0.3100					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 38.64 Prob > F = 0.0000 within R-squared = 0.3308				
Adjustment Size Model					Spend Model					Tax Model																			
Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t	Labour Share	Coef.	Drisc/Kraay Std. Err	t	P>t															
Labour Share Lag1	-	-	-	-	Labour Share Lag1	-	-	-	-	Labour Share Lag1	-	-	-	-															
Adjustment Size	0.05615	0.09735	-0.58	0.5680	Adjustment Size	0.05193	0.09708	-0.53	0.5960	Adjustment Size	0.05761	0.09857	-0.58	0.5620															
Unemployment	0.16104	0.07645	2.11	0.0420	Unemployment	0.02461	0.14844	0.17	0.8690	Unemployment	0.63976	0.16437	3.89	0.0000															
Inflation	-	-	-	-	Inflation	-	-	-	-	Inflation	-	-	-	-															
Trade	0.33256	0.04466	-7.45	0.0000	Trade	0.32309	0.04718	-6.85	0.0000	Trade	0.33396	0.04227	-7.9	0.0000															
GDPG	0.00365	0.03689	0.1	0.9220	GDPG	0.00424	0.03763	0.11	0.9110	GDPG	0.00117	0.03620	0.03	0.9740															
C	-	-	-	-	C	-	-	-	-	C	-	-	-	-															
	0.04179	0.01089	-3.84	0.0000		0.04084	0.01077	-3.79	0.0010		0.04066	0.01119	-3.63	0.0010															
	0.31405	0.05919	-5.31	0.0000		0.31356	0.05750	-5.45	0.0000		0.31395	0.06095	-5.15	0.0000															
	4.87324	0.79625	6.12	0.0000		4.80103	0.80556	5.96	0.0000		4.81877	0.80588	5.98	0.0000															

I.1.1 Driscoll Kraay Fixed Effects model results contd.

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 8.69 Prob > F = 0.0000 within R-squared = 0.1894					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 7.03 Prob > F = 0.0000 within R-squared = 0.1860					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 11.50 Prob > F = 0.0000 within R-squared = 0.2017				
Adjustment Size Model					Spend Model					Tax Model																			
TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP1	Coef.	Drisc/Kraay Std. Err	t	P>t															
	-					-					-																		
TOP1Lag1	0.15083	0.05180	-2.91	0.0060	TOP1Lag1	0.14495	0.05256	-2.76	0.0090	TOP1Lag1	0.15379	0.05049	-3.05	0.0040															
Adjustment Size	0.00070	0.00047	-1.47	0.1500	Spend	0.00006	0.00087	0.07	0.9470	Tax	0.00310	0.00096	-3.22	0.0030															
Unemployment	0.00067	0.00031	2.18	0.0360	Unemployment	0.00063	0.00031	2.02	0.0510	Unemployment	0.00068	0.00030	2.29	0.0280															
Inflation	0.00008	0.00018	-0.46	0.6470	Inflation	0.00008	0.00018	-0.46	0.6460	Inflation	0.00007	0.00018	-0.4	0.6900															
Trade	0.00009	0.00006	1.53	0.1360	Trade	0.00008	0.00006	1.43	0.1600	Trade	0.00008	0.00006	1.49	0.1450															
GDPG	0.00169	0.00028	5.97	0.0000	GDPG	0.00168	0.00028	6.08	0.0000	GDPG	0.00169	0.00029	5.9	0.0000															
C	0.01073	0.00503	-2.13	0.0400	C	0.01039	0.00504	-2.06	0.0460	C	0.01049	0.00496	-2.11	0.0410															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 8.40 Prob > F = 0.0000 within R-squared = 0.1297					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 10.49 Prob > F = 0.0000 within R-squared = 0.1192					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 266 Number = 7 F(6, 37) = 9.85 Prob > F = 0.0000 within R-squared = 0.1501				
Adjustment Size Model					Spend Model					Tax Model																			
TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t	TOP10	Coef.	Drisc/Kraay Std. Err	t	P>t															
	-					-					-																		
TOP10Lag1	0.13410	0.04325	-3.1	0.0040	TOP10Lag1	0.12611	0.04268	-2.95	0.0050	TOP10Lag1	0.13788	0.04266	-3.23	0.0030															
Adjustment Size	0.00150	0.00077	-1.96	0.0580	Spend	0.00057	0.00115	-0.5	0.6210	Tax	0.00520	0.00137	-3.81	0.0010															
Unemployment	0.00088	0.00039	2.29	0.0280	Unemployment	0.00082	0.00038	2.14	0.0390	Unemployment	0.00088	0.00037	2.39	0.0220															
Inflation	0.00015	0.00026	-0.58	0.5680	Inflation	0.00016	0.00027	-0.58	0.5660	Inflation	0.00013	0.00026	-0.51	0.6100															
Trade	0.00006	0.00006	1.07	0.2900	Trade	0.00006	0.00006	1	0.3220	Trade	0.00005	0.00006	0.93	0.3600															
GDPG	0.00153	0.00025	6.16	0.0000	GDPG	0.00152	0.00024	6.34	0.0000	GDPG	0.00153	0.00025	6.09	0.0000															
C	0.00970	0.00504	-1.92	0.0620	C	0.00928	0.00498	-1.87	0.0700	C	0.00915	0.00492	-1.86	0.0710															

I.1.2 Driscoll Kraay Fixed Effects model results contd.

Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 273 Number = 7 F(6, 38) = 627.68 Prob > F = 0.0000 within R-squared = 0.8831					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 273 Number = 7 F(6, 38) = 589.62 Prob > F = 0.0000 within R-squared = 0.8797					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 273 Number = 7 F(6, 38) = 664.50 Prob > F = 0.0000 within R-squared = 0.8860				
Adjustment Size Model					Spend Model					Tax Model																			
BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t	BOT40	Coef.	Drisc/Kraay Std. Err	t	P>t															
BOT40Lag1	0.86552	0.03441	25.16	0.0000	BOT40Lag1	0.87298	0.03266	26.73	0.0000	BOT40Lag1	0.86869	0.03206	27.09	0.0000															
Adjustment Size	0.00116	0.00044	2.62	0.0120	Spend	0.00087	0.00073	1.19	0.2400	Tax	0.00294	0.00073	4.03	0.0000															
Unemployment	0.00020	0.00011	-1.86	0.0710	Unemployment	0.00017	0.00011	-1.59	0.1190	Unemployment	0.00019	0.00010	-1.91	0.0640															
Inflation	0.00009	0.00009	0.99	0.3300	Inflation	0.00010	0.00009	1.05	0.3020	Inflation	0.00006	0.00009	0.68	0.4980															
Trade	0.00009	0.00004	-2.53	0.0160	Trade	0.00009	0.00003	-2.55	0.0150	Trade	0.00009	0.00003	-2.50	0.0170															
GDPG	0.00017	0.00010	-1.67	0.1040	GDPG	0.00018	0.00010	-1.79	0.0810	GDPG	0.00017	0.00010	-1.72	0.0930															
C	0.02469	0.00640	3.86	0.0000	C	0.02328	0.00603	3.86	0.0000	C	0.02390	0.00598	4.00	0.0000															
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 234 Number = 6 F(6, 38) = 3590.00 Prob > F = 0.0000 within R-squared = 0.9964					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 234 Number = 6 F(6, 38) = 3851.52 Prob > F = 0.0000 within R-squared = 0.9963					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Number of obs = 234 Number = 6 F(6, 38) = 4038.14 Prob > F = 0.0000 within R-squared = 0.9966				
Adjustment Size Model					Spend Model					Tax Model																			
Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t	Palma Ratio	Coef.	Drisc/Kraay Std. Err	t	P>t															
Palma Ratio Lag1	0.96706	0.00899	107.63	0.0000	Palma Ratio Lag1	0.96966	0.00958	101.21	0.0000	Palma Ratio Lag1	0.96740	0.00837	115.58	0.0000															
Adjustment Size	0.00845	0.00538	-1.57	0.1240	Spend	0.00393	0.00880	-0.45	0.6580	Tax	0.02546	0.00801	-3.18	0.0030															
Unemployment	0.00019	0.00074	0.26	0.7980	Unemployment	0.00027	0.00074	-0.36	0.7190	Unemployment	0.00019	0.00074	0.25	0.8020															
Inflation	0.00175	0.00061	2.87	0.0070	Inflation	0.00154	0.00061	2.52	0.0160	Inflation	0.00195	0.00057	3.44	0.0010															
Trade	0.00029	0.00018	1.56	0.1280	Trade	0.00026	0.00021	1.26	0.2170	Trade	0.00024	0.00018	1.30	0.2030															
GDPG	0.00124	0.00049	-2.53	0.0150	GDPG	0.00129	0.00048	-2.68	0.0110	GDPG	0.00128	0.00048	-2.65	0.0120															
C	0.02386	0.01562	1.53	0.1350	C	0.02347	0.01530	1.53	0.1330	C	0.02543	0.01646	1.54	0.1310															

Appendix J Impulse Response Function from Local Projections – Full Country Sample

Gini - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel 1

Figure 1

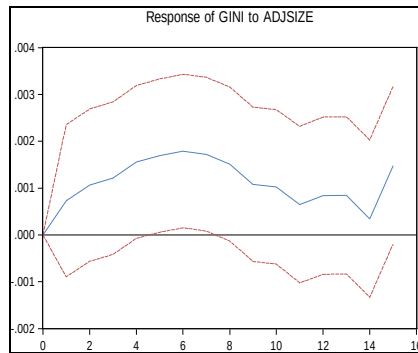


Figure 2

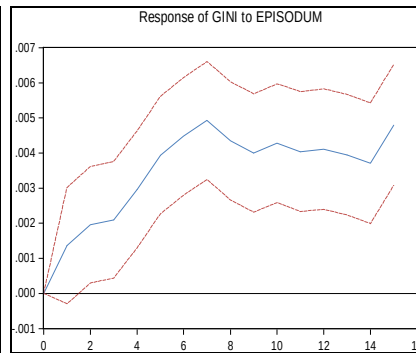


Figure 3



Figure 4



Figure 5

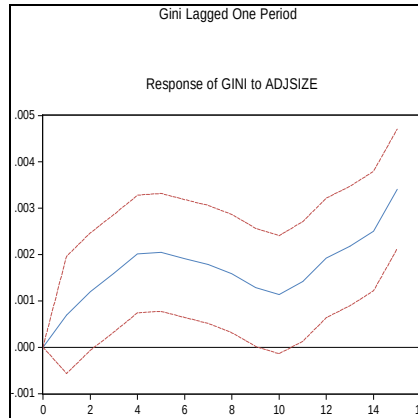


Figure 6



Figure 7

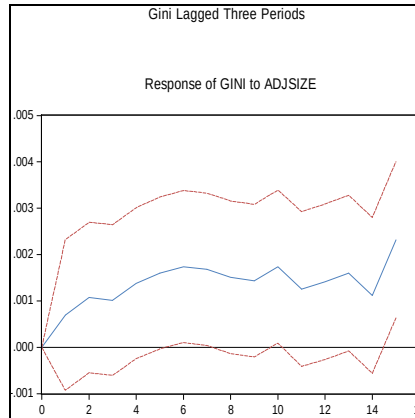
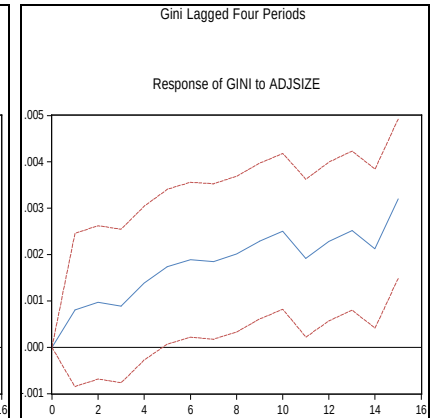


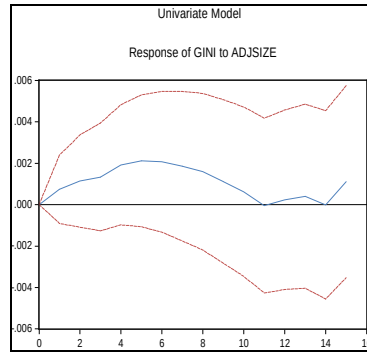
Figure 8



Labour income share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel1

Figure 9



Panel 2

Figure 1

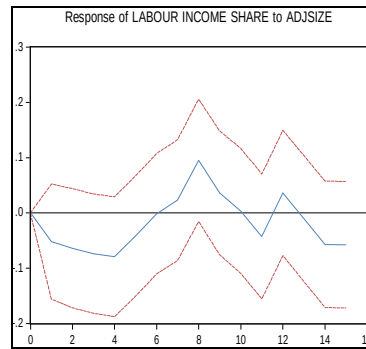


Figure 2

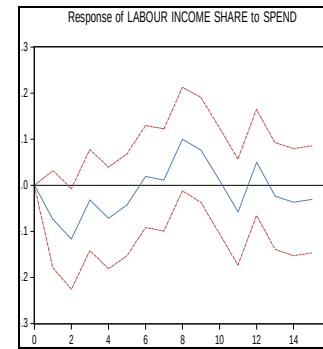
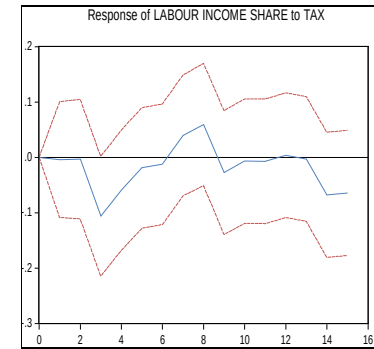


Figure 3



Top 1 Income Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Figure 4

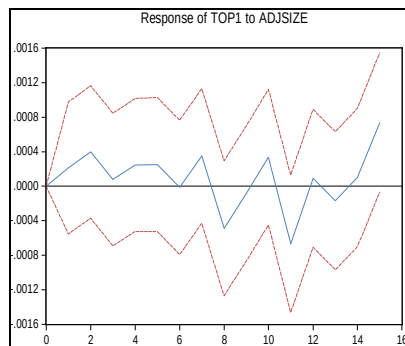


Figure 5

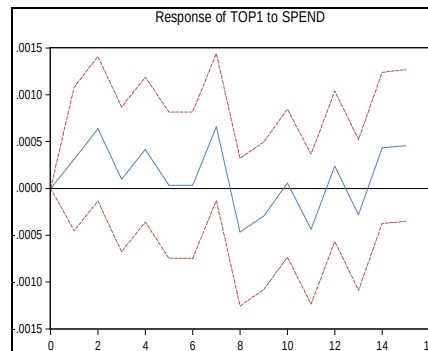


Figure 6



BOTTOM40 Income Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Figure 7

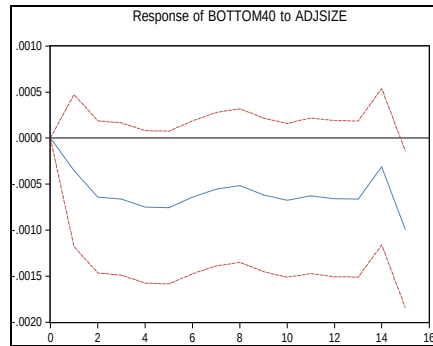


Figure 8

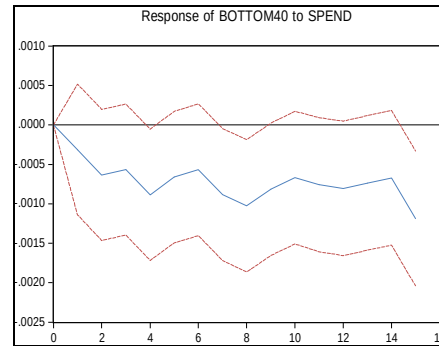
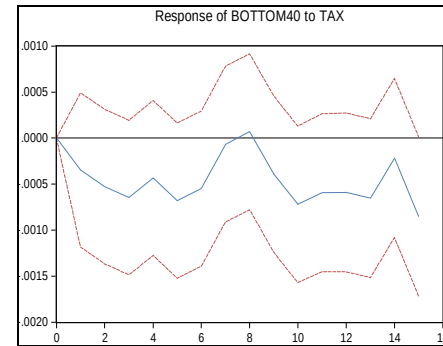


Figure 9



Control Variables - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel 3

Figure 1



Figure 2



Figure 3

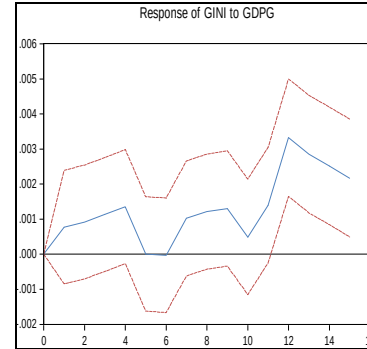


Figure 4

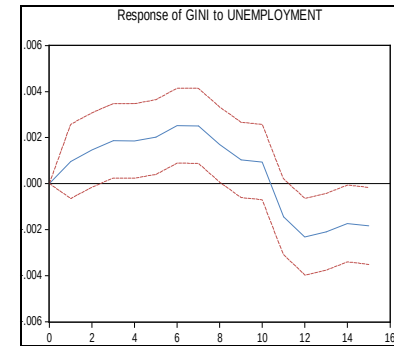
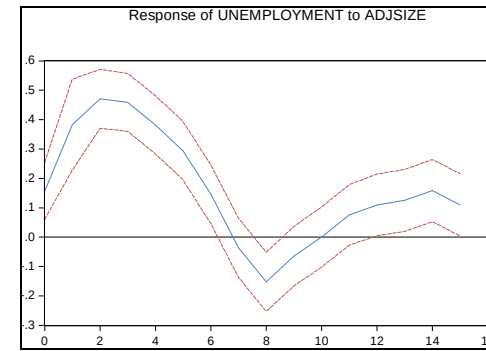


Figure 5



Figure 6



Appendix K - Large adjustment countries

Gini & Labour Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel 4

Figure 1



Figure 2



Figure 3



Figure 4

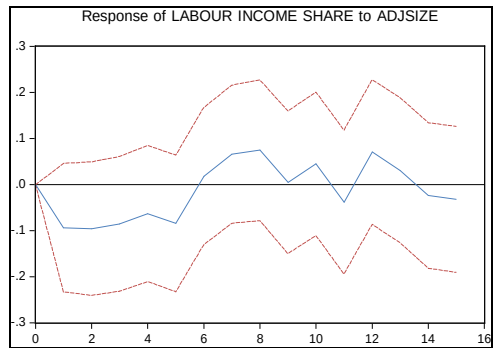


Figure 5



Figure 6



Top 1 & BOTTOM40 Income Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Figure 7



Figure 8



Figure 9

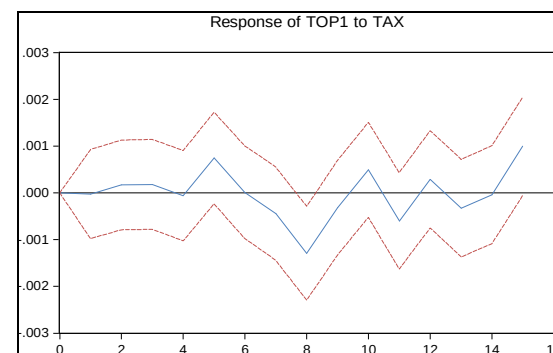


Figure 10

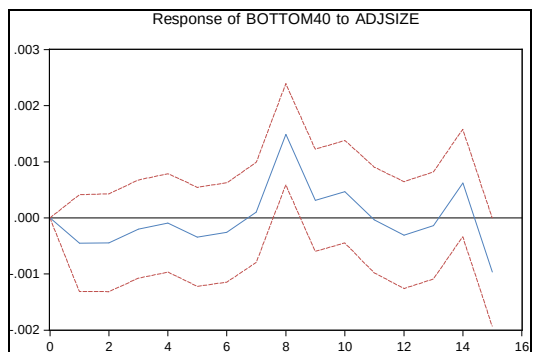


Figure 11

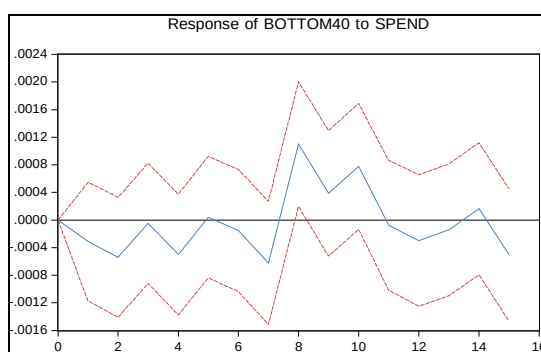
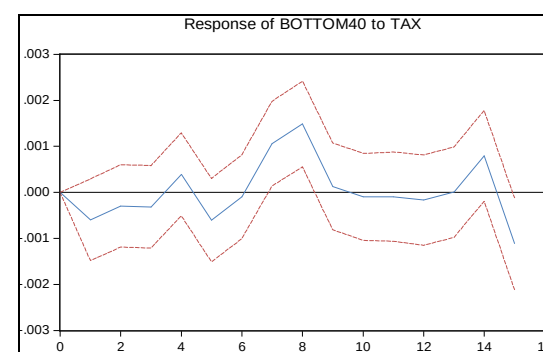


Figure 12



Appendix L - Small adjustment countries

Gini & Labour Income Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Panel 5

Figure 1

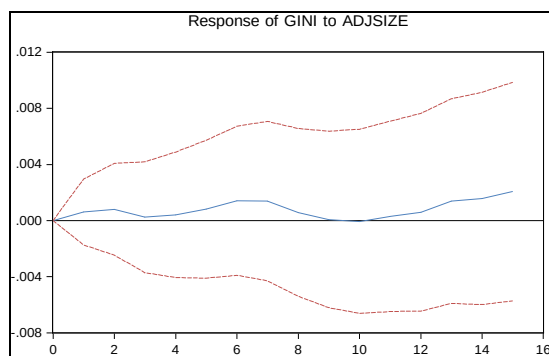


Figure 2

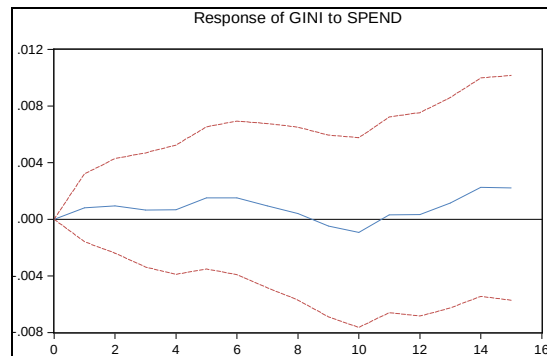


Figure 3

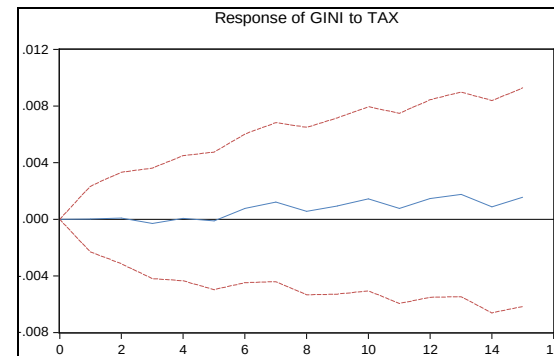


Figure 4

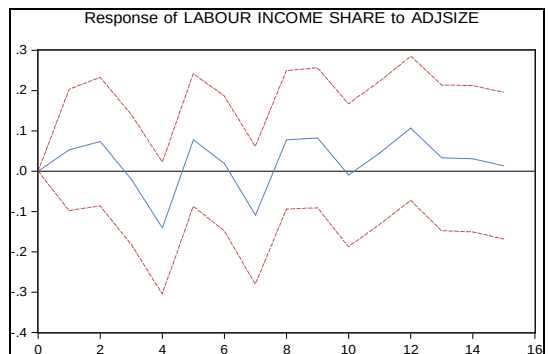


Figure 5

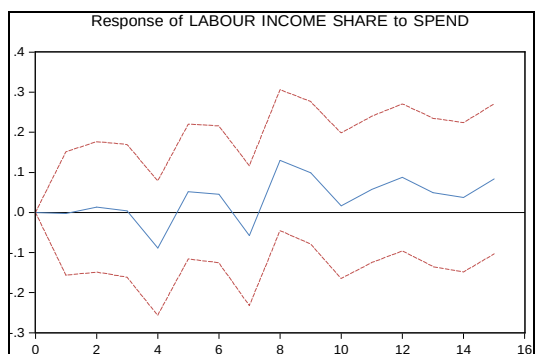


Figure 6



Top 1 & BOTTOM40 Income Share - Response to Cholesky One S.D 95% Conditional Confidence Bands

Figure 7

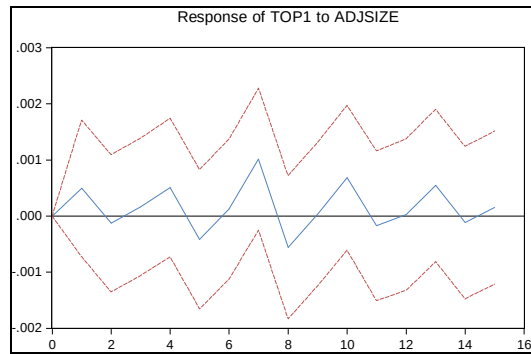


Figure 8



Figure 9



Figure 10

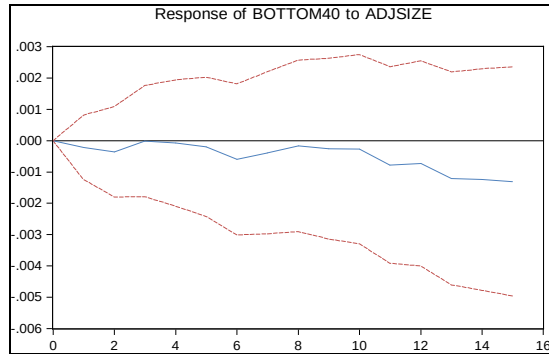


Figure 11

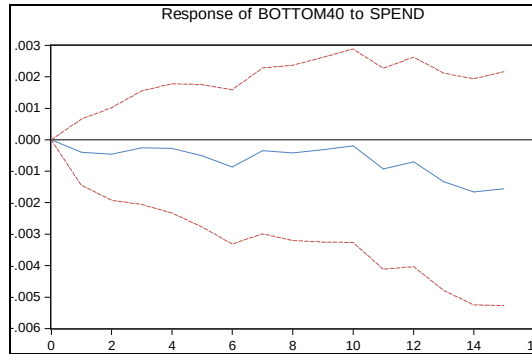
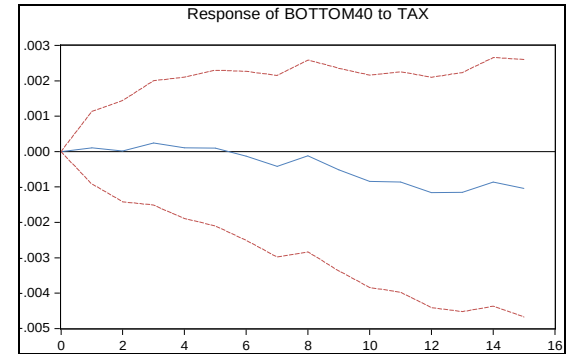


Figure 12



4 PUBLIC DEBT, FISCAL CONSOLIDATION AND INCOME INEQUALITY. UNRAVELLING THE PUZZLE!

ABSTRACT

In this study we explore the impact of public debt levels on income inequality during periods of fiscal consolidation. In this direction, we employ a dynamic threshold panel regression methodology using annual time series that span the period 1980 to 2019 for 16 OECD countries. The novel evidence obtained suggests that, while public debt levels have an impact on income inequality, the effects are amplified during instances of fiscal adjustment and typically tend to manifest themselves at medium (30-60%) thresholds. When gauging the impact of tax-based versus spend-based adjustments on income inequality, the evidence indicates that tax-based adjustments vis-à-vis spend-based adjustments deliver persistent adverse outcomes. Additionally, by grouping our panel of countries in terms of debt levels into two sub-samples we explore the distributional implications for high indebted countries vis-à-vis low indebted countries; the evidence indicates that the latter are more adversely affected by discretionary changes to the fiscal stance.

Keywords: Income Disparity, Inequality, Distribution, Public Debt, Debt Levels, Debt Threshold, Austerity, Fiscal Adjustment, Gini, Labour Income Share, Top Income Share

4.1 Introduction

Public debt plays a significant role in economic development by enhancing growth and improving welfare. Although, in the last few decades public debt has been on the increase, the global financial crisis and the more recent covid 19 pandemic have however, pushed it to unprecedented levels as a result of policy responses implemented to combat the pandemic and, the ensuing recession caused by sharp output decline. Consequently, global debt in 2020, increased by 29% of GDP to 262% of GDP, the highest single-year surge in 50 years – with government debt⁴¹ for advanced economies at record highs of 120% of GDP (Kose et al. 2021). With the pandemic under control, once more, the costs associated with excessive debt levels have been brought to the forefront of the current debate and include inter alia: potential diminished economic performance due to crowding out of private investment; an increase in distortive taxation to meet interest payments, and an accompanying decrease in public investment. Other concerns include the possibility of an increase in risk premia (due to increases in debt cost) as a result of investor concerns; constraints on fiscal space and the government's ability to respond effectively in the event of adverse shocks; as well as increasing uncontrolled debt levels, which could also lead to debt distress (Aiyagari and McGrattan 1998; Gaspar et al. 2019; Yared 2019; Kose et al. 2020).

Options for lowering debt ratios include targeting and growing nominal GDP at a rate higher than interest rates - while this has the advantage of lowering debt levels, the debt stock may remain unchanged. On the other hand, targeting debt levels through fiscal adjustment programmes i.e. austerity - though this option may be contractionary in the short term, as evidenced by the broad literature (see for instance IMF 2010; Guajardo et al. 2011; Jorda and Taylor 2015; Alexiou

⁴¹ This is the central government general debt – also referred to as public debt; we use the terms interchangeably.

and Nellis 2016; Alesina et al. 2019) - proponents consider it a better alternative to the costs associated with excessive debt levels (Okeke et al. 2021). While fiscal support during the pandemic helped to prevent further increases in inequality and poverty, an early withdrawal (including the pace at which it is phased out) could harm the most vulnerable (Furceri et al. 2022; wir2022). In this regard, the significance of ample fiscal space comes into play with Ghosh et al. (2013, p.4) noting: “a critical question confronting the world economy today is how much fiscal adjustment advanced economies need to restore public debt sustainability and regain some room for fiscal manoeuvre – ‘fiscal space’.” In the same spirit, Ostry et al. (2015) contend that it is rather difficult to envisage a safe level of debt through some mechanical rule or thresholds. Furthermore, although they agree with the early Classicalists that accumulated debt is a deadweight burden on the economy, they argue that if fiscal space is ample, implementing discretionary policies to reduce the debt ratio should be avoided due to the "distortive" costs associated with these policies. They, rather argue that debt ratios should be reduced through growth or when less distorting revenue sources are available.

Although the literature (see for instance Alesina et al. 2019; Furceri et al. 2022) has debunked the "expansionary austerity hypothesis" that emerged in the aftermath of the 2007/8 global financial crisis, the long-term benefits of lower public debt levels cannot be discounted. However, the challenge of keeping debt sustainable, particularly in the aftermath of the pandemic, is made all the more difficult by the pandemic's lingering effects, especially on low-income groups (Furceri et al. 2022), since the inequality literature (for instance Mulas-Granados 2005; Agnello and Sousa 2011, 2012; Ball et al. 2013; IMF 2014; Heimberger 2020) shows that distributional disparities tend to increase when fiscal adjustment programmes are implemented.

As post-pandemic options (*next steps*) are explored by fiscal authorities - should governments decide to tow the path of fiscal adjustments once more – it is crucial to explore if high public indebtedness during adjustment implementation causes inequality to worsen. While the inequality literature abounds with evidence showing that distributional outcomes are impacted by the composition, size, duration and pace of the adjustments as well as the business cycle, the role (*if any*) of public indebtedness has been relatively under-researched. Indicatively, Klein and Winkler (2019) explore the distributional consequences of austerity implementation during episodes characterised by private debt overhang and find that inequality significantly increases when firms and households are heavily indebted. Furthermore, although by accounting for the effects of public debt levels, they find that inequality is amplified during times of low public debt compared to instances of high public debt, they postulate that “public debt levels seem to play a minor role for whether or not austerity increases inequality” p100. In the same vein, Bartak et al. (2022) in exploring the *public debt-inequality* nexus, show findings indicative of a non-causal linear relationship between the two – with increases in inequality driven by negative changes in unemployment levels (as a result of adjustment implementation) while increases in public debt levels are driven via the actions of automatic stabilisers.

In this study, by building on an annual dataset for 16 OECD countries over a 40-year period and estimating a dynamic panel threshold model using a handful of inequality indicators (comprising the Gini, Labour income share, Top & Bottom income share ratios), we explore if high (low) public debt levels influence distributional outcomes during the implementation of fiscal adjustments. The evidence indicates that (i) although public debt levels appear to have a minimal impact on income inequality, however the effects are considerably heightened during instances of fiscal adjustment with the Gini of inequality increasing by up to 0.236 percentage point (ii) on

average, adverse distributional effects tend to start manifesting from *medium debt levels*. Further by investigating the adjustment channel through which distributional impacts dominate, we provide evidence that tax-based adjustments are more persistent in delivering adverse outcomes compared to spend-based ones. Additionally, by grouping our panel of countries in terms of debt levels into two sub-samples (*low and high*), we explore the distributional impact for high indebted countries vis-à-vis low indebted countries – the evidence indicates that the latter are more adversely affected by discretionary changes to the fiscal stance. The post-pandemic policy message would be for policy makers to pursue growth-enhancing strategies that are effective in achieving short-to-medium-term debt sustainability goals while also assuaging distributional concerns. The rest of the study is organized as follows: Section 2 reviews the literature pertaining to public debt & economic growth; public debt & austerity; and public debt & income inequality whilst Section 3 expounds upon the adopted econometric strategy. Section 4 presents the empirical estimates as well as discusses the results whilst Section 5 provides some concluding remarks and highlights potential limitations.

4.2 Literature Review

Public debt as a percentage of GDP has been on a sustained increase in the last four decades - however, since the global financial crisis-triggered recession, concerns have been raised regarding the sustainability of these large debt build-ups. As captured eloquently by Cecchetti et al. (2011, p.9): “debt has been rising for decades, and economies have been growing. And, with high levels of debt, policymakers are counting on robust growth to ensure sustainability. Without rising GDP, there will be no way to raise the revenues governments need to reduce their exploding debts.” Although standard macroeconomic theories postulate that government debt serves three purposes - facilitates tax smoothing (i.e. smooths the taxes necessary to finance lumpy expenditures), safe

asset provision and sustenance of dynamic efficiency in the economy - these theories do not explain the long run trend in public debt (prior to the global financial crisis and the covid pandemic) in the last few decades. Political economy theory, however, attributes these trends to factors relating to increases in: (i) the ageing population (ii) political polarisation and (iii) electoral party turnover (Yared 2019). Enhancing economic growth and welfare provision are the two main benefits of public debt, however given the high trajectory of debt in recent years, a strand in the extant literature (for example, Kose et al. 2020) has argued that the aforementioned benefits are contingent on how productively the debt is utilised, the position of the economy's business cycle and, the degree of financial market expansion. They contend that the costs associated with high and rising debt levels, such as the crowding out of both public and private investment, outweigh any intrinsic benefits. On the one hand, high interest rates may cause a crowding out of private investment, resulting in lower economic growth; on the other hand higher associated costs for debt servicing could lead to a crowding out of public investment in crucial areas such as education, health and infrastructure (Aiyagari and McGrattan 1998; Gaspar et al. 2019). Other concerns in the empirical literature pertain to the possibility of an increase in risk premia which could raise the cost of debt as a result of investor concerns; constraints on fiscal space and the government's ability to respond effectively in the event of adverse shocks; and increasing uncontrolled debt levels, which could also lead to debt distress (Aiyagari and McGrattan 1998; Kumar and Woo 2010; Cecchetti et al. 2011; Gaspar et al. 2019; Yared 2019; Kose et al. 2020). In view of these, the central discourse in the literature has revolved around optimal debt levels with regards to economic growth and; debt with regards to equity.

4.2.1 Public debt and economic growth

A seminal paper by Reinhart and Rogoff (2010) associating debt levels above the 90% debt to GDP thresholds with sub-optimal economy performance reinforced the discourse resulting in an adjudication for austerity to reduce and stabilise the public debt. Specifically, Reinhart and Rogoff by categorising debt levels into four groups of 0-30% (low); 30-60% (medium); 60-90% (high) and; >90% (very high), find that although at normal debt levels, a weak link exists between debt and growth; however, at thresholds above 90% of GDP, a non-linear relationship can be observed between debt and *average* gdp growth rate. These findings, consequently, spurred an increase in the literary discourse (see for instance Caner et al. 2010; Kumar and Woo 2010; Cecchetti et al. 2011; Taylor et al. 2012; Herndon et al. 2013) – with findings by Caner et al. (2010), Kumar and Woo (2010) and Cecchetti et al. (2011) echoing a similar position. However, Kumar and Woo (2010) additionally note that the findings for non-linearity are driven by low labour productivity which occur primarily as a result of reduced investment. Accordingly, they note that issues relating to reverse causality between debt and growth could not be ruled out, for high debt build-up could also be a consequence of low growth. While Caner et al. (2010) establish an inverse relationship between debt and growth at 77% of GDP, Cecchetti et al. (2011) show that optimal debt levels mildly differ depending on if the economy is in crisis or not at 96% and 84% of GDP respectively. Additionally, they further find that average growth is not significantly different for low or highly indebted countries. On the other hand, Taylor et al. (2012), show findings for an inverse relationship between high debt and low GDP growth - however in contrast to Reinhart and Rogoff (2010) - they establish causality in the opposite direction thereby indicating that high debt-to-GDP ratios are a fallout of low growth and not the cause. In addition they contend that a return to positive growth levels could improve the fiscal stance. Herndon et al. (2013), contribute to the discourse by replicating the Reinhart and Rogoff (2010) methodology and proffer evidence showing

identifiable errors pertaining to estimation, data omission and worksheet coding. Furthermore, by extending the debt categories to include the 90-120% and >120% levels, they produce findings indicative of an absence of non-linearity. Rather they find that although growth diminishes at the above 120% debt threshold, it does not transverse the zero-bound limit; in contrast they find for a non-linearity between the 0-30% and 30-60% debt thresholds.

4.2.2 Public debt and fiscal adjustment

Although the public debt can be reduced via growth stimulating policies, however, agitation for the invocation of austerity policies as a means of lowering the public debt gathered further momentum on the wings of the *debt-growth* nexus and “*expansionary austerity hypothesis*”⁴² with a large strand of the literature (see for example Alesina and Ardagna 2010, 2013; Jayadev and Konczal 2010; Agnello et al. 2013; Blanchard and Leigh 2013) contending that austerity implementation could render successful and expansionary outcomes in the short-term - especially when expenditure-based measures are undertaken. A successful adjustment is one in which the debt/GDP ratio reduces by 5% of GDP three years after the adjustment implementation (Alesina and Ardagna 1998). There appears to be an interconnection between a successful and expansionary adjustment; while the latter requires growth in GDP, the former requires a reduction in debt and deficit levels. Real GDP growth drives down debt and deficit levels. Evidence provided by the proponents of austerity - emphasise its merits by showing that expenditure-based adjustments (especially cuts geared at transfers, public sector wages and jobs) are expansionary on output in the short-term. However, this stance has received substantial backlash in the literature (see for example IMF 2010; Jayadev and Konczal 2010; Guajardo et al. 2011) which in contrast show that

⁴² Expansionary fiscal austerity (also referred to as expansionary fiscal contractions hypothesis in the literature) is when a fiscal retrenchment exercise stimulates growth in the short term.

during instances of fiscal adjustments, unemployment rises and domestic demand contracts in the short run for both revenue and expenditure-based adjustments but by more with revenue instruments. In recent times, some of the most vociferous proponents⁴³ of the expansionary austerity hypothesis have debunked the notion - conceding that austerity is indeed contractionary on output in the short-to-medium-term by both spend and tax instruments *albeit* by more with tax instruments.

4.2.3 Public debt and inequality

Equity considerations with regard to public debt typically focus on the welfare benefits of public debt expenditures rather than on a causal link between the two variables. As a result, the literature is rather limited with the bulk of the inequality literature on the redistributive and distributive effects of fiscal policy.

Furceri et al. (2022) explore the options regarding debt sustainability and distributional concerns, by estimating an ordinary least squares (OLS) baseline panel regression with country and period fixed effects and subsequently estimating impulse response functions (IRFs) from local projections to investigate the effects of 5 major pandemics on real GDP and inequality. They find that in the aftermath of a pandemic event: (i) real GDP falls and inequality sharply increases with fiscal balances on average 2.5 percentage points lower than at the onset of the pandemic (ii) consistent with the findings by Herndon et al. 2013, they note – “there appears to be little evidence of a mechanical relationship between debt to GDP ratios and growth outcomes or the occurrence of financial crises” (p.42). They argue that since debt situations differ across countries and within

⁴³ Alesina et al. (2019) provide evidence supporting contractionary effects on output in the short-term – while spend instruments are mildly contractionary and generally short-lived, tax instruments are deeply contractionary and longer-lasting.

country group, what matters is the availability of fiscal space. In the same vein, Ghosh et al. (2013); Ostry et al. (2015); and Charmon et al. (2021) echo these sentiments - with Ostry et al. (2015) and Charmon et al. 2021 further noting that countries with high debt levels but with ample fiscal space gain no additional “crisis-insurance” benefit by implementing debt reduction policies because of the inherent costs associated with these policies.

Similarly the broad inequality literature (see for example Agnello and Sousa 2011, 2012; Ball et al. 2013; Woo et al. 2013; IMF 2014; Brinca et al. 2017; Ciminelli 2019; Heimberger 2020) also offer evidence indicating that austerity implementation tends to lead to an increase in income inequality especially through the wage and employment channels. While the broad literature finds that revenue measures tend to have moderating effects on inequality, a strand of the literature (e.g. Woo et al. 2013; Bova et al. 2018; Ciminelli 2019) however, show that revenue-based measures especially those targeted at higher labour tax could lead to an increase in income inequality since they tend to decrease net wage thereby affecting the disposable income of households especially those with low earnings. Furthermore, an increase in the direct tax could also lead to an increase in unemployment if they produce a substitution effect (Ciminelli et al. 2019). On the other hand, *actions on the expenditure side* – particularly those targeted at public sector job & wage cuts, as well as cash and social benefits cuts tend to lead to an increase in inequality. While cuts to social benefits increase the market inequality, cuts to cash-benefits increase the disposable income inequality. In so far as public spend cuts result in lower public sector employment, increases to the labour supply in the economy are bound to occur, with a resultant decline in private sector wages thereby leading to an increase in inequality. Consistent with this, Ball et al. (2013) and; Woo et al. (2013) contend that approximately 15-20% of increases in income inequality is through the unemployment channel. Moreover, the IMF (2014) emphasises that since employers tend to show

a preference for skilled labour over unskilled labour, the wages of unskilled labour tend to fall relative to skilled wages – thereby worsening the distributional impacts for those at the lower end of the distribution. Nonetheless, Furceri et al. (2022) emphasise that, despite the near and far-reaching costs of fiscal adjustment programmes on output and inequality, there is no gainsaying the long-term benefits of having sustainable debt and finances.

Pertaining to the relationship between public debt and distributional outcomes, Klein and Winkler (2019) and Bartak et al. (2022) explore this phenomenon – with Klein and Winkler (2019) exploring this within the context of private debt overhang and Bartak et al. (2022) within the context of a possible causal relationship between public debt and income inequality. In exploring the distributional consequences of austerity implementation during episodes characterised by private debt overhang, by estimating an ordinary least squares (OLS) baseline panel regression with country and period fixed effects and thereafter estimating impulse response functions (IRFs) from local projections, Klein and Winkler (2019) show findings indicating that inequality is greatly increased when firms and households are heavily indebted. Further by accounting for the effects of public debt levels, they test the robustness of their findings in the face of high (low) public debt levels and find that inequality is amplified during times of low public debt compared to instances of public debt overhang. However, they further note that public debt levels appear to have minimal bearing (a minimal role) on whether or not austerity increases inequality. On the other hand, Bartak et al. (2022) by estimating a random effect within-between model explore a link between public debt and inequality and report findings showing that income inequality grows hand in hand with public debt in the short-term. However, they further note that these increases in inequality do not stem from a causal relationship with public debt (i.e. the increase in inequality does not follow from increases in the public debt or the existing level of public debt) but occur through negative

changes in unemployment levels as a result of fiscal adjustments; while the increases in public debt levels are driven via the actions of automatic stabilisers.

In the aftermath of the covid-19 pandemic, with record levels of high public debt, the challenge of keeping debt sustainable (amidst investors' concerns) is further compounded in the face of distributional concerns exacerbated by the pandemic. Since as established in the review of the literature, the possibility of a causal link between public debt and income inequality *via* the fiscal channel is relatively under-researched, it becomes imperative to explore if high public indebtedness during adjustment implementation causes inequality to worsen – should fiscal authorities opt for debt stabilisation policies in a bid to assuage investors' concerns. Evidence such as this would contribute to the academic discourse and crucially assist policymakers to balance equity-efficiency trade-offs during austerity considerations. In view of this, this study sets out to explore whether high public indebtedness during adjustment implementation causes inequality to further increase.

In addition, as the inequality literature highlights the significance of the adjustment composition (i.e. expenditure and revenue instruments) as important channels through which inequality is impacted, this study further explores whether the public debt-inequality nexus is driven by this transmission channel. Finally, this study also explores the high-and low-debt nexus by grouping the countries in terms of low and high debt, in order to assess the distributional effects of fiscal adjustments. In view of the above, the following hypotheses are envisaged:

H₁: High (Low) debt levels during implementation of fiscal adjustments have an impact on income inequality

H₂: Distributional effects are the same for both high and low debt countries.

4.3 Econometric Strategy

The methodological approach considered for this empirical study will be premised on the panel threshold methodology. Since analysing debt levels will necessarily mean exploring debt threshold levels, the empirical framework for this study will draw on the Seo and Shin (2016) Panel Threshold Regression methodology. A similar approach is also used by Caner et al. (2010) to explore the impact of public debt on growth beyond an unidentified threshold. The benefit of threshold modeling lies in its efficacy - based on the data generated - in identifying the unknown threshold parameter for inference purposes. The model also “describes the jumping character or structural break in the relationship between variables” (Wang 2015, p.121). Despite the popularity of threshold modelling in non-linear time series, it had only limited application in panel structures till Hansen (1999) developed the panel model with the fixed effects estimator to address heterogeneity issues inherent in panel data structures. Subsequently, it has been widely used “since the threshold effect⁴⁴ in the model allows for the asymmetric effect of the exogenous variables depending on whether the threshold variable is *above* or *below* the unknown threshold” (Seo et al. 2019, p.685). Given that Hansen’s model operates within a static framework and the fixed effects estimator requires the regressors to be strongly exogenous in order to produce consistent results, Seo and Shin (2016) advance this to allow for a dynamic model which allows both regressors and threshold variables to be endogenous. They equally propose two alternative estimations depending on whether or not the threshold variable is endogenous: the “First Difference Generalised Method of Moments and First Difference 2 Step Least Squares (FD-GMM and FD-2SLS), on the basis of the FD transformation for removing unobserved individual effects” (p.27). While the FD-GMM is

⁴⁴ “Testing for a threshold effect is the same as testing for whether the coefficients are the same in each regime” (Wang 2015, p.123).

efficient for use on models with endogenous threshold variable and regressors, the FD-2SLS is more efficient for models with exogenous threshold variables since it produces super-consistent estimates.

4.3.1 Data

The data set used in this study consists of annual time series that span the period 1980 to 2019. The panel of selected countries is subject to the availability of fiscal adjustment data which is based on the narrative methodology for identification of fiscal episodes – and therefore limited to 16 OECD countries⁴⁵ i.e. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Portugal, Spain, Sweden, United Kingdom and the United States of America. Since this research will be addressing two hypotheses, in testing the second hypothesis, the panel of countries is categorised into two according to debt ratio size i.e. countries with large debt ratios vis-à-vis countries with small/medium sized debt ratios. Fiscal Adjustment data covers episodes relating to the crucial *post* Great Recession period; while the income inequality data covers the trajectory in recent decades of the global rise in income inequality up to 2019 (wid.world 2018, 2020, 2022) – this is because inequality indicators *post 2019* might simultaneously reflect the impact of the COVID-19 pandemic as well as the expansionary policies pursued by fiscal authorities in a bid to curtail the adverse economic consequences arising from the pandemic - thereby rendering potentially biased estimates.

⁴⁵ Greece is excluded from the panel of countries due to the unavailability of “narrative” fiscal adjustment data.

4.3.2 Income inequality data

The Gini coefficient for disposable income⁴⁶ as well as labour income share and income share ratios are used for analysis in this study. The Gini measures the average dispersion of the income distribution; a value of 0 indicates perfect equality i.e. an absence of inequality while a value of 1 is indicative of maximum inequality. Although the Gini is one of the most widely used measures of inequality, it has been criticised for often downplaying shifts at the top and bottom of the distribution (Cobham and Sumner 2013). Consistent with this, significant findings in the inequality literature pertain to the evolution of top income shares and their impact on income distribution (wir2018.wid.world). To that end, a rich stream of literature (e.g. Kumhof and Ranciere 2010; Woo et al. 2013; Furceri et al. 2016; Woo 2021) employ the top income share as alternative indicators of inequality. Following the same rationale, this study makes use of top income share ratios (Top 1 and Top 10), additional income ratios which capture the dynamics at the bottom of the distribution (Bottom 40 & 50, the Palma ratio⁴⁷ and Top10/Bottom50), the labour share of income and total income share⁴⁸ to elicit a more holistic picture as well as to check the robustness

⁴⁶ Gini disposable income data was only available for 12 countries and so pre-tax national income data was relied on for Australia, Canada, Japan and USA; despite the use of these series, they do not detract from the overall trend.

⁴⁷ The Palma ratio highlights the share of income received by the highest 10% in the distribution compared to the share of income received by the bottom 40%. Issues with the sourced dataset with regards to missing data points meant interpolation had to be relied and so the Top10/Bottom 50 data was used as a close substitute and in that regard the Bottom 50 was also employed to enable proper comparison. However estimation results based on the two indicators (Palma ratio and the Top10Bottom50) did not indicate a significant difference.

⁴⁸ This is used for hypotheses 2 for the purposes of estimating the quantile regression. Total income as an inequality indicator refers to the total income in the economy at PPP (Purchasing Power Parity). It is also referred to as national income. Formally national income is defined as “the sum of all incomes received by individuals residents in a given country over a year”(wir2022, p.26).

of our initial estimates. Furthermore, in so far as spend-based fiscal adjustments entail public sector job loss and wage cuts, the share of income which accrues to labour becomes significant as an important channel for inequality increase due to potential loss in earnings. Consistent with this, the inequality literature (e.g. IMF 2014; Ball et al. 2013; Loungani 2013; Woo et al. 2013 and Bova et al. 2018) highlights the significance of this indicator as a measure of inequality with Woo et al. (2013) noting that up to 20% of increases in income inequality can be attributed as occurring through the transmission channel of unemployment with impact notably persisting till the long-term. Negative point estimates seen when labour is used as the dependent variable in the panel regression are indicative of an increase in inequality (and vice-versa for when there are positive coefficients) since it inherently implies that labour is incurring income losses. A summary table comprising the definitions of the inequality indicators can be found in *Table 1A* in the Appendix.

Inequality data is sourced primarily⁴⁹ from the World Inequality Database (wid.world) because of coverage and quality. In terms of coverage, it is currently the largest repository for income and wealth inequality data covering over 173 countries with observations in some instances dating as far back as 1875. With regards to quality - since it makes use of Distributed National Accounts (DINA) which “provide annual estimates of the distribution of income and wealth using concepts of income and wealth that are consistent with the macroeconomic national accounts” (Alvaredo et al. 2016, p.4). As further enumerated “the key advantage of national accounts is that they follow internationally standardized definitions for measuring national economic activity. As such, they allow for a more consistent comparison over time and across countries than do fiscal data. National accounts definitions, in particular, do not depend on local variations in tax

⁴⁹ With the exception of the Palma Ratio series which was sourced from the OECD data bank.

legislation or other parts of the legal system. They are the most widely used concepts for comparing economic prosperity across nations” (wir2022.wid.world p.43).

The Palma ratio data was obtained from the OECD data bank – however since there was a considerable amount of missing data, interpolation had to be heavily relied on for the missing data points. Since excessive data interpolation tends to give rise to issues pertaining to data quality – consequently, the Top 10 Bottom 50 inequality indicator as obtained from the WID database was employed as a close substitute. Estimation results based on the two indicators (Palma ratio and the Top10Bottom50) did not indicate a significant difference. Also, in order to obtain a balanced panel, data had to be interpolated to cover some missing labour share data points for some cross-sections⁵⁰. A summary table of the relevant statistics for the inequality indicators can be seen in *Table 2A* while the Gini trend (1980 to 2019) for the countries can be seen in *Figure 1 in the Appendix*.

4.3.3 Fiscal adjustment data

As noted by a number of studies such as IMF (2010), Guajardo et al. (2011), Holden and Midthjell (2013), Jorda and Taylor (2015), Castro (2018), Ciminelli et al. (2019), the Cyclical Adjusted Primary Balance (CAPB - an alternative method for identifying fiscal adjustment episodes) tends to be problematic due to issues associated with measurement errors and reverse causality – thereby, inevitably rendering in the short run, biased macroeconomic estimates in favour of expansionary output effects of fiscal consolidation programmes. Devries et al. (2011) by employing the narrative methodology (pioneered by Romer and Romer 2010) map out episodes of fiscal adjustment

⁵⁰ Austria, Denmark, Ireland, Portugal and Spain for the period 1980 to 1994; Germany – 1980 to 1989; Belgium – 1980 to 1984; Japan – 2018 to 2019; USA – 2019.

identified from several narrative historical sources⁵¹ and consequently encapsulate a database for 17 OECD countries capturing 173 episodes of fiscal adjustment over a span of 32 years i.e. 1978 to 2009. Similarly, Alesina et al. (2015) by following the same methodology and using the same original sources as Devries et al. (2011) construct a fiscal adjustment dataset for the same set of countries⁵² - and *also* crucially extend the dataset to cover the adjustment period embarked on by countries *following* the global financial crises years – and therefore cover the period *1978 to 2014*. The empirical analysis for this paper is therefore built on fiscal adjustment data based on the narrative approach as obtained from the Alesina et al. (2015) dataset - albeit for the period 1980 to 2014 - since it covers the crucial adjustment period following the Great Recession. A total of 227 fiscal adjustment episodes is identified for the period 1980 to 2014 for the panel of 16 OECD countries. Adjustment size is scaled relative to GDP with sizes ranging between -0.309 and 9.748%. An overview of the adjustment dataset is reported in *Table 2B in the Appendix*.

Heimberger (2020)⁵³ in exploring the dynamic consequences of fiscal consolidation countries in 17 OECD countries for the period 1978 to 2013 combines the Devries et al. (2011) and Alesina et al. (2015) datasets in order to include the relevant years (2010 to 2013) not covered by the Devries et al. dataset. Therefore, as robustness checks, we have also merged the datasets

⁵¹ Budget reports and speeches, central banks' reports, IMF reports, OECD economic surveys, convergence and stability programs submitted to the Euro Commission, country specific reports (e.g. congressional budget office reports in the US), etc.

⁵² With the exception of Netherlands.

⁵³ The dynamic effects of fiscal consolidation episodes on income inequality: evidence from 17 OECD countries over 1978-2013.

(for years not covered by the Devries et al. 2011 dataset) and the results are not significantly different⁵⁴.

4.3.4 Public debt data

Data series for debt to GDP ratio for the period 1980 to 2019 was obtained from the World Economic Outlook database of the IMF. Missing series were observed for some countries for the early period⁵⁵ and so interpolation had to be relied on. Extremely large debt ratios i.e. in excess of 120% of GDP can be observed for Ireland, Italy, Portugal, Belgium and Japan with size ranging between 120.04% and 236.14% of GDP. On the other hand, the lowest country period wise *average* debt ratio is recorded for Australia at 23.47% of GDP.

Countries are further categorised into two – relative to the size of the debt ratios for respective countries. The extant literature as seen in Reinhart and Rogoff (2010), Herndon et al. (2013)⁵⁶ - categorise debt ratios into groups of: 0-30%, 30-60%, 60-90%, 90-120% and 120% & above. Therefore to enable comparability with the extant literature and for the purpose of this analysis, debt ratios in excess of 60%⁵⁷ of GDP (i.e. the median category of 60-90%) will be grouped as large while ratios below this will be considered as small to medium (otherwise referred to as ‘*low debt*’ countries in the ensuing analysis). An overview of the debt ratio series for the select panel of 16 countries as well as the respective debt category is reported in *Table 2C in the*

⁵⁴ And so are not presented.

⁵⁵ Australia 80-88; Austria 80-87; Denmark 80-91; Germany 80-90; Ireland 80-94; Italy 80-87; Portugal 80-89; Sweden 80-92; USA 80-00.

⁵⁶ While Reinhart and Rogoff (2010) end their category at 90% & above, Herndon et al. (2013) further define and extend it to include: 90-120% and 120% & above.

⁵⁷ Incidentally, this corresponds with the Maastricht criteria which identifies 60% debt ratios as unsustainable.

Appendix. Also debt ratio trend for the high and low indebted countries is represented in figures 4-1 to 4-4.

Figures 4-1 to 4-4

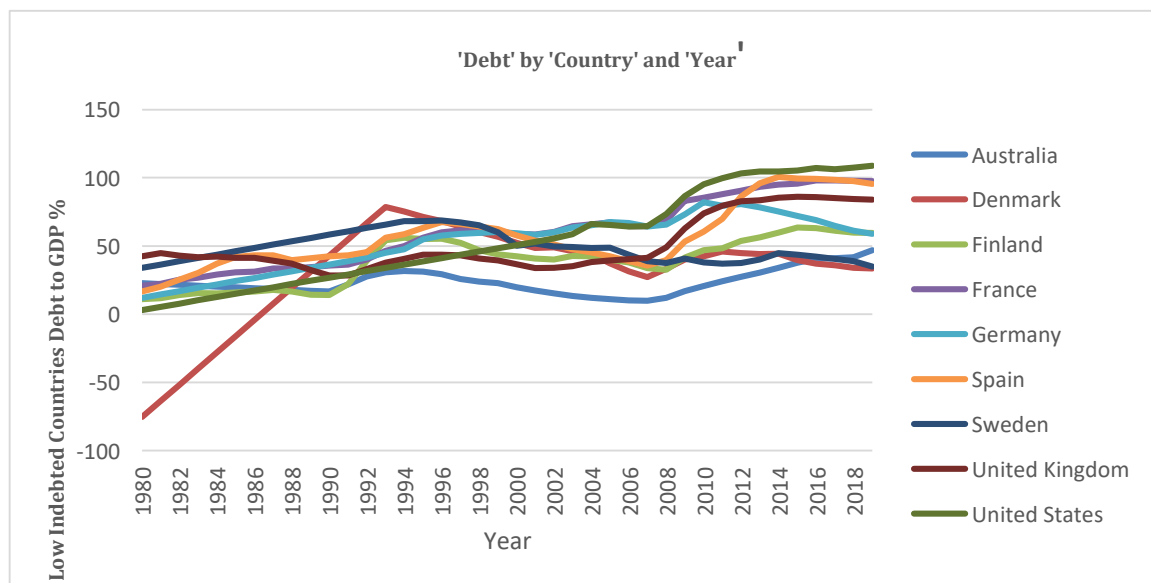
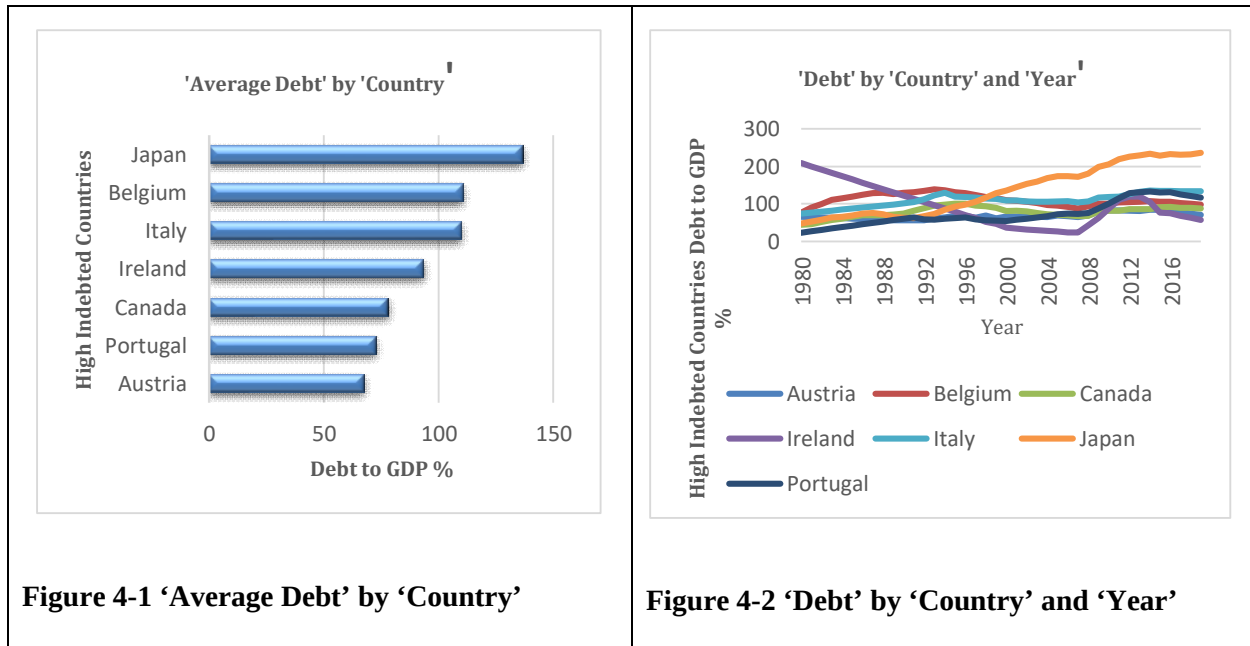


Figure 4-3 Debt by 'Country' and 'Year'

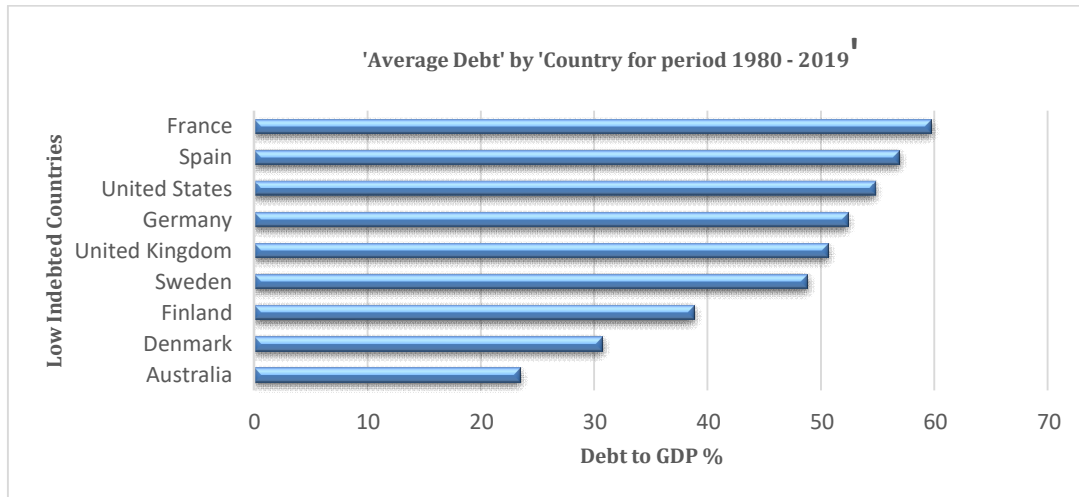


Figure 4-4 'Average Debt' by Country for period 1980 - 2019

4.3.5 Methodologies considered

The econometric methodologies considered in estimating the baseline panel regression are: (i) the panel threshold model and (ii) the quantile panel regression model. While the threshold model is used in testing hypothesis one, the quantile regression model is used for hypothesis two. Additionally, the fixed effects (FE) model with Driscoll Kraay standard errors and an ordinary least square (OLS) model with cross section SUR are employed as robustness checks. Although the classical fixed effects model is also robust for correcting heteroskedasticity and autocorrelation errors, one of its core advantages is its usefulness in limiting sources of bias especially omitted variable bias (which arise due to time invariant properties) by exploiting within group variation overtime. The fixed effects model therefore is able to address issues of heterogeneity arising in panel data albeit only in the intercepts (Collischon and Eberl 2020). Adopting the Driscoll Kray estimator in the FE model, additionally renders it well suited for addressing issues relating to cross-section and temporal dependence especially when the time structure is large (Driscoll and Kraay, 1998).

Other than the issues enumerated above, a core concern which could render the estimates of a regression suspect either from exaggeration or otherwise, revolves around the issue of endogeneity⁵⁸. One of the tractable ways in which incidences of endogeneity in regression models can be dealt with is by running a first differenced generalised method of moments (FD-GMM) model⁵⁹. The panel threshold regression model as extended by Seo and Shin (2016) and the quantile panel regression model incorporate first difference transformations. The Seo and Shin (2016) generalised model with FD-GMM estimator is seen below:

$$Y_{it} = (1, X'_{it}) \beta_1 1\{q_{it} \leq Y\} + (1, X'_{it}) \beta_2 + 1\{q_{it} > Y\} + e_{it} \quad (4-1)$$

where $i = 1, \dots, n$ and represents the different cross-sections of the data; $t = 1, \dots, T$ represents the time dimension of the data; Y_{it} is the dependent variable and a measure of income inequality for country i in year t ; X_{it} is a $k \times 1$ vector of time-varying regressors and includes the lagged dependent variable, the fiscal adjustment size and its binary component⁶⁰ as well as a set of control variables; $1\{ \}$ is an indicator function that takes the value of one when the event inside occurs, otherwise zero; q_{it} is the threshold variable; Y the threshold or transition parameter that divides the equation into 2 regimes with associated coefficients β_1 and β_2 for the respective regimes; and e_{it} is the error

⁵⁸ Endogeneity arises when an explanatory variable in a regression model is correlated with the error term. This occurs when one or more of the explanatory variables in a regression model is correlated with some random explanatory variable(s) which is not included in the model (Gujarati 2011).

⁵⁹ The Generalised Method of Moments (GMM) is useful in estimating dynamic panel models and controls for incidences of endogeneity, omitted variable bias, undetected panel heterogeneity as well as data measurement errors.

⁶⁰ i.e. a dummy variable that takes the value 1 (one) to correspond to the start date of each fiscal adjustment episode in country i in year t and zero (0) otherwise.

component which comprises the individual country fixed effect μ_{it} and the idiosyncratic disturbance or error term.

Equation one can be re-specified to represent the 2 regimes:

$$Y_{it} = X_{it}(q_{it}, Y)\beta + e_{it} \quad (4-2)$$

where $X_{it}(q_{it}, Y) = X_{it} 1(q_{it} \leq Y)$

$$X_{it} 1(q_{it} > Y)$$

with $1(q_{it} \leq Y)$ specifying the lower regime and $1(q_{it} > Y)$ the upper regime.

The individual time-invariant characteristics (μ_{it}) inherent in equation one are removed via first difference transformation of the model as follows:

$$\Delta Y_{it} = \beta \Delta X_{it} + \partial X_{it} 1_{it}(Y) + \Delta e_{it} \quad (4-3)$$

To eliminate sources of bias and inconsistency that could arise due to correlation between the transformed regressors and the error term, GMM estimation is implemented and instrumental variables (IVs) used. The IVs used in the model include a set of control variables (*inflation, unemployment, GDP growth and a measure of financialisation – stock to GDP ratio*) which could impact on the explanatory and dependent variables. Since both the fiscal adjustment component and debt are important in determining the distributional impact, it is therefore essential to

incorporate into the model the “interacted” dynamics of these variables. Consequently, the regressors in X_{it} also include an interaction variable between debt and the adjustment size. Going further, by specifically estimating a model which distinctly and jointly incorporates the interaction of debt and the adjustment type (spend and tax), the transmission channel through which the adjustment acts on can easily be assessed at determined debt thresholds.

4.4 Estimated Results

Prior to estimating the baseline panel regression, standard diagnostic tests such as – stationarity, heteroskedasticity, correlation, cross-sectional dependency and normalcy - were performed to ensure the fitness of the variables used in the model. In performing the stationarity test, a summary of different measures (test types) was adopted for robustness purposes in order to mitigate against the limitations associated with any particular test and maximise the gains from each test type; for example, the Im Pesaran Shin (IPS) assumes that the regression slopes are heterogenous while the Levin Lin Chu (LLC) test assumes that they are homogenous. The result showed that all the variables were stationary at levels (0) at the 5% significance level with the exception of the debt ratio series and the following inequality indicators – Top 1 & 10, total income share, Bottom50 and Labour Share - which were stationary at first difference (1). Correlation tests revealed that there were no signs of multicollinearity among the regressors⁶¹. In performing the cross-section dependency test, a “summary” of tests (Breusch-Pagan LM; Pesaran-Scaled LM; and Pesaran CD) was also adopted even though the Breusch-Pagan LM method was relied on based on the data panel structure (since it is usually applied in instances whereby $T > N$) whereas the Pesaran CD is used in instances when $T < N$ or of the same magnitude. The results indicated evidence for cross

⁶¹ Interest rate was initially considered as a control variable but it was dropped since results indicated there was high multicollinearity between it and inflation.

section dependency could not be rejected among some of the panels – and so to correct for this (when using the pools model), estimation was conducted using a generalised least square (GLS) weights and a cross section seemingly unrelated regression (SUR) applied. The tables showing the diagnostic tests can be found in the Appendix.

4.4.1 Hypothesis 1 - Does the level of public debt determine whether austerity affects income inequality?

From our data, we note that most adjustments implemented are notably multi-year events and composed of mixed instruments (tax hikes and spend cuts). In order to properly categorise the adjustments, since our analysis would necessarily include differentiating distributional effects arising from both instruments, we follow the direction used in the literature (e.g. Guajardo et al. 2011; Ball et al. 2013; Furceri et al. 2016) and classify spend-based adjustments as episodes in which spend cuts have been larger than tax hikes and vice versa for tax-based adjustments.

In exploring the nexus between debt and fiscal adjustment and their resultant impact on inequality at different debt levels, the panel threshold regression was used to estimate the model. One way to proceed could be to either estimate the model based on auto generated regimes *or* manually indicate (choose) the different regimes for the thresholds based on debt to GDP ratio categories of 0-30%; 30-60%; 60-90%; 90-120%; 120% & above. Since manual engagement was not available⁶² for the Seo and Shin (2016) Stata programming command for dynamic threshold panel model, we opted for the automatic generated ‘two’ threshold regimes (Monte Carlo tests performed by Seo et al. 2019 show that these are equally prudent and efficient). For the estimated results, we note that in most cases where the results are significant, the points estimates were of

⁶² The manual option was only available for *dynamic time series* data and; the *static fixed effect estimator* for the Stata programming command of Wang (2015).

corresponding values for the respective regimes albeit with different signs. A synopsis of the results for the inequality indicators for the panel threshold model indicate the following:

Gini Coefficient: Estimated threshold levels as seen from the interacted debt and adjustment size variable (*debt-adj*) indicate an identified debt threshold parameter of 60.73% of GDP (significant at the 1% level). The threshold parameter divides the model into two regimes - debt thresholds below and above the threshold parameter are referred to as the lower and upper regime respectively. Results appear to indicate that adjustments implemented when debt thresholds are below or equal to the threshold parameter are suggestive of a negative relationship with inequality thereby signifying a decrease in inequality levels by 0.045 percentage points (ppts). However, at the upper regime i.e. at thresholds above 60.73% of GDP, inequality seems to significantly increase by corresponding values (0.045ppts) at the 1% level. Furthermore, increases in inequality can be seen (*model 1 in Table 1*) to act when adjustments are tax based as can be seen from the interacted debt and tax-based adjustment variable (*debt-tax*). However, the identified threshold parameter is slightly larger at 64.47% of GDP (significant at the 1% level) with increases in inequality (also larger at 0.239 ppts) occurring at the lower regime. Interestingly, this seems to imply that tax-based adjustments tend to be significant for larger adverse distributional consequences. Insights abound here and are consistent with: (i) Keynesian effects (ii) the austerity literature and (iii) the inequality literature. The austerity literature (as can be seen in for example Bertola and Drazen 1991; Mulas-Granados 2005; IMF 2010; Guajardo et al. 2011; Alesina et al. 2015, 2018, 2019; Paulus et al. 2017) finds that debt stabilisation policies that are tax-based tend to be contractionary. Although the inequality literature finds that tax-based adjustments tend to have a more moderating effect – this is however dependent on the type of tax i.e. direct or indirect tax and nature of the tax i.e. progressive or otherwise. Bova et al. (2018) find that indirect taxes

such as VAT seem to result in adverse distributional effects for budget constrained households while Ciminelli et al. (2019) find that via the operation of substitution effects, direct taxes tend to cause an increase in inequality.

Labour Income Share: estimates for the labour share are indicative of inequality increases occurring through both the spend and tax channels. Specifically, at the lower regimes of the identified threshold parameters (38.33% and 36.46%) for the interacted debt models - *debt-spend* & *debt-tax*, increases in inequality of 0.225 ppts are witnessed for the debt-spend variable while larger increases of 1.139 ppts are seen for the debt-tax. Alesina et al. (2019) show that when initial debt level is low, if spend and tax-based adjustments are implemented jointly, they work faster at reducing debt levels. Along this line, we observe based on the fiscal adjustment dataset, that most adjustments implemented seem to be a mix (combination) of both tax and spend instruments. In this sense we note that even at low moderate debt levels, tax-based adjustments tend to have more adverse distributional consequences.

Ratios: at the identified debt threshold parameter of 37.08% of GDP, estimates for the *Top1* seem to indicate that at the lower regime, inequality significantly reduces by 1.404ppt (at the 1% significance level) for the interacted debt and tax variable (*debt-tax*) and increases by almost the same magnitude (1.402ppts) at the upper regime. Conversely, estimates for the interacted debt and spend variable (*debt-spend*), appear to suggest that at debt thresholds below or equal 53.27% of GDP, inequality decreases by 0.262ppt (at the 5% significance) while those for the upper regime are suggestive of an increase in inequality by 0.269ppt. At this stage it should be pertinent to mention that although these results are for different threshold regimes – however the debt ratios can still be classified (based on the grouping structure seen earlier) as medium debt ratios. Thus it would appear that as seen for the labour share inequality indicator, although tax-based and spend

based adjustments appear to emit adverse effects on inequality at medium debt thresholds, larger effects are emitted by tax instruments. *For the Top10*, estimates are indicative of a decrease in inequality when debt thresholds are below the threshold parameter of 37.70% of GDP while inequality increases of up to 3.914ppts (1% significance) can be detected at levels greater than the threshold parameter. *For the Bottom40*⁶³: results for the interacted debt and tax variable (*debt-tax*) are suggestive of income share gains at thresholds below 66.34% (the threshold parameter) thereby signifying a decrease in inequality of up to 0.042ppt (at the 1% significance); however at thresholds above this, income share loss is recorded leading to adverse distributional effects by the same magnitude. *For the Bottom50*: results are suggestive that inequality is driven through both the spend and tax channels at identified threshold parameters of 38.33% and 66.96% respectively. While increases in inequality of 0.664ppt as a result of income share loss are witnessed at the lower regime for spend instruments, increases (0.028ppt) are recorded at the upper regime for tax-based instruments. *For the Palma Ratio*: results are indicative of inequality increase occurring through both the spend and tax channels - although at greater levels for the spend channel. While the estimates for the *debt-spend* variable seem to indicate that at the regime below the identified threshold of 38.11% of GDP, the Top10% gain income share (0.046 at the 1% significance) relative to the bottom 40% thereby leading to an increase in inequality; income share loss is however witnessed at thresholds above the identified parameter thereby leading to a decrease in inequality levels. Conversely, estimates for the *debt-tax* variable appear to suggest that at thresholds below and above 51.11% of GDP, income share loss and gains of the same magnitude

⁶³ The Bottom 40 & 50 are referred to as the *BOT40* & *BOT50* in the estimation tables.

(0.023) are indicated for the top decile relative to the Bottom 40%. See *summary of significant results*⁶⁴ under *Model 1* in *Table 4-1*. For full results see *Model 1* in *Appendix A*.

⁶⁴ The results for the control variables are not seen for the threshold model since the primary focus was on the debt threshold effects on inequality.

Table 4-1. Model 1. Dynamic Threshold Panel Regression Summary of estimated results

Gini						Gini					
Debt-Adj (Debt*Adjustment Size) Model						Debt-Tax (Debt*Tax) Model					
Regime 1: Debt $\leq$ 60.74%***			Regime 2: Debt $\geq$ 60.74%***			Regime 1: Debt $\leq$ 64.47%***			Regime 2: Debt $\geq$ 64.47%***		
Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.
GiniLag(1)	-0.528	0.576	GiniLag(1)	0.131	0.441	GiniLag(1)	-1.221	2.575	GiniLag(1)	0.4528	1.955
Debt-Adj	-0.0005**	0.0002	Debt-Adj	0.0004**	0.0002	Debt-Tax	0.002**	0.001	Debt-Tax	-0.0023638*	0.001
Labour Income Share						Labour Income Share					
Debt-Spend (Debt*Spend) Model						Debt-Tax (Debt*Tax) Model					
Regime 1: Debt $\leq$ 38.33%***			Regime 2: Debt $\geq$ 38.33%***			Regime 1: Debt $\leq$ 36.46%***			Regime 2: Debt $\geq$ 36.46%***		
Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.
LabourShareLag(1)	1.520***	0.402	LabourShareLag(1)	-0.906***	0.272	LabourShareLag(1)	1.460	1.983	LabourShareLag(1)	-2.242	2.009
Debt-Spend	-0.2270**	0.110	Debt-Spend	0.225**	0.110	Debt-Tax	-1.138**	0.497	Debt-Tax	1.142**	0.499
TOP 1						TOP 1					
Debt-Spend(Debt*Spend) Model						Debt-Tax (Debt*Tax) Model					
Regime 1: Debt $\leq$ 53.27%***			Regime 2: Debt $\geq$ 53.27%***			Regime 1: Debt $\leq$ 39.57%***			Regime 2: Debt $\geq$ 39.57%***		
Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.
TOP1Lag(1)	0.303	1.5736	TOP1Lag(1)	0.014	0.824	TOP1Lag(1)	0.514	2.045	TOP1Lag(1)	-0.800	1.707
Debt-Spend	-0.0026**	0.0012	Debt-Spend	0.002**	0.001	Debt-Tax	-0.014***	0.004	Debt-Tax	0.014***	0.004
TOP 10						PALMA					
Debt-Adj (Debt*Adjustment Size) Model						Debt-Spend Model					
Regime 1: Debt $\leq$ 37.70%***			Regime 2: Debt $\geq$ 37.70%***			Regime 1: Debt $\leq$ 38.11%***			Regime 2: Debt $\geq$ 38.11%***		
Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.
TOP10Lag(1)	-0.607	10.681	TOP10Lag(1)	-0.052	10.562	PalmaLag(1)	-1.257	11.445	PalmaLag(1)	0.100	0.948
Debt-Adj	-0.039**	0.015	DebtAdj	0.039**	0.015	Debt-Spend	0.045**	0.021	Debt-Spend	-0.046**	0.020
PALMA											
Debt-Tax Model											
Regime 1: Debt $\leq$ 51.11%***			Regime 2: Debt $\geq$ 51.11%***								
Variable	Coef.	Std. Err.	Variable	Coef.	Std. Err.						
PalmaLag(1)	0.532	2.524	PalmaLag(1)	-0.546**	0.211						
Debt-Tax	-0.022**	0.010	Debt-Tax	0.022**	0.0106						

Notes: *** = significant at 1% level; ** = significant at 5% level; * = significant at 10% level; Debt-Adj = (Debt*Adjustment Size); Debt-Spend = (Debt*Spend); Debt-Tax = (Debt*Tax): interacts debt and tax; GiniLag(1): Gini lagged one period; Top1Lag(1): top1 lagged one period; Top10Lag(1): top10 lagged one period; PalmaLag(1): Palma ratio lagged one period

Robustness Check:

The findings from the Panel Threshold Regression are assessed for robustness using the Driscoll Kraay Fixed Effects model and the Pooled OLS model. In order to model the influence of public debt ratios on fiscal adjustment and their consequent impact on inequality, 5 dummies representing the different debt thresholds presented in the literature (as seen in Herndon et al. 2013) are incorporated into the model:

$$Y_{it} = \Delta Y_{i,t-j} + \beta X_{it} + \gamma D_{it} + e_{it} \quad (4-4)$$

where the subscripts *i* and *t* in the model denote the *ith* country and *tth* year respectively, Y_{it} is the dependent variable and a measure of income inequality; $\Delta Y_{i,t-j}$ is the lagged dependent variable; X_{it} is a $k \times 1$ vector of time invariant regressors including: the fiscal adjustment variable and a set of economic controls; D_{it} is a set of dummy variables representing the different debt thresholds: 0-30%; 30-60%; 60-90%; 90-120% and; 120% & above; e_{it} is the stochastic error term for country *i* at time *t*. In order to determine the impact on inequality at different thresholds, the dummy variables are consequently interacted with the fiscal adjustment size variable and also with the adjustment type (i.e. spend and tax) in order to ascertain the channel of transmission (i.e. the type of adjustment) driving the inequality.

Models 2 & 3: Driscoll Kraay Fixed Effects model and Pooled OLS model:

The results for the Driscoll Kraay Fixed Effects model are largely similar (with slight differences in the point estimates) to those obtained from the pooled OLS model and so for the sake of brevity,

they are not presented separately. However, where significant differences exist, these are mentioned distinctly. A summary of the significant results for the Driscoll Kraay model is further presented in *Table 4-2 under model 2*. Since we seek to explore the impact of the debt-adjustment nexus on inequality, in order to put this into proper perspective, this will be compared vis-à-vis the impact of the distinct debt variable on inequality in order to know if a more prevailing impact exists.

Gini: the lagged values of the Gini coefficient are found to be positively persistent at the 1% significance level. Similar to the panel threshold model, results are indicative for the tax composition channel. However, while decrease in inequality levels are witnessed at large debt thresholds (60-90%), increases in inequality of up to 0.327ppt can be seen at the 120% & above thresholds.

Labour income share: the point estimates of the interacted debt thresholds and adjustment size are suggestive of increases in inequality with the exception of the smallest category (0-30%) which is significant for up to a 0.327ppt decrease in inequality. As seen in *Table 4-2*, while increase in inequality of 0.160 and 0.142 ppt is respectively witnessed at the 90-120% and $\geq 120\%$ debt thresholds, the increase in the 30-60% category is by up to 0.476ppt. Further scrutiny appears to indicate that increases in inequality act mainly through the spend instrument for the fixed effect model (and through both spend and tax for the pool OLS model)⁶⁵ for the indicated thresholds. Additionally, findings are suggestive that income losses accruing to the 30-60% threshold from spend cuts impact on inequality by up to 0.754ppts. Further, a cursory look at the obtained results

⁶⁵ The pool OLS is further significant for inequality increases (0.282 & 0.269ppts) for changes occurring through the tax channel at the 30-60% and $\geq 120\%$ debt thresholds respectively.

between the first two thresholds: 0-30% and 30-60% shows a non-linearity which is consistent across the estimates for the various interacted variables. This result therefore appears to correspond with literature - Herndon et al. (2013) show that a major non-linearity exists between public debt and growth occurring between the 0-30% and 30-60% debt thresholds resulting in decline in GDP growth. Correspondingly, Heimberger (2020) show findings indicating that distributional effects arising from fiscal consolidations are more harmful during times of low (weakened growth). In addition, findings for the pool OLS show that the distinct debt variable is indicative of increases in inequality by 0.017ppt; when compared to the estimates for the interacted debt and adjustment variables, it can be seen that the impact on inequality (from the distinct debt variable) is less thereby implying that income losses are worse during instances of fiscal adjustment.

Income loss accruing to labour share of income is further reflected in the results via the *unemployment channel* which indicate an increase in inequality by up to 0.160ppt (1% significance). Evidence from Agnello and Sousa (2012), Elson (2013) and; also from McCausland and Theodossiou (2016) who note that “policies aimed at reducing the primary deficit would seem to actually worsen the debt ratio and increase unemployment” p13 tend to lend support to this finding. Also, this result appears to be in line with evidence from Woo et al. (2013) and Bova et al. (2018) which additionally find that up to 20% of inequality increases is via the unemployment channel; and persistent both in the short and medium terms (Ball et al. 2013). Along this line, the IMF (2014) and Klein and Winkler (2017) note that unemployment losses fall more disproportionately on low-income groups who tend to be more adversely affected during instances of fiscal adjustments. Results seen from the bottom 50 of the distribution (Bot50) is also consistent with this showing inequality increase of up to 0.025ppt occurring via the unemployment channel. In comparing these results with those from the panel threshold, we note that the interacted debt

thresholds and adjustment size estimates are consistent with those from the panel threshold model therefore implying that public debt levels matter and influence adjustment outcomes on inequality. Furthermore, it is observed that the estimates of the interacted *debt-spend* and *debt-tax* variables from the panel threshold model are indicative of stronger adverse distributional effects especially as emitted from the tax channel. These findings on tax-based adjustments are also consistent with theory as can be seen in Alesina et al. (2002) and Muinelo-Gallo and Roca-Sagalés (2013) who show that tax hikes – especially labour taxes tend to negatively impact firms’ investment and profitability.

Ratios: results for the *Top1* & *Top10* are suggestive that inequality is more pervasive in the former. For the *Top1*, increases in inequality are seen as occurring through the spend channel with the point estimates for the interacted *debt-spend* variable at medium thresholds (30-60% debt threshold) suggestive of increases in inequality by up to 0.176ppt. Additionally as seen in the pool estimations, the *debt ratio* is positively significant suggesting inequality increase by up to 0.011ppt. This could be indicative (suggestive) that as the economy expands the top percentile accrue the gains more so than other distribution groups. Indeed insight as follows from the wir2022 lends credence to this notion: “since wealth is a major source of future economic gains, and increasingly, of power and influence, this *presages further increases in inequality*. Indeed, at the heart of this explosion is the extreme concentration of the *economic power in the hands of a very small minority of the super-rich*” p3. Moreover, the pool point estimates for the interacted *debt-spend* variable are not only significant for medium debt thresholds but also across all the threshold categories (with the exception of the 60-90% threshold) and are equally suggestive of increases in inequality (by up to 0.212ppt) – thereby further supporting and buttressing the notion that the influence (role) of public indebtedness during fiscal adjustments cannot be neglected. *For the*

Top10, results are significant at the 30-60% thresholds⁶⁶ for inequality increase of up to 0.227ppt occurring via the spend channel (0.293 and 0.224ppts respectively). For the *Bot40 & 50*, results suggest that at the $\geq 120\%$ debt threshold, a case for increased inequality levels can be witnessed via both the spend and tax channels – with larger increases of up to 0.190ppt occurring via the tax channel while increases of up to 0.136ppt occur via the spend channel. Results for the *Top10Bot50 & Palma ratio* are suggestive of persistence in inequality since their lagged values are positively significant. Additionally, estimates are indicative of an influential relationship between debt and adjustment on inequality - with increases occurring through both the spend and tax channels. Specifically at the highest debt threshold $\geq 120\%$, while the *Top10* gains income share (0.006 and 0.066 respectively) relative to the Bottom 40 & 50 via the spend channel, it records larger gains (0.007 and 0.081) via the tax channel. Further, the distinct debt variable is also significant for the *Palma*; however it depicts income loss for the *Top10* relative to the Bottom 40 thereby implying that adverse distributional impact arising are worsened from the interacted debt and adjustment ratio than that emitted solely by debt ratios.

Control Variables:

The obtained results indicate that the effect of the control variables on inequality are largely the same for the different interacted models i.e. the interacted *debt-adj*, *debt-spend* and *debt-tax* models.

Inflation: regardless of the composition of the adjustment, inflation appears to produce adverse distributional effects (up to 0.0005ppt as seen via the *Palma* ratio). Taylor et al. (2012) note that

⁶⁶ The pool OLS is additionally significant for inequality increase (0.286ppt) occurring at small debt thresholds (0-30%).

the marginal propensity of the wealthy to spend is less than those at the lower end of the distribution who have a higher marginal propensity to consume. Since the disposable incomes of lower income groups tend to be more disproportionately affected during instances of fiscal adjustments (Agnello and Sousa 2012; IMF 2014; wir2018, 2020, 2022), if adjustments are implemented during inflationary periods, they tend to be worse-off (Agnello and Sousa 2011, 2012; IMF 2014). The obtained results on the widening of the income disparity gap (through the Palma ratio) via the inflation channel during instances of fiscal adjustment appear to be consistent with literature.

Unemployment: the effect of unemployment as a transmission channel for inequality has been touched on while discussing the impact of labour share on inequality and so will not be expanded further. However, it is further observed that unemployment is also significant in the Top 1 model. This result would therefore appear to be consistent with the finding by Tomaskovic-Devey and Lin (2013) who in assessing the effect of financialisation on income inequality, note: “it is not only that financial income is funneled to the top 1% of the population through equity ownership, but also that it distorts the rest of the economy, reducing employment and economic well-being for many people, increasing inequality among wage earners..” (p.169).

GDPG: interestingly, GDP growth is significant for inequality increase of varying magnitude across the inequality indicators with the exception of the *Gini*, *Palma*⁶⁷ and *Bot40 & 50*. The Top1 & 10 are lowest with impact ranging between 0.079 and 0.104ppt, and labour share highest by up to 0.236ppts. While GDP gains (growth) in itself is consistent with the cross country determinants of inequality literature and Kuznets’ theory as a driver for inequality; Muinelo-Gallo and Roca-

⁶⁷ The Palma ratio is significant for increase in the pool estimations.

Sagalés (2013) in their paper, furthermore, note that significant adverse distributional consequences arising from GDP growth can also be linked to direct taxes because of their distorting effects on labour and investment decisions of economic agents. This therefore lends support to our findings since we observe that the highest point estimates for GDP growth are from the interacted debt and tax models; also inequality increases emanating from tax hikes can be witnessed from the *labour share indicator*.

Stock Ratio: Financialisation captures the increasing importance of financial markets, institutions and the actors thereof and the influence wielded by them in matters of economic policies and their related outcomes (Epstein 2002; Palley 2007; Huber et al. 2020; Kaldor 2021). Although financialisation has been associated with greater access to credit⁶⁸ as a result of increased and complex financial instruments (Kumhof and Rancière 2010), it has increasingly and more crucially been linked as a driver for increased income inequality via activities perpetuating increases in top income share - specifically through (i) the growth in the *shareholder value model (equity ownership structure) of corporate governance* and (ii) *larger shares of national income accrued by the financial and corporate sectors*. While the one, drives increases in inequality through the disproportionate growth of income for the Top 1% (Tomaskovic-Devey and Lin 2013; Huber et al. 2020), the other drives increases in inequality for *both* the Top 1% and the next 9% i.e. Top 10% through the increased demand for finance professionals (Huber et al. 2020). To that end, since the stock market is viewed as one of the most potent mechanisms for wealth accumulation, the stock to GDP ratio is therefore employed as an index of financialisation and used to capture the

⁶⁸ Reflecting in increased borrowings at the bottom of the income distribution.

extent to which financialisation plays a role in distributional outcomes of fiscal adjustment policies. Results indicate that the effect of a percentage change in stock ratio on inequality can only be witnessed in the top percentile and decile⁶⁹ and is indicative of an increase in inequality by up to 0.003ppts. This finding thus appears consistent with the evidence by Tomaskovic-Devey and Lin (2013) and; Huber et al. (2020) which show that increases in inequality occurring as a result of financialisation are driven by the top income shares. Furthermore, we test to see if public debt levels play a role on the effect emitted by the financialisation index on inequality (i.e. if stock ratios combined with debt ratios increases inequality) by interacting the two variables. We note that the interacted debt and stock variable *debt-stock* is suggestive of a smaller increase (by up to 0.00005ppt at the 1% significance level) in inequality than when the stock to gdp ratio is considered distinctly. This would seemingly imply that public debt levels do not drive the impact of financialisation on inequality. On the other hand, when the stock ratio is interacted with the adjustment size, results are indicative of inequality reduction through the tax channel by up to 0.009 and 0.015ppt for the Top1 and Top10 respectively but by more for the latter. This would seemingly imply that impacts from tax-based adjustments tend to drive down the gains of financialisation thereby causing a reduction in inequality.

Private Debt: since the financialisation literature inequality (e.g. Kumhof and Rancière 2010; Huber et al. 2020) identifies greater access to credit, growth in household indebtedness as well as increased participation by non-financial sector in financial markets as drivers for increased inequality; private debt is subsequently introduced as a control variable to allow us identify if there is a resulting change in the public debt-adjustment-inequality nexus as a result of private debt

⁶⁹ This is significant for only the pools estimation.

influences. The effects of private debt overhang during fiscal adjustments is extensively discussed in Klein and Winkler (2019) with findings indicative that private debt overhang during instances of fiscal consolidation lead to a rise in income inequality and vice-versa for low debt. Also by using public debt as a control variable, they provide evidence showing these results as robust regardless of high or low public debt levels. The private debt data series (sourced from the Bank of International Settlement - BIS) is made up of 2 components: total credit to the non-financial sector (*NFS*) and total credit to households (*HHC*) – and are modelled separately and distinctly. Furthermore, to gauge the influence (responsiveness), private debt is interacted with the public debt ratio and fiscal adjustment variable (*debt-hhc-adj* & *debt-nfs-adj*)⁷⁰ with results significantly indicative for inequality increase for both private debt components through the *Top 1 and Palma ratio* indicators. While increases occurring through the Palma are at large debt thresholds (60-90%) for both the households and non-financial sector; those occurring through the Top 1 are at small (0-30%) and very large (90-120%) debt thresholds for the households and non-financial sector respectively. It is interesting to note that for both the Top 1 and Palma, inequality increase occurring via the households is greater than that occurring via the non-financial sector. Along this line, this finding appears consistent with the notion that increased savings at the top and borrowings at the lower distribution stream tend to magnify inequality effects (Kumhof and Rancière 2010). These results also therefore appear to provide additional empirical evidence to support the findings by Wood (2020) which show that increases in household indebtedness tends to lead to an increase in inequality by increasing income share of the Top10 relative to the Bottom 40. See *summary of*

⁷⁰ *debt-hhc-adj* for when the household component is interacted with the public debt ratio and adjustment size; *debt-nfs-adj* for when the non-financial sector component is interacted with public debt ratio and adjustment size.

estimated results for the Driscoll Kraay Fixed Effects under Model 2 in Table 4-2. For full results (Driscoll Kraay FE & Pool OLS) see Models 2 & 3 in Appendix B.

Table 4-2. Driscoll Kraay Fixed Effects Model Summary of estimated results

GINI			GINI			LABOUR INCOME SHARE			LABOUR INCOME SHARE		
DEBT-ADJ (DEBT*ADJUSTMENT SIZE)			DEBT-TAX (DEBT*TAX)			DEBT-SPEND (DEBT*SPEND)			DEBT-TAX (DEBT*TAX)		
Variable	Coef.	Std. Error	Variable	Coef.	Std. Error	Variable	Coef.	Std. Error	Variable	Coef.	Std. Error
GiniLag(1)	0.834***	0.0285	GiniLag(1)	0.834***	0.0285	LabourLag(1)	0.017	0.112	LabourLag(1)	0.034	0.112
Debt	-0.0002*	0.0001	Debt	-0.0002	0.0001	Debt	0.003	0.015	Debt	-0.010	0.015
SDDAD	-0.0004	0.0008	SDDTAX	-0.001	0.0024	SDDSPEND	0.378	0.238	SDDTAX	0.967***	0.253
MDDAD	-0.001	0.0014	MDDTAX	-0.001	0.0023	MDDSPEND	-0.754***	0.107	MDDTAX	-0.265	0.243
LDDAD	-0.001**	0.0006	LDDTAX	-0.004**	0.0014	LDDSPEND	-0.177	0.197	LDDTAX	-0.046	0.240
VLDDAD	-0.0004	0.0004	VLDDTAX	-0.001	0.0010	VLDDSPEND	-0.287***	0.040	VLDDTAX	-0.134	0.088
ELDDAD	0.001**	0.0006	ELDDTAX	0.003***	0.0009	ELDDSPEND	-0.221***	0.080	ELDDTAX	-0.226	0.135
Inflation	-0.001**	0.0002	Inflation	-0.001***	0.0002	Inflation	0.025	0.031	Inflation	0.035	0.030
Unemployment	0.0002	0.0001	Unemployment	0.0002	0.0001	Unemployment	-0.135***	0.029	Unemployment	-0.160***	0.033
GDPG	0.0001	0.0002	GDPG	0.0002	0.0002	GDPG	-0.225***	0.065	GDPG	-0.237***	0.071
Stock	0.0000	0.0000	Stock	0.00002	0.0000	Stock	0.002	0.003	Stock	0.002	0.002
C	0.066***	0.0115	C	0.066***	0.0116	C	1.577***	0.353	C	1.711***	0.387
TOP 1			TOP 10			PALMA RATIO			PALMA RATIO		
DEBT-SPEND (DEBT*SPEND)			DEBT-SPEND (DEBT*SPEND)			DEBT-SPEND (DEBT*SPEND)			DEBT-TAX (DEBT*TAX)		
Variable	Coef.	Std. Error	Variable	Coef.	Std. Error	Variable	Coef.	Std. Error	Variable	Coef.	Std. Error
TOP1Lag(1)	-0.205***	0.0455	TOP10Lag(1)	-0.205***	0.0499	PalmaLag(1)	0.971***	0.0080	PalmaLag(1)	0.970***	0.0077
Debt	-0.00001	0.0001	Debt	-0.0001	0.0001	Debt	-0.0005**	0.0002	Debt	-0.0003	0.0003
SDDSPEND	0.001	0.0011	SDDSPEND	0.001	0.0011	SDDSPEND	0.001	0.0016	SDDTAX	-0.002	0.0027
MDDSPEND	0.002**	0.0007	MDDSPEND	0.002*	0.0010	MDDSPEND	0.001	0.0015	MDDTAX	-0.009**	0.0045
LDDSPEND	0.0002	0.0006	LDDSPEND	-0.0003	0.0007	LDDSPEND	-0.005	0.0034	LDDTAX	-0.004	0.0057
VLDDSPEND	0.001	0.0005	VLDDSPEND	0.0001	0.0004	VLDDSPEND	0.005	0.0035	VLDDTAX	0.002	0.0064
ELDDSPEND	0.001	0.0005	ELDDSPEND	0.0005	0.0006	ELDDSPEND	0.006**	0.0024	ELDDTAX	0.007**	0.0034
Inflation	-0.00001	0.0001	Inflation	0.0002	0.0002	Inflation	0.0005*	0.0002	Inflation	0.0005***	0.0002
Unemployment	0.0004***	0.0001	Unemployment	0.001***	0.0002	Unemployment	-0.0002	0.0003	Unemployment	-0.0002	0.0004
GDPG	0.001***	0.0002	GDPG	0.001***	0.0002	GDPG	-0.001*	0.0003	GDPG	-0.0005	0.0004
Stock	0.00001	0.0000	Stock	0.00003	0.0000	Stock	0.0001	0.0001	Stock	0.0001	0.0001
C	-0.005***	0.0012	C	-0.005***	0.0013	C	0.035***	0.0101	C	0.035***	0.0100

Note: *** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level; SDDAD = (SmallDebtDummy*Adjustment Size); MDDAD = (MediumDebtDummy*Adjustment Size); LDDAD = (LargeDebtDummy*Adjustment Size); VLDDAD = (VeryLargeDebtDummy*Adjustment Size); ELDDAD = (ExtremelyLargeDebtDummy*Adjustment Size); SDDSPEND = (SmallDebtDummy*Spend); MDDSPEND = (MediumDebtDummy*Spend); LDDSPEND = (LargeDebtDummy*Spend); VLDDSPEND = (VeryLargeDebtDummy*Spend); ELDDSPEND = (ExtremelyLargeDebtDummy*Spend); SDDTAX = (SmallDebtDummy*Tax); MDDTAX = (MediumDebtDummy*Tax); LDDTAX = (LargeDebtDummy*Tax); VLDDTAX = (VeryLargeDebtDummy*Tax); ELDDTAX = (ExtremelyLargeDebtDummy*Adjustment Size).

4.4.2 Hypothesis 2 - Are high indebted countries more affected by adverse distributional consequences vis a vis low indebted countries during instances of fiscal adjustments?

The countries in the sample are grouped into 2 sub-samples of broad debt categories: low (comprising the small and medium debt categories i.e. 0-30% and 30-60%) and high (comprising the large-very large-extremely large debt categories i.e. 60-90%, 90-120% and > 120%). Country averages are obtained over a 40 year duration (1980 – 2019). Accordingly, 7 countries are grouped under the high category: *Austria, Belgium, Canada, Ireland, Italy, Japan and Portugal* while 9 countries fall under the SMED: *Australia, Denmark, France, Finland, Germany, Spain, Sweden, the UK and USA*. It is worthwhile to note that Australia is the only country within the low category with period wise debt average which qualifies as small. A table detailing identified debt ratio categories of 0-30%; 30-60%; 60-90%; 90-120%; 120% & above, with countries each grouped by year and frequency is seen in the *Appendix*. The total income share (i.e. the absolute magnitude of distribution in the economy) is used as the inequality indicator here. Since the countries are grouped into two sub-samples of debt category, it would be redundant to estimate a threshold model – thus the quantile panel regression model is therefore used instead. Quantiles are used to describe the distribution of the dependent variable Y in a model, therefore the quantile regression (QR) model explores the relationship between the explanatory variable X and the conditional *quantiles* of Y and is as follows:

$$Y_{it} = X_{it}'\beta_q + e_{it} \quad (4-5)$$

Where Y_{it} is the dependent variable and is the logarithm of total income share; β_q is a vector of unknown parameters associated with the q^{th} quantile; X_{it} is a $k \times 1$ vector of regressors that includes the explanatory variables as well as a set of control variables.

Prior to estimating the quantile regression, a normalcy test was carried out justifying the reason (among other reasons earlier enumerated) for the chosen methodology. Based on the Jacque Berra test, the null for normalcy was rejected since the p-value for the residuals was less than 0.05 significance level. Since one of the benefits of the quantile regression methodology rests on its efficacy in modeling the entire conditional distribution – we do not limit our investigation to the median quant (i.e. the 5th or 0.5 quantile) but rather consider the distributional outcomes for quantiles 0.1 to 0.9. Quantiles are synonymous to percentiles such that the 0.9 quantile is the same as the 90th percentile.

High Indebted Countries: results for this category of countries (as seen from the interacted debt and adjustment variable *debt-adj*) appear to indicate that responses to deflationary changes in the fiscal stance are only witnessed at the 0.6 and 0.7 quantiles and are suggestive of a 0.001ppt increase and decrease in inequality. Further scrutiny appears to suggest that these changes occur through both the spend and tax channels.

We note from the literature as can be seen in Furceri et al. (2022), that markets seem to attach a low probability of debt crisis to countries with strong records of fiscal responsibility that have the leeway to pursue expansionary fiscal policies even when debt levels are very high. In this sense, a country with inherently high debt ratios could have ample fiscal space and as a result, longterm interest rates for debt servicing might be low compared to countries with limited ample fiscal space. Relatedly, Ghosh et al. (2013) indicate that if debt were to exceed its fiscal space

limit, “there is no finite interest rate that would compensate creditors for the probability of default...recognising this, creditors demand an infinite interest rate beyond the debt limit – effectively shutting the government out of the market” (p.10-11). Fiscal adjustments in instances such as this, would seemingly aggravate distributional consequences. Consonant with this, we therefore explore the distributional impact of adjustments when long-term interest rates on debt are high (or low). Accordingly, long-term interest rates are categorised into 5 classifications of *low, medium, high, very high and extremely high* and countries are thereafter classified based on their average long-term interest rates into 2 broad groups of *low and high*. 10-year bond yields are used as a proxy for long-term interest rate and obtained from the OECD databank. *A table showing the classification can be seen in the Appendix.* Consequently, the only country that falls into the category of ‘*high debt ratios with low long-term interest rates*’ is Japan while Italy is the only country that falls into the ‘*high debt with high long-term interest rates*’. To explore if long-term interest rates for debt servicing influence the outcome on inequality, we interact the debt ratio variable with the long-term interest rate variable. Firstly, we explore the notion for the whole sub-sample⁷¹ by investigating if long-term interest rates for debt servicing influence the outcome on inequality by interacting the debt ratio variable with the long-term interest rate variable. The results indicate that the interacted variable *debt-ltintr* is significant for the total distribution except for quantiles 0.2 to 0.5. Further, the results are suggestive that for the 0.6 quantile, *debt-ltintr* is indicative of inequality decrease of up to 0.001ppt; however the reverse is the case for the tails of the distribution i.e. the 0.1 and the 0.7 to 0.9 quantiles which show inequality increase by a similar magnitude thereby indicating that for highly indebted countries, long-term interest rates on debt

⁷¹ All other countries in the sub-sample are identified with medium long-term interest rate.

servicing are significant for adverse distributional effects during instances of fiscal adjustments. We further observe that the findings are suggestive that adverse distributional effects appear to be similar (0.001ppt) for influences from the interacted debt and long-term interest rate variable (*debt-ltintr*) and the interacted debt and adjustment size variable (*debt-adj*).

Since Japan and Italy are the only countries within the sub-sample that are associated with average low and high long-term interest rates for their respective high debt ratios, we consequently test the robustness of these findings by excluding effects which could arise from “*key country effects*” by carrying out distinct and separate estimations for Japan and Italy. In this sense, we adopt an approach similar to Klein and Winkler (2019) - who model the robustness of the findings in their paper by “sequentially dropping one country at a time.” Estimates for Japan are broadly similar with that obtained for the entire sub-sample. However, while Japan is significant for a *decrease* in inequality for the middle of the income distribution (0.6 quantile) by 0.0002ppt, Italy is significant for an *increase* by 0.0001ppt. Decrease in inequality levels seen for Japan as a result of low long-term interest rate might not be surprising and is broadly consistent with the notion by Blanchard (2019) that if long-term interest rate and the marginal product of capital are lower than GDP growth rate ($r < g > m$), then the welfare costs of high debt tend to be reduced. Moreover for Italy, if one envisages that in so far as borrowing constrained households find it difficult to access funds needed to smooth their consumption as a result of high interest rates,⁷² increases in inequality are bound to occur. Interestingly, it is also observed that while the distinct debt variable is significant across the quantiles (albeit only at the 0.1 quant for Italy), however, the magnitude of increase (*and decrease*) of the interacted *debt-ltintr* is *less than* that occurring across the associated

⁷² A graphical illustration of historical interest rates and long-term government bond yields seen in Blanchard (2019) shows that short-term and long-term interest rates on average follow the same trend.

quantiles of the distinct *debt variable* thereby apparently implying that for highly indebted countries, influences from (i.e. low or high) long-term interest rates do not result in greater adverse (or otherwise) distributional effects.

A look at the control variables suggest that inequality increases of up to 0.091ppts (at the 1% significance) can be observed via the unemployment channel. This finding for increases in inequality (ranging between 0.049 to 0.091ppt) is evident in the 0.1 to 0.6 quantiles thereby implying that the bottom to the mid quantiles of the distribution are seemingly somewhat more disproportionately affected by unemployment losses during instances of fiscal adjustment. Interestingly, it can be observed that the magnitudinal impact appears to reduce as it transverses along the distribution line (between the 0.2 and 0.4 quantiles); however it picks up again between the 0.5 and 0.6 quant (with the 0.6 quant displaying greater losses at 0.091ppt than the 0.1 quant). And so this result for the mid quantiles would appear quite intuitive in corresponding with the evidence in the extant literature that the median class has also lost earnings in recent years (Atkinson 1999, Dobbs et al. 2016, OECD 2019). As elucidated by the world inequality report “...focusing on the bottom 40% alone can miss important dynamics – in part for the middle class, which may be squeezed between increases in both the bottom 40% share and the top 1% share” (wir2018.widworld). Similarly, results for *GDP growth* just like for unemployment are indicative for inequality increase at the 0.1 to 0.6 quantiles, while adjustments during *inflationary* times seem to adversely affect those at the bottom of the distribution ladder as can be seen at the 0.1 and 0.2 quantiles, results for the median and other quantiles remain largely insignificant. At the 0.1 to 0.6 quants, it would appear that for highly indebted countries, *financialisation* gains appear to lead to a decrease in inequality by up to 0.017ppts during instances of adjustment while the reverse appears to be the case for the 0.7 and 0.8 quantiles (which are similarly impacted). This might not

be surprising if one considers that those at the bottom and median distribution stream might increasingly opt for credit lines in order to meet their consumption needs. This notion is consistent with the findings by Palley (2007) and Kumhof and Rancière (2010) which identify increases in debt volume as one of the significant features of financialisation. *See summary of estimated results under Model 4 in Table 4-3. For full results see Model 4 in Appendix C.*

Table 4-3. Model 4: Quantile Panel Regression – High indebted countries - Summary of estimated results

Total Income Share											
	Debt-Adj Model										
	Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error
DEBT-ADJ	0.1	-0.0003	0.0008	DEBT-LTINTR	0.1	-0.0005***	0.0001	UNEMPLOYMENT	0.1	-0.071***	0.013
	0.2	-0.0002	0.0012		0.2	-0.0004*	0.0002		0.2	-0.075***	0.018
	0.3	-0.0004	0.0007		0.3	-0.0001	0.0004		0.3	-0.062***	0.021
	0.4	-0.0004	0.0005		0.4	0.0003	0.0004		0.4	-0.049**	0.024
	0.5	-0.0005	0.0005		0.5	0.0005	0.0004		0.5	-0.058**	0.026
	0.6	-0.0013***	0.0005		0.6	0.001***	0.0001		0.6	-0.091**	0.044
	0.7	-0.0013***	0.0005		0.7	0.001***	0.0001		0.7	-0.104*	0.058
	0.8	-0.0001	0.0012		0.8	0.001***	0.0001		0.8	-0.147***	0.047
	0.9	-0.0006	0.0009		0.9	0.001***	0.0001		0.9	-0.107*	0.055
	Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error
GDPG	0.1	-0.069***	0.018	INFLATION	0.1	-0.040**	0.012	STOCK	0.1	0.006***	0.001
	0.2	-0.082***	0.025		0.2	-0.040***	0.013		0.2	0.007***	0.001
	0.3	-0.059**	0.024		0.3	-0.023	0.016		0.3	0.007***	0.002
	0.4	-0.068**	0.027		0.4	-0.016	0.016		0.4	0.011***	0.003
	0.5	-0.064**	0.028		0.5	-0.008	0.016		0.5	0.016***	0.004
	0.6	-0.087***	0.030		0.6	-0.011	0.014		0.6	0.017***	0.003
	0.7	-0.072	0.050		0.7	-0.020	0.026		0.7	0.017***	0.004
	0.8	-0.078	0.059		0.8	-0.056**	0.028		0.8	0.011***	0.004
	0.9	-0.078***	0.027		0.9	-0.066*	0.034		0.9	0.009*	0.005

*** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level; Debt-Adj= Debt*AdjustmentSize; Debt-Ltinr= Debt*Long-Term Interest rate.

Low Indebted Countries: countries in this category include *Australia, Denmark, Finland, France, Germany, Spain, Sweden, UK and US*. Unlike the high indebted countries, estimates for the *distinct* debt variable for low indebted countries are significant to deflationary changes in the fiscal stance and indicative of up to 0.018ppt increase in inequality for the 0.7 and 0.8 quantiles but decrease in inequality for the 0.2 to 0.6 quants by up to 0.031ppts (all at the 1% significance). However, similar to the high indebted countries, when the interacted debt and adjustment variable *debt-adj* is considered, although the 0.6 and 0.7 quantiles are associated with inequality increase and decrease respectively, larger inequality increases ranging between 0.004 to 0.010ppt are also witnessed from the 0.2 to 0.5 quantiles. Interestingly, the magnitudinal impact decreases as it progresses along the distribution stream attenuating to the findings in the extant literature that adjustments are more harmful to lower income groups. Further scrutiny reveals the increases in inequality are occurring via both channels (spend and tax).

Similar to the high indebted countries, a look at the effects of *long-term interest rates influence on debt ratios* during instances of adjustment is suggestive of inequality increase by up to 0.001 for the lower distribution (albeit for the 0.2 to 0.4 quantiles respectively) and the top quintile (0.8 & 0.9 quantiles). However, for this group of countries, inequality increase occurring via the interacted *debt-ltintr* variable at 0.001ppt is *less than* that occurring via the interacted *debt-adj* variable at 0.01ppt. Accordingly, this then would imply that although influences from low (high) long-term interest rates do not result in greater adverse distributional effects, however influences from the *debt-adj* nexus is more magnified for low indebted countries. Estimates for the control variables indicate that increases in inequality as occurring through the *financialisation* variable are only seen for the quantiles at the upper end of the income distribution i.e. 0.7 to the 0.9 quantiles (at 0.006, 0.008 & 0.011ppts) with greater disparities witnessed at the 0.9 quantile

(i.e. the top decile). Interestingly, although the *unemployment* variable is significant for the lower quantiles (0.2 to 0.4), it is not with the expected sign. See *summary of estimated results under Model 4 in Table 4-4. For full results see Model 3 in Appendix C.*

Table 4-4 Model 4: Quantile Panel Regression – Low indebted countries - Summary of estimated results

Total Income Share											
	Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error
DEBT-ADJ	0.1	-0.002	0.002	DEBT	0.1	0.011	0.016				
	0.2	-0.010***	0.004		0.2	0.026***	0.006				
	0.3	-0.007***	0.002		0.3	0.031***	0.005				
	0.4	-0.005***	0.001		0.4	0.030***	0.006				
	0.5	-0.005**	0.002		0.5	0.026***	0.006				
	0.6	-0.004***	0.002		0.6	0.019***	0.005				
	0.7	-0.004***	0.001		0.7	0.0183***	0.005				
	0.8	-0.002	0.002		0.8	0.015***	0.005				
	0.9	-0.0004	0.001		0.9	0.004	0.005				
	Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error
DEBT-LTINTR	0.1	-0.0003	0.0010	UNEMPLOYMENT	0.1	0.008	0.047	INFLATION	0.1	0.029	0.049
	0.2	-0.001**	0.0004		0.2	0.095***	0.018		0.2	0.095***	0.030
	0.3	-0.001***	0.0004		0.3	0.077***	0.017		0.3	0.126***	0.038
	0.4	-0.001**	0.0004		0.4	0.059***	0.020		0.4	0.096**	0.042
	0.5	-0.0001	0.0004		0.5	0.007	0.021		0.5	0.078*	0.041
	0.6	0.001	0.0004		0.6	-0.010	0.019		0.6	0.055	0.038
	0.7	0.001*	0.0004		0.7	-0.020	0.019		0.7	0.053	0.034
	0.8	0.001***	0.0003		0.8	-0.047***	0.018		0.8	0.048	0.034
	0.9	0.001***	0.0003		0.9	-0.059***	0.016		0.9	0.009	0.029
	Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error		Quantile	Coefficient	Std. Error
GDPG	0.1	-0.004	0.021	STOCK	0.1	-0.0004	0.001				
	0.2	0.030	0.033		0.2	-0.001	0.001				
	0.3	0.024	0.038		0.3	-0.001	0.001				
	0.4	0.056	0.042		0.4	-0.002	0.001				
	0.5	0.047	0.066		0.5	0.001	0.004				
	0.6	-0.012	0.053		0.6	0.003	0.003				
	0.7	0.015	0.050		0.7	0.006**	0.003				
	0.8	0.031	0.046		0.8	0.008***	0.002				
	0.9	0.068*	0.041		0.9	0.011***	0.002				

*** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level; Debt-Adj= Debt*AdjustmentSize; Debt-Ltinr= Debt*Long-Term Interest rate

4.4.3 Discussion:

For hypothesis #1, in exploring whether public debt levels during fiscal consolidations determine distributional outcomes, we utilise a dynamic threshold panel regression that allows for auto generated threshold levels as our baseline regression model. We also generate debt thresholds of 0-30% (small), 30-60% (medium), 60-90% (large), 90-120% (very large) and $\geq 120\%$ (extremely large) in line with Herndon et al. (2013) - which we employ in our fixed effects and pools models as robustness checks. We find that the results from our fixed effects and pooled regressions - while more detailed because of the multiple thresholds - are qualitatively consistent (however with minor differences in each regime coefficients) with the 2-regime results of the threshold regression. By interacting the debt thresholds with the adjustment variables, we find evidence for different regime switches (i.e. threshold effects) for the different inequality indicators. Primarily our findings indicate that threshold effects are: (i) mostly significant for inequality at thresholds *equal to or greater than* medium thresholds (ii) inequality effects for the top decile and percentile are significant for low to medium debt ratios while those occurring through the Gini, Labour share, Palma, Bottom 40 & 50 are significant for being driven at large and extremely large debt ratios (iii) although inequality increases are mostly through both spend and tax channels, however larger increases occur via the tax channel (iv) inequality increases arising through the labour share channel is larger than other indicators and more prevalent across the different debt thresholds and (v) inequality increases from the debt-adjustment nexus is stronger than the effects emitted solely (distinctly) from public debt.

More specifically, the findings indicate that the distinct debt variable is significant for the Top 1 and Labour share for increasing inequality. This finding for the Top1 might not be surprising

if one considers that the holders of government debt bonds include financial markets and those at the upper tail of the income distribution who are effectively the recipients of interest payments for these bonds which inadvertently tend to widen the income disparity since they tend to be greater than the taxes paid by these groups (Anselmann and Kramer 2016). However, the magnitude of inequality increase emanating from the distinct debt variable is less than when the debt variable is interacted with the adjustment variables (spend and tax) thereby implying that influences arising from the debt-adjustment nexus cannot be neglected since they tend to have larger distributional consequences. The evidence also indicates that mixed adjustment instruments (spend and tax) as reflected by the Labour share, Top1, Bot 40 & 50 and the Palma are consistent for inequality increase. However as noted by the wir2022, a mix of instruments tends to amplify the adverse distributional consequences and therefore inadvertently and disproportionately hurt lower income groups. It is also interesting to note that these mix of instruments seem to be significant at very high debt levels probably attenuating that higher debt levels seem to require more stringent austerity policies. Nevertheless, Ostry et al. (2015) sustains that: “if fiscal space remains ample, policies to deliberately pay down debt are normatively undesirable...the distortive cost of policies to deliberately pay down the debt is likely to exceed the crisis-insurance benefit from lower debt” (p.1). The same line of argument is also echoed by Furceri et al. (2022).

Additional evidence from the findings suggests that the largest increases for inequality come from the labour share and are observed from medium (30-60%) to extreme debt threshold levels ($\geq 120\%$). Furthermore, non-linear effects are evident between the 0-30% and the 30-60% thresholds via the spend and tax channels respectively for a significant *decrease* in inequality (0.325 & 0.624ppt) at the 0-30% debt threshold as well as an *increase* in inequality (0.642 & 0.282ppts) at the 30-60% threshold. This non-linearity is consistent with the findings by Herndon

et al. (2013) that a non-linear relationship exists between these two debt categories albeit for public debt and growth⁷³.

With respect to hypothesis #2, the results indicate that *low indebted countries* are more adversely affected by discretionary changes to the fiscal stance (i.e. austerity policies). The impact of these policies is more pronounced for those at the lower end of the distribution especially - as occurring via the spend and tax channels. Specifically, findings for *high indebted countries* indicate that the impact arising from the interacted *debt-adj* variable leads to an increase in inequality levels by *0.001ppt* while that for *low indebted countries* is by up to *0.01ppt*. Interestingly, a look at the composition of countries which fall under this low-indebted category indicates the following: (i) three out of the nine countries are ranked as highly unequal countries based on the Gini ranking⁷⁴ and (ii) large-sized adjustments were implemented in four of these countries. Similarly we note that in the high indebted category - two of the countries implemented small adjustments. It could therefore be the case that the effects on inequality are being magnified by the pre-existing high (*low*) unequal state or/and the size of the adjustments. Brinca et al. (2017) note that high income inequality tends to amplify the recessive effects of fiscal consolidation. The inequality literature (e.g. Bova et al. 2018) finds large sized adjustments i.e. adjustments $\geq 1.5\%$ of GDP tend to lead to more adverse distributional effects. Nevertheless, the result for the *low indebted countries* would appear to be consistent with the findings by Klein and Winkler (2019) which show that low public debt during instances of fiscal adjustment tend to lead to “*amplified*” distributional effects relative to when public debt is high. Other reasons for this could be: (i) high

⁷³ Herndon et al. (2013) findings indicate that a non-linear relationship exist between public debt and growth at the first 2 debt thresholds (i.e. 0-30% and 30-60%) and not at the above 90% threshold as shown by Reinhart and Rogoff.

⁷⁴ See world inequality report.

debt accumulation by high indebted countries might be as a result of increased fiscal support and infrastructural buildup (i.e. growth enhancing investments) and so large Keynesian effects resulting from the latter could act in reducing inequality – such that adverse distributional effects are not as severe (ii) low debt levels for low indebted countries could imply low levels of activity in the economy with a resultant effect on growth and inequality. Indeed this would appear consistent with the notion by IMF (2017) that many advanced economies tend to experience increases in inequality during periods of low economic growth. Furthermore, while the austerity literature (for e.g. Alesina et al. 2019) suggests that when initial debt level is low, if spend and tax-based adjustments are implemented jointly, they work *faster* at reducing debt level. Along this line, the inequality literature (for e.g. IMF 2014, Clements et al. 2015, Furceri et al. 2022) consequently note that adjustments that are too fast, tend to magnify adverse distributional effects and can derail the recovery process. Our findings are therefore consistent with the existing evidence in the respective literature. Also, when the effect of *high (low)* long-term interest rates on *high indebtedness* is explored, the findings seem to suggest that high indebtedness with high long-term interest rate regimes are associated with mild inequality increase while the reverse is the case for low long-term interest rate regimes. This finding for the low long-term interest rate regimes is broadly consistent with the notion that welfare costs of high debts are low if long-term interest rate and the marginal product of capital are lower than GDP growth rate (Blanchard 2019).

4.5 Concluding remarks and policy implication

In the inequality literature despite the existing evidence suggesting that during instances of fiscal adjustment the business cycle position of the economy, prevailing economic situation, size, duration and composition of the adjustment as well as private debt dynamics play a significant role in determining distributional outcomes, it is however relatively silent on *the role (if any) of public debt levels*. In filling this gap, this study explores the extent to which public debt dynamics during fiscal adjustment implementation affects distributional outcomes. In this direction, a dynamic panel threshold methodology is applied to a dataset consisting of 16 OECD countries over a 40-year period. The emerging evidence (being robust to different model specifications) suggests that: (i) while public debt levels affects income inequality, the impact is more pronounced during periods when fiscal adjustment (austerity) policies are implemented (ii) although different inequality indicators are suggestive of different threshold parameters for increasing inequality – generally adverse effects tend to start manifesting over *medium up to extreme debt thresholds* (iii) tax-based instruments are more persistent in delivering adverse outcomes than spend-based instruments. While a strand of the inequality literature (e.g. IMF 2014; Agnello and Sousa 2011, 2012) suggests that tax-based adjustments tend to moderate inequality effects, another strand (e.g. Bova et al. 2018, Ciminelli et al. 2019) finds that the effects are dependent on the type of tax instrument (direct or indirect).

In the wake of the Covid pandemic, global public debt has greatly increased (with increase for developed economies ranging between 5-20% of national income)⁷⁵ as a result of large stimulus packages undertaken by fiscal authorities to alleviate the effects of the pandemic and also prevent

⁷⁵ See Kose et al. (2021).

a worsening of inequality and poverty (wir2022). As the world emerges from the throes of the pandemic, the need for sustainable debt and finances is still at the forefront of economic debate. Although higher debt ratios imply higher interest payments on debt holdings which tend to amplify the income gap by increasing top income share since government bond holders are majorly financial markets and those at the upper tail of the income distribution (Anselmann and Kramer 2016); however, our findings indicate that distributional effects which arise during fiscal adjustments tend to be harmful. Several optimal debt levels such as the 60% of GDP - Maastricht criteria; > 90% of GDP - Reinhart and Rogoff (2010); 77% of GDP – Caner et al. (2010)⁷⁶ have been tendered in the literature as limits impacting on effective growth outcomes. However, based on our findings, we note that a one size-fits-all debt threshold for *inequality reduction* might be difficult to achieve since thresholds differ based on the channel through which it is transmitted. Whilst the potential gains arising from sustainable finances cannot be disregarded, we equally throw a word of caution from lessons learnt from the consolidation exercises implemented by most developed economies post the 2007/8 global financial crises. In the face of this, it might prove more prudent for policymakers to tow the Keynesian course for a short to medium term outlook that would encompass a balanced measure of spend increases and tax hikes (Taylor et al. 2012). Essentially, it is critical for increased spending not to be geared towards consumption by way of increased transfers, but rather towards productive capabilities that would spur employment thereby creating a multiplier effect by stimulating aggregate demand and consequently growth. On the tax side – since increases in inequality are more pronounced from tax-based adjustments as suggested by findings in this study – tax hikes should be geared towards more progressive tax instruments

⁷⁶ Researchers at the World Bank.

encompassing specificity of target (e.g. targeting corporations) and reach (widened tax base that would incorporate short-run measures such as one-off windfalls). Such increases would potentially help to moderate inequality and at the same time act to fund increases in expenditure.

Finally, the findings for this study, however, come with certain limitations: firstly pertaining to methodology: an important limitation in the Seo and Shin's (2019) dynamic panel threshold model is the two-regime threshold structure. Although efficient, assessing the impact of the debt-adjustment nexus on inequality would be more specific and detailed if multiple thresholds for analysis were available within the dynamic *panel* framework. By the use of dummies we devised an alternative solution – with results being largely consistent with those of the two-regime threshold (of the dynamic panel threshold model). To that extent, it would be beneficial to re-assess this relationship at a time when multiple thresholds (both automatically and manually generated) are available for trialling within a dynamic panel setting.⁷⁷ Secondly, since we observe that some of the countries within the low indebted categorisation seem to fall within the highly unequal ranking, a possibility for further analysis would be to explore the nature of causality (i.e. one-way or bidirectional). Despite these, the findings remain robust and consistent with main tenets of economic theory and the extant academic literature.

⁷⁷ Seo et al. (2016) similarly note the development of multiple threshold variables and regimes as a priority for future research.

REFERENCES

Agnello, L. and Sousa, R. M. (2011) ‘Fiscal Consolidation and Income Inequality’, *IDEAS Working Paper Series* from RePEc. St. Louis: Federal Reserve Bank of St Louis. Available at: <https://search.proquest.com/working-papers/fiscal-consolidation-income-inequality/docview/1698807418/se-2?accountid=10297>

Agnello, L. and Sousa, R. M. (2012) How does Fiscal Consolidation Impact on Income Inequality?, *IDEAS Working Paper Series* from RePEc. St. Louis: Federal Reserve Bank of St Louis. doi: 10.1111/roiw.12004.

Agnello, L., Castro, V. and Sousa, R. M. (2013) ‘What determines the duration of a fiscal consolidation program?’, *Journal of International Money and Finance*, 37, pp. 113–134. doi: 10.1016/j.jimonfin.2013.05.012.

Alcidi, C. and Gros, D. (2019) ‘Public debt and the risk premium: A dangerous doom loop’, *CEPS Policy Insight*, No 2019-06 /2 May 2019.

Alesina, A. and Ardagna, S. (1998) ‘Tales of Fiscal Adjustment’, *Economic Policy*, (27), pp. 487–545. doi: 10.1111/1468-0327.00039.

Alesina, A. and Ardagna, S. (2010) ‘Large Changes in fiscal policy: Taxes versus spending’, *Tax Policy and the Economy*, 24, pp. 35–68.

doi: 10.1086/649828/ASSET/IMAGES/LARGE/FG3.JPEG.

Alesina, A. and Ardagna, S. (2013) ‘The Design of Fiscal Adjustments’, *Tax Policy and the Economy*, 27(1), pp. 19–68. doi: 10.1086/671243.

Alesina, A., Ardagna, S., Perotti, R. and Schiantarelli, F. (2002) 'Fiscal Policy, Profits, and Investment', *American Economic Review*, 92(3), pp. 571–589. doi: 10.1257/00028280260136255.

Alesina, A., Favero, C. and Giavazzi, F. (2015) 'The output effect of fiscal consolidation plans', *Journal of International Economics*, 96(S1), pp. S19–S42.

doi: 10.1016/j.jinteco.2014.11.003.

Alesina, A., Favero, C. and Giavazzi, F. (2018) 'What do we know about the effects of Austerity?', *NBER Working Paper Series*, Available at: <http://www.nber.org/papers/w24246>.

Alesina, A., Favero, C. and Giavazzi, F. (2019) 'Austerity: When It Works and When It Doesn't', *Princeton University Press*.

Alexiou, Constantinos; Nellis, J. (2016) 'A Post-Mortem of Austerity: The Greek Experience', *Economic Issues*, Vol. 21, Part 2, 2016, 21(2), p. 3. doi: 10.2307/4344111.

Alvaredo, F. et al. (2016) 'Distributional National Accounts Guidelines: Methods and Concepts Used in WID.world', *WID.world Working Paper Series* No 2016/2, Available at [Alvaredoetal2016WIDworld-2.pdf](#).

Alvaredo, F. et al. (2018) 'World Inequality Report', Available at <https://wir2018.wid.world>

Alvaredo, F. et al. (2021) 'Distributional National Accounts Guidelines: Methods and Concepts Used in the World Inequality Database', *World Inequality Lab*, Available at * (wid.world)

Aiyagari, S. R. and McGrattan, E. R. (1998) 'The optimum quantity of debt', *Journal of Monetary Economics*, 42(3), pp. 447–469. doi: 10.1016/S0304-3932(98)00031-2.

Anselmann, C. and Krämer, H. (2016) 'Does Government Debt Increase Income Inequality? Historical Roots and Basic Criticisms of the "Transfer Approach" of distributional effects', *20th Annual FMM Conference*.

Atkinson A.B (1999) 'Is Rising Inequality Inevitable? A Critique of the Transatlantic Consensus', *WIDER Annual Lectures 3*, UNU-WIDER.

Ball, L.M., Furceri, D., Leigh, D. and Loungani, P. (2013) 'The Distributional Effects of Fiscal Consolidation', *IMF Working Papers*, 13(151), p. 1. doi: 10.5089/9781475551945.001.

Bartak, J., Jabłoński, Ł. and Tomkiewicz, J. (2022) 'Does income inequality explain public debt change in OECD countries?', *International Review of Economics & Finance*, 80, pp. 211–224. doi: 10.1016/J.IREF.2022.02.045.

Bertola, G. and Drazen, A. (1993) 'Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity', *American Economic Review*, 83(9), pp. 11–26. Available at: <http://www.nber.org/papers/w3844>.

Blanchard, O. (2019) 'Public Debt and Low Interest Rates', *American Economic Review*, (109(4):), pp. 1197–1229. Available at: <https://piie.com/publications/>

Blanchard, O. and Leigh, D. (2013) 'Fiscal Consolidation: At What Speed?' *VOX CEPR Policy Portal*. May 03, 2013. Available at <https://voxeu.org/article/fiscal-consolidation-what-speed>

Bova, E., Kinda, T. and Woo, J. (2018) Austerity and inequality: The size and composition of fiscal adjustment matter, 07/02/2018. Available at: <http://crisisobs.gr/2018/02/austerity-inequality-size-composition-fiscal-adjustment-matter/>

Brinca, P., Ferreira, M.H., Franco, F., Holter, H.A. and Malafry, L. (2020) 'Fiscal Consolidation Programs and Income Inequality', *International Economic Review*, 62(1), pp. 405–460. doi: 10.1111/iere.12482.

Bulow, J., Reinhart, C., Rogoff, K. and Trebesch, C. (2020) 'The Debt Pandemic', *IMF Finance and Development*, pp. 12–16.

Caner, M., Grennes, T., Koehler-Geib, F. 2010. "Finding the Tipping Point -- When Sovereign Debt Turns Bad", *World Bank*, Policy Research Working Paper, No. WPS 5391. <https://openknowledge.worldbank.org/handle/10986/3875>

Castro, V. (2018) 'Functional components of public expenditure, fiscal consolidations, and economic activity', *Economics & Politics*, 30(1), pp. 124–150.

doi: <http://dx.doi.org/10.1111/ecpo.12104>

Cecchetti, S.G., Mohanty, M.S. and Zampolli, F. (2011) 'The real effects of debt', *BIS*, Working Papers No 352, September 2011.

Chamon, M. and Ostry, J. D. (2021) 'A Future with High Public Debt: Low-for-Long Is Not Low Forever', Available at: <https://www.imf.org/en/Blogs/Articles/2021/04/20/a-future-with-high-public-debt-low-for-long-is-not-low-forever>

Chancel, L., Piketty, T., Saez, E. and Zucman, G. (2022) 'World Inequality Report 2022', Available at <https://wir2022.wid.world/>

Charles-Coll J.A (2011), Understanding Income Inequality: Concept, Causes and Measurement', *International Journal of Economics and Management Sciences*, Vol. 1, No. 3, pp. 17-28.

Chatterjee, S., Gibson, J., Rioja, F. (2017). ‘Optimal Public Debt Redux’, *Journal of Economic Dynamics and Control* 83 (2017) 162–174.

Ciminelli, G., Ernst, E., Merola, R. and Giuliadori, M. (2019) ‘The Composition Effects of Tax-Based Consolidation on Income Inequality’, *European Journal of Political Economy*, 57, pp. 107–124. doi: 10.1016/j.ejpoleco.2018.08.009.

Clements, B., de Mooij, R., Gupta, S. and Keen, M. (2015) ‘Inequality and Fiscal Policy’, *International Monetary Fund*. September, 2015.

Cobham, A. and Sumner, A. (2013) ‘Is It All About the Tails? The Palma Measure of Income Inequality’, *Center for Global Development*, Working Paper (September), pp. 1–42. Available at: www.cgdev.org<http://www.cgdev.org/>

Collischon, M. and Eberl, A. (2020) ‘Let’s Talk About Fixed Effects: Let’s Talk About All the Good Things and the Bad Things’, *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 72, pp. 289–299. doi: 10.1007/s11577-020-00699-8.

Devries, P., Guajardo, J., Leigh, D. and Pescatori, A. (2011) ‘A New Action-based Dataset of Fiscal Consolidation’, *IMF Staff Papers*.

Available at: <https://www.imf.org/external/pubs/ft/wp/2011/wp11128.pdf>

Dobbs, R., Madgavkar, A., Manyika, J., Woetzel, J., Bughin, J., Labaye, E. and Kashyap, P. (2016) ‘Poorer Than Their Parents? A New Perspective on Income Inequality (Flat or Falling Incomes in Advanced Economies)’, *MGI-Income -Inequality-July-2016*.

Elmendorf, D. W. and Mankiw, N.G. (1998). ‘Government Debt’, *NBER*, Working Paper 6470.

Elson, D. (2013) ‘Austerity Policies Increase Unemployment and Inequality - but don’t reduce budget deficits and government borrowing’, *The Journal of Australian Political Economy*, (71), pp. 130–133.

Epstein, G. (2001) ‘Financialization, Rentier Interests, and Central Bank Policy’, *Department of Economics and Political Economy Research Institute (PERI)*, University of Massachusetts, Amherst.

Furceri, D., Jalles, J.T. and Loungani, P. (2016) ‘Fiscal Consolidation and Inequality in Advanced Economies: How Robust is the Link?’, *Income Inequality and Fiscal Policy* (2nd Edition), *IMF Staff Discussion Notes*, 12(08), p. 1. doi: 10.5089/9781475510850.006.

Furceri, D., Loungani, P., Ostry, J.D. and Pizzuto, P. (2020) ‘Financial Globalization, Fiscal Policies and the Distribution of Income’, *Comparative Economic Studies*, 62(2), pp. 185–199. doi: 10.1057/s41294-020-00113-4.

Furceri, D., Loungani, P., Ostry, J.D. and Pizzuto, P. (2022) ‘Keeping Public Debt Sustainable in an Equitable Way’ *CESifo Forum* 1 / 2022 January Volume 2. Available at: [Keeping Public Debt Sustainable in an Equitable Way \(cesifo.org\)](https://www.cesifo.org/en/papers/working/2022/01/01)

Gaspar, V., Ralyea, J. and Ture, E. (2019) ‘High Debt Hampers Countries’ Response to a Fast-Changing Global Economy’, *IMF Blog*, April 10, 2019.

Ghosh, A.R., Kim, J.I., Mendoza, E.G., Ostry, J. D. and Qureshi, M. S. (2013) ‘Fiscal Fatigue, Fiscal Space and Debt Sustainability in Advanced Economies’, *The Economic Journal*, 123(566), pp. F4–F30. doi: 10.1111/ECOJ.12010.

Giavazzi, F. and Pagano, M. (1990) 'Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries', *National Bureau of Economic Research*, MA 02138(3372), p. 55.

Guajardo, J., Leigh, D. and Pescatori, A. (2011) 'Expansionary Austerity: New International Evidence', *IMF Working Paper*, WP/11/158, July 2011.

Hakura, D. (2020) Back to Basics: What is Debt Sustainability?, *IMF Finance and Development*. Available at: <https://www.imf.org/en/Publications/fandd/issues/2020/09/what-is-debt-sustainability-basics>

Heimberger, P. (2020) 'The dynamic effects of fiscal consolidation episodes on income inequality: evidence for 17 OECD countries over 1978-2013', *Empirica*, 47, pp. 53–81. doi: 10.1007/s10663-018-9404-z.

Herndon, T., Ash, M. and Pollin, R. (2014) 'Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff', *Cambridge Journal of Economics*, 38(2), pp. 257–279. doi: 10.1093/cje/bet075.

Holden, S. and Midthjell, N. (2013) 'Successful Fiscal Adjustments. Does Choice of Fiscal Instrument Matter?', *CESifo Working Papers*, No. 4456 (October), pp. 1–47. doi: 10.2139/ssrn.2345297.

Huber, E., Petrova, B. and Stephens, J. D. (2022) 'Financialization, labor market institutions and inequality', *Review of International Political Economy*, 29(2), pp. 425–452. doi: 10.1080/09692290.2020.1808046.

Huidrom, R., Kose, M.A., Lim, J. J. and Ohnsorge, F. L. (2020) ‘Why do fiscal multipliers depend on fiscal Positions?’, *Journal of Monetary Economics*, 114, pp. 109–125. doi: 10.1016/J.JMONECO.2019.03.004.

International Monetary Fund (2010) ‘Will it Hurt? Macroeconomic Effects of Fiscal Consolidation’, *IMF World Economic Outlook (2010) (October)* 93-124.

International Monetary Fund (2014) ‘Fiscal Policy and Income Inequality’, *Policy Papers*, 14. Doi: 10.5089/9781498343671.007.

International Monetary Fund (2017) ‘Tackling Inequality’, *Fiscal Monitor*, October 2017 .

Jayadev, A. and Konczal, M. (2010) ‘The Boom Not the Slump: The Right Time for Austerity’, *The Roosevelt Institute*, pp. 1–8.

Jordà, Ò. And Taylor, A. M. (2015) ‘The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy’, *Economic Journal*, 126(590), pp. 219–255. Doi: 10.1111/econj.12332.

Kaldor, Y. (2022) ‘Financialization and income inequality: bringing class struggle back in’, *Critical Sociology*, 48(3), pp. 381–396.

Doi: 10.1177/08969205211029359/ASSET/IMAGES/LARGE/10.1177_08969205211029359-FIG3.JPEG.

Klein, M. and Winkler, R. (2019) ‘Austerity, Inequality, and Private Debt Overhang’, *European Journal of Political Economy*, 57, pp. 89–106. doi: 10.1016/j.ejpoleco.2018.08.003.

Koenker, R. and Hallock, K. F. (2001) ‘Quantile Regression’, *Journal of Economic Perspectives*, 15(4), pp. 143–156.

Kose, M.A., Ohnsorge, F., Reinhart, C. and Rogoff, K. (2021) ‘The Aftermath of Debt Surges’. *World Bank*, doi: 10.1146/annurev-economics-051420-015343. September 2021.

Kose, M. A., Ohnsorge, F. and Sugawara, N. (2020) ‘Benefits and Costs of Debt: The Dose Makes the Poison’, *World Bank Policy Research Paper*, 9166 (February), pp. 1–39. Available at: <http://www.worldbank.org/prwp>

Kose, M. A., Nagle, P., Ohnsorge, F. and Sugawara, N. (2021) ‘How has the pandemic made the fourth wave of debt more dangerous?’, *Global Economic Prospects, World Bank*, Box 1.1, 12-18, January 2021.

Kumar, M.S. and Woo, J. (2010) ‘Public Debt and Growth’, *IMF Working Paper*, WP/10/174 July 2010.

Kumhof, M and Rancière, R. (2010) ‘Inequality, Leverage and Crises’, *IMF Working Paper*, WP/10/268. November, 2010.

Machado, J. A. F. and Santos Silva, J. M. C. (2019) ‘Quantiles via moments’, *Journal of Econometrics*, 213(1), pp. 145–173. doi: 10.1016/J.JECONOM.2019.04.009.

McCausland, W. D. and Theodossiou, I. (2016) ‘The consequences of Fiscal Stimulus on Public Debt: A Historical Perspective’, *Cambridge Journal of Economics*, 40(4), pp. 1103–1116. doi: 10.1093/cje/bev059.

Mehrotra, N. R. and Sergeyev, D. (2021) ‘Debt sustainability in a low interest rate world’, *Journal of Monetary Economics*, 124, pp. S1–S18. doi: 10.1016/J.JMONECO.2021.09.001.

Muinelo-Gallo, L. and Roca-Sagalés, O. (2013) ‘Joint determinants of fiscal policy, income inequality and economic growth’, *Economic Modelling*, 30, p. 814. Available at:

<https://search.proquest.com/scholarly-journals/joint-determinants-fiscal-policy-income/docview/1266249138/se-2?accountid=10297>

Mulas-Granados, C. (2005) 'Fiscal Adjustments and the Short-Term Trade-Off between economic growth and equality', *Hacienda Pública Española / Revista de Economía Pública*, 172(1), pp. 61–92.

Okeke, A., Alexiou, C. and Nellis, J. (2021) 'Austerity Effects on National Output and Income Inequality: A Systematic Literature Review', *Review of Economics* 2021; 72(2): 97–148. <https://doi.org/10.1515/roe-2021-0012>.

Ostry, J. D., Ghosh, A. R. and Espinoza, R. (2015) 'When Should Public Debt Be Reduced?', *IMF Staff Discussion Notes*, SDN/15/10 (June 2), pp. 1–26.

Palley, T.I. (2007) 'Financialization: What It Is and Why It Matters', *The Levy Economics Institute and Economics for Democratic and Open Societies*, Working Paper No. 525, December 2007.

Perotti, R. (2011) 'The “Austerity Myth”: Gain Without pain?', *NBER Working Paper*, pp. 1–58. Available at: <http://www.nber.org/data-appendix/w17571>

Paulus, A., Figari, F. and Sutherland, H. (2017) 'The design of fiscal consolidation measures in the European Union: distributional effects and implications for macro-economic recovery', *Oxford Economic Papers*, 69 (December 2016), p. gpw054. doi: 10.1093/oep/gpw054.

Pesaran, M. Hashem and Smith, Ron. (1995) 'Estimating long-run relationships from dynamic heterogeneous panels', *Journal of Econometrics*, Volume 68, Issue 1, Pages 79-113.

Pesaran, M.H., Shin, Y., Smith R.P. (1999) 'Pooled mean Group Estimation of Dynamic

heterogenous Panels’. *Journal of the American Statistical Association*, 94:446, 621-634, DOI: 10.1080/01621459.1999.10474156.

Rawdanowicz, Ł., Turban, S., Haas, J., Crowe, D. and Millot, V. (2021), "Constraints and demands on public finances: Considerations of resilient fiscal policy", *OECD Economics Department Working Papers*, No. 1694, OECD Publishing, Paris, <https://doi.org/10.1787/602500be-en>.

Reinhart, C. M. and Rogoff, K. S. (2010) ‘Growth in a Time of Debt’, *American Economic Review: Papers & Proceedings*, 100, pp. 573–578. doi: 10.1257/aer.100.2.573.

Seo, M. H. and Shin, Y. (2016) ‘Dynamic panels with threshold effect and endogeneity’, *Journal of Econometrics*, 195(2), pp. 169–186. doi: 10.1016/J.JECONOM.2016.03.005.

Seo, M. H., Kim, S. and Kim, Y. J. (2019) ‘Estimation of dynamic panel threshold model using Stata’, *Stata Journal*, 19(3), pp. 685–697. doi: 10.1177/1536867X19874243.

Sutherland, A. (1997) ‘Fiscal crises and aggregate demand: can high public debt reverse the effects of fiscal policy?’, *Journal of Public Economics*, 65(2), pp. 147–162. doi: 10.1016/S0047-2727(97)00027-3.

Taylor, L., Proano, C.R., de Carvalho, L. and Barbosa, N. (2012) ‘Fiscal Deficits, Economic Growth and Government Debt in the USA’, *Cambridge Journal of Economics*, 36(1), pp. 189–204. doi: 10.1093/cje/ber041.

Tomaskovic-Devey, D. and Lin, K.H. (2013) ‘Financialization: Causes, Inequality Consequences, and Policy Implications’, *North Carolina Banking Institute* 18, 2013. Available at: <http://scholarship.law.unc.edu/ncbi/vol18/iss1/17>

van Treeck, T. and Sturn, S. (2012) 'Income inequality as a cause of the Great Recession? A survey of current debates', *ILO Working Papers*, 470934(39).

Wang, Q. (2015) 'Fixed-effect panel threshold model using Stata', *The Stata Journal*, 15(1), pp. 121–134.

Woo, J., Bova, E., Kinda, T. and Zhang, Y.S. (2013) 'Distributional Consequences of Fiscal Consolidation and the Role of Fiscal Policy: What Do the Data Say?', *IMF Working Paper Fiscal Affairs Department*, WP/13/195.

Wood, J. D. G. (2020) 'Can household debt influence income inequality? Evidence from Britain: 1966–2016', *British Journal of Politics and International Relations*, 22(1), pp. 24–46. doi: 10.1177/1369148119888830/ASSET/IMAGES/LARGE/10.1177_1369148119888830-FIG2.JPEG.

Yared, P. (2019) 'Rising Government Debt: Causes and Solutions for a Decades-Old Trend', *Journal of Economic Perspectives*, 33(No. 2 Spring 2019), pp. 115–140. doi: 10.1257/jep.33.2.115.

Appendix A

Table 1A. Definition of variables

Variables	Definition	Source
GINI	The Gini coefficient measures the distribution of income in a population. It ranges between 0 and 1; where 0 denotes perfect equality and 1 perfect inequality	OECD
LABOUR SHARE	It is that part of national income which is allocated for labour compensation.	OECD
TOP1	This refers to the share of all income received by the 1% with the highest income in the population.	https://wid.world
TOP10	This refers to the share of all income received by the 10% with the highest income in the population.	https://wid.world
BOTTOM40	This is the share of all income received by the bottom 40% in the income distribution ladder i.e. the 40% with the lowest income in the population (wid.world). It is measured in percentages.	https://wid.world
BOTTOM50	This is the share of all income received by the bottom 50% in the income distribution ladder i.e. the 50% with the lowest income in the population (wid.world). It is measured in percentages.	https://wid.world
PALMA RATIO	The Palma ratio is the share of all income received by the 10% people with highest disposable income divided by the share of all income received by the 40% people with the lowest disposable income. In other words, the Palma ratio indicator measures the income share of the top decile relative to the bottom 40.	OECD
TOP10BOT50	This is the ratio of the top decile to the bottom 50 in the income distribution i.e. the income share of the richest 10% in the population divided by the income share of the poorest 50%.	https://wid.world
INFLATION	This refers to the inflation rate and is the annual percentage change in the cost of living and is measured by the consumer price index. In other words, it measures the changes in price level (activity in goods and services); an increase in inflation rate therefore corresponds to a decrease in purchasing power.	oecd.org ; un.org ; imf.org
UNEMPLOYMENT	The annual unemployment rate measures the numbers of unemployed people as a percentage of the labour force.	OECD
TRADE	Trade refers to trade openness and captures the sum of total exports and imports as a percentage of GDP.	oecd.org ; worldbank.org ; imf.org
GDPG	This refers to the gross domestic product growth rate and it measures the total annual income earned from productive capacities (i.e. economic activities) less imports.	OECD
ADJUSTMENT SIZE	This is the budgetary impact of the fiscal adjustments scaled relative to GDP i.e. the fiscal adjustment size measured as a percentage of GDP.	Devries et al. (2011); Alesina et al. (2015)
PUBLIC DEBT	Public Debt to GDP ratio is also referred to as the general government debt-to-GDP ratio. It measures the gross debt of the general government as a percentage of GDP. It is a key indicator for the sustainability of government finance	OECD

Table 2A. Descriptive Statistics

Regressor	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
ADJUSTMENT SIZE	0.56811	9.74799	-0.30894	1.183494	3.184176	17.13238	6407.468	640
DEBT	67.90231	236.139	-75.514	42.35493	1.101308	5.71181	325.4781	640

Control Variable	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
INFLATION	3.449047	28.38	-4.48	3.77455	2.518252	11.26419	2497.685	640
UNEMPLOYMENT	8.042225	26.09	1.46	3.999918	1.446809	5.908611	448.8812	
GDPG	2.284429	25.17625	-8.074447	2.414256	1.008569	16.84338	5218.88	640
STOCK	53.95619	396.8041	-29.60648	67.7945	2.193747	8.500371	1320.112	640

Other Variables	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
LONG-TERM INTEREST RATE	6.255156	38.5	-12	5.244525	1.633141	9.678282	1473.815	640
PRIVATE DEBT - HOUSEHOLD	53.79313	137.9	-100.4	30.38745	0.704788	6.843001	446.8151	640
PRIVATE DEBT - NON FIN SECTOR	142.3692	323	53.9	48.4377	0.779658	3.757285	80.13193	640

Inequality Indicator	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
GINI	0.390219	0.56	0.26	0.069098	0.537177	2.37605	41.16138	640
LABOUR SHARE	75.35078	97.65	50.83	6.022229	0.081555	5.571468	177.0414	640
TOP1	0.090494	0.1933	0.0324	0.029767	1.005719	4.204382	146.5711	640
TOP10	0.303382	0.4602	0.2076	0.05696	1.06214	3.492731	126.8093	640
BOT40	0.169187	0.2565	0.0942	0.038272	0.371086	2.079714	37.27322	640
BOT50	0.240187	0.3355	0.1282	0.049734	0.474759	2.074806	46.86846	640
PALMA	1.289247	4.04	-1.56	0.753712	0.240025	5.254444	124.4119	562
TOP10BOT50	6.901562	18	3	3.121634	1.445763	4.447721	278.8484	640
TOTAL INCOME SHARE (log)	25.03614	28.71069	21.31436	1.413233	0.341999	2.604245	16.65271	640
								640

Public Debt Ratio	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
LARGE-VLGE-EXT LGE COUNTRIES	95.70406	236.139	23.193	42.88008	1.201569	4.694362	100.8692	280
SMALL MED DEBT COUNTRIES	46.27872	108.8	-75.514	26.31389	0.305076	5.165353	75.91556	360

Table 2B: Fiscal Adjustment Episodes (1980 – 2014)

Alesina et al. (2015)

16 OECD COUNTRIES		1980 – 2014
Countries		Fiscal Adjustment Episodes
Australia		1985-88; 1994-99
Austria		1980-81; 84; 1996-97; 2001-02;2011-14
Belgium		1982-87;1990; 1992-94;1996-97;2010-14
Canada		1983-97;2010-14
Denmark		1982-85;1994-95;2009-13
Finland		1992-97;2010-14
France		1987-89;1991-92;1995-00;2010-14
Germany		1982-84;1991-95;1997-00;2003-07;2011-13
Ireland		1982-88;2008-14
Italy		1991-98;2004-07;2010-14
Japan		1980-83;1997-98;2003-07
Portugal		1983;2000;2002;2005-07;2010-14
Spain		1983-84;1989-90;1992-97;2009-14
Sweden		1984;1993-98
United Kingdom		1980-82;1993-99;2010-14
United States		1980-81;1985-88;1990-98;2011-13

Source: Alesina et al. (2015) dataset available at www.igier.unibocconi.it/fiscalplans

Appendix B – Diagnostic Tests

B.1 Heteroskedasticity Test

Source	SS	df	MS
Model	2.882130	7	0.411733
Residual	0.087734	616	0.000142
Total	2.969864	623	0.004767

Number of obs = 624
F(7, 616) = 2890.88
Prob > F = 0
R-squared = 0.9705
Adj R-squared = 0.9701
Root MSE = 0.01193

Gini	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
GiniLag1	0.986588	0.007142	138.13	0	0.9725611 1.000614
Debt	-0.000032	0.000120	-0.26	0.792	-0.0002674 0.000204
Adjustment Size	-0.000232	0.000444	-0.52	0.602	-0.0011038 0.0006404
Inflation	0.000019	0.000141	0.13	0.893	-0.0002585 0.0002965
Unemployment	0.000089	0.000126	0.71	0.479	-0.0001581 0.0003367
GDPG	0.000382	0.000243	1.57	0.117	-0.0000953 0.000859
Stock	0.000024	0.000025	0.96	0.337	-0.0000249 0.0000724
C	0.004957	0.003137	1.58	0.115	-0.0012039 0.0111172

White's test for Ho: homoskedasticity			
Ha: unrestricted heteroskedasticity			
Source	chi2	df	p
Heteroskedasticity	41.32	35	0.214
Skewness	5.06	7	0.6529
Kurtosis	2.03	1	0.1542
Total	48.4	43	0.2639

Variable	VIF	1/VIF
Debt	1.63	0.613094
GDPG	1.52	0.657799
Adjustment Size	1.23	0.810957
Unemployment	1.12	0.892105
GiniLag1	1.06	0.941786
Inflation	1.04	0.957676
Stock	1.04	0.965985
Mean VIF	1.24	

Table 2C. Public Debt to GDP Ratio Categories

DEBT CATEGORY					
Debt Size	0-30%	30-60%	60-90%	90-120%	≥ 120%
Category	Small	Medium	Large	Very Large	Extremely Large

Debt Range, Frequency & Category (1980 -2019)												
Country	0-30% (Small)		30-60% (Medium)		60-90% (Large)		90-120% (Very Large)		120% & Above (Extremely Large)		DebtCategory	Ave Debt Ratio % GDP
	Year Range	Debt Ratio Range % & Frequency	Year Range	Debt Ratio Range % & Frequency	Year Range	Debt Ratio Range % & Frequency	Year Range	Debt Ratio Range % & Frequency	Year Range	Debt Ratio Range % & Frequency		
Australia	80-92; 96-12	9.68 - 29.36; 30x	93-95; 13-19	30.49 - 46.80; 10x	-	-	-	-	-	-	SmallDebtRatio	23.47
Austria	-	-	86-92	55.93 - 59.43; 7x	80-85; 93-19	60.46 - 84.40; 33x	-	-	-	-	LargeDebtRatio	67.72
Belgium	-	-	-	-	80-81; 07	76.80 - 89.69; 3x	82-85; 98-06; 08-19	91.49 - 119.388; 25x	86-97	124.271 - 138.926; 12x	VLargeDebtRatio	110.82
Canada	-	-	80-83	44.59 - 57.21; 4x	84-92; 99-14; 17-19	60.21 - 88.97; 28x	93-98; 15-16	91.22 - 100.24; 8x	-	-	LargeDebtRatio	78.26
Denmark	80-88; 07	-75.51 - 27.35; 10x	89-91; 99-06; 08-19	31.20 - 56.76; 23x	92-98	60.28 - 78.63; 7x	-	-	-	-	MediumDebtRatio	30.76
Finland	80-91	10.89 - 21.89; 12x	92-14; 18-19	32.56 - 59.83; 25x	15-17	61.17 - 63.64; 3x	-	-	-	-	MediumDebtRatio	38.83
France	80-84	20.83 - 29.09; 5x	85-96; 00-01	30.70 - 59.99; 14x	97-99; 02-11	60.26 - 87.84; 13x	44914.00	90.60 - 98.13; 8x	-	-	MediumDebtRatio	59.77
Germany	80-87	11.83 - 29.11; 8x	85-98; 00-02; 19	31.58 - 59.95; 15x	99; 03-18	60.39 - 82.00; 17x	-	-	-	-	MediumDebtRatio	52.39
Ireland	44627.00	27.65 - 29.82; 5x	98-02; 08; 19	30.87 - 57.22; 7x	94-97; 09-10; 15-18	61.58 - 87.21; 10x	91-93; 11-12; 14	95.90 - 119.67; 6x	80-90; 13	120.04 - 208.86; 12x	VLargeDebtRatio	93.62
Italy	-	-	-	-	80-86	73.89 89.86; 7x	87-92; 95-11	92.53 - 119.69; 23x	93-94; 12-19	123.417 - 135.37; 10x	VLargeDebtRatio	109.85
Japan	-	-	80-82	47.84 - 57.78; 3x	83-94	63.62 - 84.36; 12x	95-98	92.53 - 116.02; 4x	99-19	129.50 - 236.14; 21x	ELargeDebtRatio	136.82
Portugal	80-81	23.19 - 26.90; 2x	82-89; 92-93; 97-01	30.60 - 58.72; 15x	90-91; 94-96; 02-09	60.04 - 87.80; 13x	10-11; 19	100.21 - 116.61; 3x	44913.00	121.48 - 132.94; 7x	LargeDebtRatio	72.83
Spain	80-82	16.58 - 25.14; 3x	83-94; 00-09	30.38 - 58.68; 22x	95-99; 10-12	63.38 - 86.31; 8x	13-19	95.54 - 100.70; 7x	-	-	MediumDebtRatio	56.94
Sweden	-	-	80-90; 00-19	34.00 - 58.39; 31x	91-99	60.07 - 68.68; 9x	-	-	-	-	MediumDebtRatio	48.83
United Kingdom	90-91	28.44 - 28.52; 2x	80-89; 92-08	42.59 - 49.03; 27x	44823.00	62.84 - 86.02; 11x	-	-	-	-	MediumDebtRatio	50.68
United States	80-91	2.91 - 29.23; 12x	92-03	31.62 - 58.63; 12x	44660.00	64.22 - 84.64; 6x	44853.00	95.20 - 108.80; 10x	-	-	MediumDebtRatio	54.83

Year Range: for e.g. 80-92 = 1980 to 1992; **Debt Ratio Range:** for e.g. 9.68 - 29.36 = debt ratio range for 1980 to 1992 and 1996 to 2012. Debt for the period ranged between 9.68% and 29.36%;

Frequency: for e.g. 30x = the number of years debt ratio fell within the identified range. In other words, out of 40 years, Australia had low debt ratios for a total of 30 years

Table 2D. Long-term Interest Rates Category

Country	Long-Term Interest Rate, Frequency & Category											
	0-3.99% (Low)		4.000 - 7.999% (Medium)		8.000-11.999% (High)		12.000-15.999% (Very High)		16% & Above (Extremely High)			
	Year Range	LTerm Int Rate Range % & Frequency	Year Range	LTerm Int Rate Range % & Frequency	Year Range	LTerm Int Rate Range % & Frequency	Year Range	LTerm Int Rate Range % & Frequency	Year Range	LTerm Int Rate Range % & Frequency	Long-Term IntRate Category	Ave LongTerm IntRate
Australia	44914.00	1.50 - 3.70; 8x	93; 97-11	4.90 - 7.30; 16x	80; 91-92; 94-96	8.20 - 11.60; 6x	81-90	12.10 - 15.40; 10x	-	-	Medium	7.73
Austria	05-06; 09-19	0.10 - 3.90; 13x	93-04; 07-08	4.10 - 7.10; 14x	80-92	8.10 - 10.70; 13x	-	-	-	-	Medium	5.60
Belgium	05-06; 09-10; 12-19	0.20 - 3.90; 12x	93-04; 07-08; 11	4.20 - 7.80; 15x	80;83;85-92	8.00 - 11.90; 10x	81-82;84	12.20 - 13.40; 3x	-	-	Medium	6.03
Canada	08-19	1.30 - 3.60; 13x	93; 96-07	4.10 - 7.20; 13x	83;85-92; 94-95	8.10 - 11.40; 11x	80-82; 84	12.30 - 15.00; 4x	-	-	Medium	6.44
Denmark	05-06; 09-19	-0.20 - 3.80; 13x	93-94; 96-04; 07-08	4.30 - 7.80; 13x	87-92; 95	8.30 - 11.30; 7x	84-86	12.70 - 15.50; 3x	80-83	16.90 - 21.10; 4x	Medium	7.01
Finland	80-83; 05-06; 09-19	-1.40 - 3.80; 17x	84-86; 96-04; 07-08	4.10 - 7.60; 14x	87-88; 91; 93-95	8.80 - 11.70; 6x	89-90; 92	12.00 - 13.20; 3x	-	-	Medium	4.91
France	05-06; 09-19	0.10 - 3.80; 13x	93-04; 07-08	4.10 - 7.50; 14x	85-92	8.60 - 11.90; 8x	80; 83-84	13.40 - 14.40; 3x	81-82	16.00 - 16.30; 2x	Medium	6.27
Germany	05-06; 09-19	-0.30 - 3.80; 13x	85-89; 92-04; 07-08	4.00 - 7.80; 20x	80-84; 90-91	8.00 - 10.10; 7x	-	-	-	-	Medium	4.87
Ireland	05-06; 13-19	0.30 - 3.80; 9x	93-94; 96-04; 07-10; 12	4.10 - 7.90; 16x	86-92; 95; 11	8.30 - 11.40; 9x	80; 83-85	13.00 - 15.60; 4x	81-82	17.30 - 17.50; 2x	Medium	7.17
Italy	05; 14-19	1.50 - 3.60; 7x	97-04; 06-13	4.00 - 6.90; 16x	93-94; 96	9.40 - 11.20; 3x	91-92; 95	12.20 - 15.40; 3x	80-90	17.50 - 38.50; 11x	High	11.85
Japan	80-88; 95-19	-12.00 - 4.40; 34x	89-94	4.30 - 7.00; 6x	-	-	-	-	-	-	Low	0.60
Portugal	80-87;05-06;14-19	-3.50 - 3.90; 16x	88-91;97-04;07-10;13	4.10 - 7.50; 17x	92-96;11-12	8.50 - 11.50; 7x	-	-	-	-	Medium	4.52
Spain	05-06;14-19	0.70 - 3.80; 8x	97-04;07-13	4.00 - 6.40; 15x	86;88;92-96	8.70 - 11.70; 7x	81;85;87;89-01	12.40 - 15.80; 6x	80; 82-84	16.00- 16.90; 4x	Medium	7.81
Sweden	05-06;08-19	0.00 - 3.90; 14x	97-04;07	4.20 - 6.60; 9x	87-89;91-96	8.00 - 11.70; 9x	80-86;90	12.00 - 13.80; 8x	-	-	Medium	6.70
United Kingdom	44823.00	0.90 - 3.60; 11x	93;96-08	4.40 - 7.80; 14x	83-92;94-95	8.10 - 11.80; 12x	80-82	12.00 - 13.80; 3x	-	-	Medium	6.56
United States	44792.00	1.80 - 3.70; 12x	86;91-07	4.00 - 7.90; 18x	80;83;85;87-90	8.40 - 11.50; 7x	81-82;84	12.40 - 13.90; 3x	-	-	Medium	6.03

Year Range: for e.g. 12-19 = 2012 to 2019; **Long-term Int Range:** for e.g. 1.50 to 3.70 = long-term interest range for 2012 to 2019. Long-term interest for the period ranged between 1.50% and 3.70%; **Frequency:** for e.g. 8x = the number of years long-term interest fell within the identified range. In other words, out of 40 years, Australia had low long-term interest rates for a total of 8 years.

B.2 Correlation Test

	Gini	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	Unemployment	GDPG	Stock
Gini	1								
Debt	0.0991	1							
Adjustment Size	-0.0583	0.307	1						
Inflation	-0.1523	0.0341	-0.0302	1					
Interest Rate	-0.2484	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	-0.2769	0.091	0.0864	0.5457	0.7871	1			
Unemployment	-0.0713	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	0.0233	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	-0.0274	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

	Labour Income Share	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	Unemployment	GDPG	Stock
Labour Income Share	1								
Debt	0.1352	1							
Adjustment Size	-0.1304	0.307	1						
Inflation	0.1205	0.0341	-0.0302	1					
Interest Rate	0.0645	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	-0.0614	0.091	0.0864	0.5457	0.7871	1			
Unemployment	-0.1638	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	-0.3011	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	-0.0606	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

	TOP1	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	Unemployment	GDPG	Stock
TOP1	1								
Debt	-0.0802	1							
Adjustment Size	0.0381	0.307	1						
Inflation	-0.0426	0.0341	-0.0302	1					
Interest Rate	-0.0079	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	0.0095	0.091	0.0864	0.5457	0.7871	1			
Unemployment	0.0648	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	0.2256	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	0.084	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

B.2.1 Correlation Test contd.

	TOP10	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	UnempIoyment	GDPG	Stock
TOP10	1								
Debt	-0.0876	1							
Adjustment Size	0.0011	0.307	1						
Inflation	-0.017	0.0341	-0.0302	1					
Interest Rate	0.0083	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	0.0021	0.091	0.0864	0.5457	0.7871	1			
Unemployment	0.0372	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	0.1776	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	0.0999	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

	BOT40	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	UnempIoyment	GDPG	Stock
BOT40	1								
Debt	-0.1028	1							
Adjustment Size	0.0494	0.307	1						
Inflation	0.0809	0.0341	-0.0302	1					
Interest Rate	0.1506	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	0.188	0.091	0.0864	0.5457	0.7871	1			
Unemployment	0.0271	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	-0.0224	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	0.0242	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

	BOT50	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	UnempIoyment	GDPG	Stock
BOT50	1								
Debt	0.0637	1							
Adjustment Size	0.0417	0.307	1						
Inflation	-0.0443	0.0341	-0.0302	1					
Interest Rate	-0.0395	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	-0.0298	0.091	0.0864	0.5457	0.7871	1			
Unemployment	-0.0203	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	-0.0687	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	-0.0511	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

B.2.2 Correlation Test contd.

	Palma Ratio	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	Unemployment	GDPG	Stock
Palma Ratio	1								
Debt	-0.0588	1							
Adjustment Size	-0.0003	0.3357	1						
Inflation	-0.0225	0.0605	-0.0579	1					
Interest Rate	-0.0065	0.0829	-0.0847	0.8062	1				
LongTerm Int.Rate	-0.0306	0.1385	0.062	0.5363	0.7755	1			
Unemployment	0.19	0.1187	0.3005	0.0182	0.1049	0.2011	1		
GDPG	0.0349	-0.5774	-0.2269	-0.0312	0.0635	0.0166	-0.0576	1	
Stock	0.041	-0.1326	-0.032	-0.0781	-0.0685	-0.0783	0.0238	0.1332	1

	TOP10BOT50	Debt	Adjustment Size	Inflation	Interest Rate	LongTerm Int.Rate	Unemployment	GDPG	Stock
TOP10BOT50	1								
Debt	0.11	1							
Adjustment Size	-0.0753	0.307	1						
Inflation	-0.1663	0.0341	-0.0302	1					
Interest Rate	-0.2523	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	-0.2471	0.091	0.0864	0.5457	0.7871	1			
Unemployment	-0.1749	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	0.0355	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	-0.0233	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

	Income Share	Debt	Adjustment Size	Inflation	Interest Rate	Long-term Int.Rate	Unemployment	GDPG	Stock
Income Share	1								
Debt	-0.2051	1							
Adjustment Size	-0.0511	0.307	1						
Inflation	0.2801	0.0341	-0.0302	1					
Interest Rate	0.276	0.0551	-0.0446	0.8052	1				
LongTerm Int.Rate	0.1506	0.091	0.0864	0.5457	0.7871	1			
Unemployment	0.1218	0.0725	0.3114	0.0728	0.1851	0.2719	1		
GDPG	0.2921	-0.5749	-0.2155	-0.0134	0.0689	0.0221	-0.0473	1	
Stock	-0.0055	-0.1393	-0.0268	-0.073	-0.0568	-0.0718	0.0276	0.1464	1

B.3 Unit Root Test

Panel unit root test: Summary					Panel unit root test: Summary				
Series: GINI					Series: D(LABOUR INCOME SHARE)				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.51736	0.0646	16	608	Levin, Lin & Chu t*	-6.29714	0.0000	16	592
Breitung t-stat	-2.07013	0.0192	16	592	Breitung t-stat	-3.6233	0.0001	16	576
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.12975	0.0166	16	608	Im, Pesaran and Shin W-stat	-9.22653	0.0000	16	592
ADF - Fisher Chi-square	50.1213	0.0217	16	608	ADF - Fisher Chi-square	145.879	0.0000	16	592
PP - Fisher Chi-square	82.1281	0.0000	16	624	PP - Fisher Chi-square	535.936	0.0000	16	608
Panel unit root test: Summary					Panel unit root test: Summary				
Series: D(TOP1)					Series: D(DTOP10)				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.8655	0.0000	16	592	Levin, Lin & Chu t*	-15.5822	0.0000	16	576
Breitung t-stat	-13.0478	0.0000	16	576	Breitung t-stat	-15.0518	0.0000	16	560
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.1571	0.0000	16	592	Im, Pesaran and Shin W-stat	-27.8668	0.0000	16	576
ADF - Fisher Chi-square	244.894	0.0000	16	592	ADF - Fisher Chi-square	566.703	0.0000	16	576
PP - Fisher Chi-square	1021.23	0.0000	16	608	PP - Fisher Chi-square	3573.96	0.0000	16	592

B.3.1 Unit Root Tests contd.

Panel unit root test: Summary					Panel unit root test: Summary				
Series: BOTTOM 40					Series: D(BOTTOM 50)				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	- 2.96427	0.0015	16	608	Levin, Lin & Chu t*	-11.1698	0.0000	16	592
Breitung t-stat	- 1.69336	0.0452	16	592	Breitung t-stat	-11.7174	0.0000	16	576
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	- 2.84993	0.0022	16	608	Im, Pesaran and Shin W-stat	-15.1784	0.0000	16	592
ADF - Fisher Chi-square	61.3837	0.0013	16	608	ADF - Fisher Chi-square	258.18	0.0000	16	592
PP - Fisher Chi-square	128.087	0.0000	16	624	PP - Fisher Chi-square	592.76	0.0000	16	608
Panel unit root test: Summary					Panel unit root test: Summary				
Series: D(PALMA RATIO)					Series: TOP10BOTTOM50				
Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	- 2.42184	0.0077	14	518	Levin, Lin & Chu t*	-2.04611	0.0204	16	608
					Breitung t-stat	-3.28565	0.0005	16	592
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	- 5.08139	0.0000	14	518	Im, Pesaran and Shin W-stat	-2.24899	0.0123	16	608
ADF - Fisher Chi-square	93.4705	0.0000	14	518	ADF - Fisher Chi-square	50.4356	0.0202	16	608
PP - Fisher Chi-square	255.6	0.0000	14	532	PP - Fisher Chi-square	95.7041	0.0000	16	624

B.3.2 Unit Root Tests contd.

Panel unit root test: Summary					Panel unit root test: Summary					Panel unit root test: Summary				
Series: ADJUSTMENT SIZE					Series: SPEND					Series: TAX				
Sample: 1980 2019					Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects					Exogenous variables: Individual effects					Exogenous variables: Individual effects				
User-specified lags: 0					User-specified lags: 0					User-specified lags: 0				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.91786	0.0000	16	624	Levin, Lin & Chu t*	-	0.0000	16	624	Levin, Lin & Chu t*	-9.40773	0.0000	16	624
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.15556	0.0000	16	624	Im, Pesaran and Shin W-stat	-	0.0000	16	624	Im, Pesaran and Shin W-stat	-8.76852	0.0000	16	624
ADF - Fisher Chi-square	95.9347	0.0000	16	624	ADF - Fisher Chi-square	113.802	0.0000	16	624	ADF - Fisher Chi-square	140.181	0.0000	16	624
PP - Fisher Chi-square	95.6336	0.0000	16	624	PP - Fisher Chi-square	111.951	0.0000	16	624	PP - Fisher Chi-square	137.661	0.0000	16	624
Panel unit root test: Summary					Panel unit root test: Summary					Panel unit root test: Summary				
Series: INFLATION					Series: UNEMPLOYMENT					Series: GDPGROWTH				
Sample: 1980 2019					Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.49019	0.0000	16	608	Levin, Lin & Chu t*	-	0.0094	16	608	Levin, Lin & Chu t*	-9.75486	0.0000	16	608
Breitung t-stat	-0.50784	0.3058	16	592		2.35007				Breitung t-stat	-9.655	0.0000	16	592
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-8.24649	0.0000	16	608	Im, Pesaran and Shin W-stat	-				Im, Pesaran and Shin W-stat	-9.41811	0.0000	16	608
ADF - Fisher Chi-square	127.741	0.0000	16	608	ADF - Fisher Chi-square	61.0894	0.0015	16	608	ADF - Fisher Chi-square	143.856	0.0000	16	608
PP - Fisher Chi-square	149.723	0.0000	16	624	PP - Fisher Chi-square	36.4819	0.2681	16	624	PP - Fisher Chi-square	168.857	0.0000	16	624

B.3.3 Unit Root Tests contd.

Panel unit root test: Summary					Panel unit root test: Summary					Panel unit root test: Summary				
Series: D(STOCK)					Series: INT-RATE					Series: LONGTERM-INT				
Sample: 1980 2019					Sample: 1980 2019					Sample: 1980 2019				
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends				
User-specified lags: 1					User-specified lags: 1					User-specified lags: 1				
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel				
Balanced observations for each test					Balanced observations for each test					Balanced observations for each test				
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	12.4318	0.0000	16	592	Levin, Lin & Chu t*	5.21482	0.0000	16	608	Levin, Lin & Chu t*	-4.65959	0.0000	16	608
Breitung t-stat	9.54825	0.0000	16	576	Breitung t-stat	2.43228	0.0075	16	592	Breitung t-stat	0.2557	0.6009	16	592
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.708	0.0000	16	592	Im, Pesaran and Shin W-stat	-5.8403	0.0000	16	608	Im, Pesaran and Shin W-stat	-4.37577	0.0000	16	608
ADF - Fisher Chi-square	185.298	0.0000	16	592	ADF - Fisher Chi-square	93.0355	0.0000	16	608	ADF - Fisher Chi-square	70.9693	0.0001	16	608
PP - Fisher Chi-square	328.12	0.0000	16	608	PP - Fisher Chi-square	42.3424	0.1045	16	624	PP - Fisher Chi-square	90.7013	0.0000	16	624
Panel unit root test: Summary					Panel unit root test: Summary									
Series: D(NON-FINANCIAL SECTOR CREDIT)					Series: D(HOUSEHOLD CREDIT)									
Sample: 1980 2019					Sample: 1980 2019									
Exogenous variables: Individual effects, individual linear trends					Exogenous variables: Individual effects, individual linear trends									
User-specified lags: 1					User-specified lags: 1									
Newey-West automatic bandwidth selection and Bartlett kernel					Newey-West automatic bandwidth selection and Bartlett kernel									
Balanced observations for each test					Balanced observations for each test									
Method	Statistic	Prob.**	Cross-sections	Obs	Method	Statistic	Prob.**	Cross-sections	Obs					
Null: Unit root (assumes common unit root process)					Null: Unit root (assumes common unit root process)									
Levin, Lin & Chu t*	-0.4669	0.3203	16	592	Levin, Lin & Chu t*	0.18465	0.5732	16	592					
Breitung t-stat	4.71286	0	16	576	Breitung t-stat	3.69525	0.0001	16	576					
Null: Unit root (assumes individual unit root process)					Null: Unit root (assumes individual unit root process)									
Im, Pesaran and Shin W-stat	3.94296	0.0000	16	592	Im, Pesaran and Shin W-stat	2.04864	0.0202	16	592					
ADF - Fisher Chi-square	70.6631	0.0001	16	592	ADF - Fisher Chi-square	49.3188	0.0259	16	592					
PP - Fisher Chi-square	118.662	0.0000	16	608	PP - Fisher Chi-square	84.1535	0.0000	16	608					

B.4 Cross Section Dependency Test

Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals			
Equation: GINI				Equation: D(TOP1)				Equation: D(TOP10)			
Periods included: 39				Periods included: 38				Periods included: 38			
Cross-sections included: 16				Cross-sections included: 16				Cross-sections included: 16			
Total panel observations: 624				Total panel observations: 608				Total panel observations: 608			
Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	136.2313	120	0.1477	Breusch-Pagan LM	7.699391	120	1.0000	Breusch-Pagan LM	6.258771	120	1.0000
Pesaran scaled LM	1.047724		0.2948	Pesaran scaled LM	-7.248973		0.0000	Pesaran scaled LM	-7.341965		0.0000
Pesaran CD	0.796537		0.4257	Pesaran CD	0.213058		0.8313	Pesaran CD	-0.194458		0.8458
Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in residuals				Null hypothesis: No cross-section dependence (correlation) in residuals			
Equation: D(LABOUR INCOME SHARE)				Equation: BOTTOM40				Equation: D(BOTTOM50)			
Periods included: 38				Periods included: 39				Periods included: 38			
Cross-sections included: 16				Cross-sections included: 16				Cross-sections included: 16			
Total panel observations: 608				Total panel observations: 624				Total panel observations: 608			
Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	10.98396	120	1.0000	Breusch-Pagan LM	127.636	120	0.2996	Breusch-Pagan LM	119.8198	120	0.4875
Pesaran scaled LM	-7.036955		0.0000	Pesaran scaled LM	0.492901		0.6221	Pesaran scaled LM	-0.011634		0.9907
Pesaran CD	0.071913		0.9427	Pesaran CD	-0.703798		0.4816	Pesaran CD	-0.115176		0.9083
Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test				Residual Cross-Section Dependence Test			
Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals				Null hypothesis: No cross-section dependence (correlation) in weighted residuals			
Equation: D(PALMA RATIO)				Equation: TOP10BOTTOM50				Equation: TOP10BOTTOM50			
Periods included: 38				Periods included: 39				Periods included: 39			
Cross-sections included: 14				Cross-sections included: 16				Cross-sections included: 16			
Total panel observations: 532				Total panel observations: 624				Total panel observations: 624			
Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data				Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations				Cross-section means were removed during computation of correlations			
Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.	Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	29.06131	91	1.0000	Breusch-Pagan LM	2.298522	120	1.0000	Breusch-Pagan LM	2.298522	120	1.0000
Pesaran scaled LM	-4.591201		0.0000	Pesaran scaled LM	-7.597598		0.0000	Pesaran scaled LM	-7.597598		0.0000
Pesaran CD	0.352427		0.7245	Pesaran CD	-0.272466		0.7853	Pesaran CD	-0.272466		0.7853

Year Range: for e.g. 12-19 = 2012 to 2019; **Long-term Int Range:** for e.g. 1.50 to 3.70 = long-term interest range for 2012 to 2019. Long-term interest for the period ranged between 1.50% and 3.70%; **Frequency:** for e.g. 8x = the number of years long-term interest fell within the identified range. In other words, out of 40 years, Australia had low long-term interest rates for a total of 8 years.

Appendix C Full Country estimation results

C.1 Model 1. Threshold Panel Regression

xthenreg Gini DebtIntp DebtAdjSize GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045					xthenreg Gini DebtIntp DebtEpidum DebtTax GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045				
Gini	Coef.	Std. Err.	z	P>z	Gini	Coef.	Std. Err.	z	P>z
GiniLag(1)	-0.5286	0.5764	-0.92	0.3590	GiniLag(1)	-1.2220	2.5755	-0.47	0.6350
Debt	0.0012	0.0020	0.6	0.5460	DebtEpidum	-0.0020	0.0008	-2.57	0.0100
DebtAdj	-0.0005	0.0002	-2.17	0.0300	DebtTax	0.0024	0.0012	2.02	0.0430
GDPG	0.0003	0.0026	0.13	0.8980	GDPG	-0.0055	0.0115	-0.48	0.6340
cons	0.0036	0.2216	0.02	0.9870	cons_d	-0.1979	0.7703	-0.26	0.7970
GiniLag(1)	0.1314	0.4415	0.3	0.7660	GiniLag(1)	0.4528	1.9552	0.23	0.8170
Debt	-0.0012	0.0030	-0.41	0.6850	DebtEpidum	0.0019	0.0009	2.2	0.0280
DebtAdj	0.0005	0.0002	2.21	0.0270	DebtTax	-0.0024	0.0012	-1.99	0.0460
GDPG	0.0000	0.0031	0	0.9980	GDPG	0.0131	0.0213	0.62	0.5380
r	60.7389	12.7098	4.78	0.0000	r	64.4742	21.4068	3.01	0.0030

xthenreg Labour Debt DebtAdj GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1007					xthenreg Labour Debt DebtSpend GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1007					xthenreg Labour Debt DebtTax GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045			
LabourIncomeShare	Coef.	Std. Err.	z	P>z	Labour	Coef.	Std. Err.	z	P>z	Labour	Coef.	Std. Err.	z
LabourShareLag(1)	2.442	0.754	3.24	0.0010	LabourShareLag(1)	1.521	0.403	3.78	0.0000	LabourShareLag(1)	1.461	1.984	0.74
DebtAdj	0.071	0.039	1.81	0.0700	DebtSpend	-0.227	0.111	-2.05	0.0410	Debt	0.414	0.420	0.99
GDPG	-1.053	0.841	-1.25	0.2110	GDPG	-0.661	0.405	-1.63	0.1030	DebtTax	-1.139	0.497	-2.29
cons	174.876	55.232	3.17	0.0020	cons	62.923	19.334	3.25	0.0010	GDPG	-1.220	1.048	-1.16
LabourShareLag(1)	-2.402	0.747	-3.21	0.0010	LabourShareLag(1)	-0.907	0.272	-3.33	0.0010	cons	168.028	162.636	1.03
DebtAdj	-0.071	0.041	-1.76	0.0790	DebtSpend	0.226	0.111	2.03	0.0420	LabourShareLag(1)	-2.243	2.010	-1.12
GDPG	0.870	0.901	0.97	0.3340	GDPG	0.298	0.457	0.65	0.5140	Debt	-0.225	0.571	-0.39
r	37.704	8.779	4.29	0.0000	r	38.327	9.847	3.89	0.0000	DebtTax	1.142	0.500	2.29
										GDPG	1.081	1.882	0.57
										r	36.459	9.128	3.99

Debt-Adj = (Debt*Adjustment Size): interacts debt and adjustment size; Debt-Spend = (Debt*Spend): interacts debt and spend; Debt-Tax = (Debt*Tax): interacts debt and tax; GiniLag(1): Gini lagged one period; LabourShareLag(1): Labour Share lagged one period; TOP1Lag(1): TOP1 lagged one period; TOP10Lag(1): TOP10 lagged one period; BOT40Lag(1): BOT40 lagged one period; BOT50 lagged one period; BOT50 lagged one period; PalmaLag(1): Palma lagged one period.

C.1.1 Model 1. Threshold Panel Regression contd.

xthenreg TOP10 Debt DebtAdj GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045					xthenreg TOP1 Debt DebtSpend GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045					xthenreg TOP1 Debt DebtEpidum DebtTax GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045				
TOP10	Coef.	Std. Err.	z	P>z	TOP1	Coef.	Std. Err.	z	P>z	TOP1	Coef.	Std. Err.	z	P>z
TOP10Lag(1)	-0.607	10.682	-0.06	0.9550	TOP1Lag(1)	0.303	1.574	0.19	0.8470	TOP1Lag(1)	0.514	2.046	0.25	0.8020
Debt	-0.017	0.024	-0.73	0.4640	Debt	-0.002	0.004	-0.48	0.6320	DebtEpidum	0.001	0.002	0.36	0.7200
DebtAdj	-0.039	0.016	-2.46	0.0140	DebtSpend	-0.003	0.001	-2.19	0.0290	DebtTax	-0.014	0.005	-2.84	0.0050
GDPG	0.032	0.026	1.24	0.2170	GDPG	-0.001	0.002	-0.59	0.5530	GDPG	0.028	0.019	1.50	0.1340
cons	-0.419	1.860	-0.23	0.8220	cons	-0.013	0.505	-0.03	0.9800	cons	0.174	0.120	1.44	0.1490
TOP10Lag(1)	-0.053	10.562	-0.01	0.9960	TOP1Lag(1)	0.015	0.825	0.02	0.9860	TOP1Lag(1)	-0.801	1.708	-0.47	0.6390
Debt	0.016	0.023	0.70	0.4860	Debt	0.001	0.006	0.12	0.9030	DebtEpidum	-0.001	0.002	-0.36	0.7170
DebtAdj	0.039	0.016	2.46	0.0140	DebtSpend	0.003	0.001	2.32	0.0200	DebtTax	0.014	0.005	2.83	0.0050
GDPG	-0.031	0.026	-1.16	0.2440	GDPG	0.007	0.004	1.89	0.0590	GDPG	-0.028	0.019	-1.50	0.1350
r	37.704	0.208	181.70	0.0000	r	53.268	5.926	8.99	0.0000	r	37.082	1.846	20.09	0.0000
xthenreg BOT40 Debt DebtTax GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1007					xthenreg BOT50 Debt DebtSpend GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1007					xthenreg BOT50 Debt DebtSpend GDPG, inst(Intr Unemp GDPG Stock) N = 16, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1007				
BOT40	Coef.	Std. Err.	z	P>z	BOT50	Coef.	Std. Err.	z	P>z	BOT50	Coef.	Std. Err.	z	P>z
BOT40Lag(1)	0.0826	0.6445	0.13	0.8980	BOT50Lag(1)	0.0074	3.1812	0.00	0.9980	BOT50Lag(1)	-0.2889	0.3890	-0.74	0.4580
DebtTax	0.0004	0.0001	3.50	0.0000	DebtSpend	-0.0066	0.0020	-3.31	0.0010	DebtTax	0.0003	0.0001	2.34	0.0190
GDPG	0.0008	0.0011	0.74	0.4620	GDPG	0.0023	0.0115	0.20	0.8450	GDPG	0.0007	0.0012	0.57	0.5660
cons	0.0737	0.0534	1.38	0.1680	cons	0.0008	0.8385	0.00	0.9990	cons_d	0.0476	0.0159	2.99	0.0030
BOT40Lag(1)	-0.4424	0.3421	-1.29	0.1960	BOT50Lag(1)	-0.0131	3.0885	0.00	0.9970	BOT50Lag(1)	-0.2524	0.0684	-3.69	0.0000
DebtTax	-0.0004	0.0001	-4.00	0.0000	DebtSpend	0.0066	0.0020	3.32	0.0010	DebtTax	-0.0003	0.0001	-2.23	0.0250
GDPG	-0.0026	0.0026	-1.03	0.3030	GDPG	-0.0026	0.0123	-0.21	0.8330	GDPG	-0.0018	0.0034	-0.54	0.5890
r	66.3419	17.2287	3.85	0.0000	r	38.3267	1.9098	20.07	0.0000	r	66.9645	19.8859	3.37	0.0010
xthenreg Palma Debt DebtSpend GDPG, inst(Intr Unemp GDPG Stock) 2 sample(s) are ignored further due to missing values N = 14, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045					xthenreg Palma Debt DebtTax GDPG, inst(Intr Unemp GDPG Stock) 2 sample(s) are ignored further due to missing values N = 14, T = 40 Panel Var. = C_ID Time Var. = Year Number of moment conditions = 1045									
Palma	Coef.	Std. Err.	z	P>z	PalmaIntp	Coef.	Std. Err.	z	P>z					
PalmaLag(1)	-1.257	11.446	-0.11	0.9130	PalmaLag(1)	0.533	2.525	0.21	0.8330					
Debt	-0.151	0.106	-1.43	0.1530	Debt	-0.006	0.023	-0.27	0.7910					
DebtSpend	0.046	0.021	2.16	0.0300	DebtTax	-0.023	0.011	-2.16	0.0300					
GDPG	0.183	0.103	1.78	0.0750	GDPG	0.033	0.069	0.47	0.6350					
cons	-4.913	2.732	-1.80	0.0720	cons_d	0.680	1.653	0.41	0.6810					
PalmaLag(1)	0.100	0.948	0.11	0.9160	PalmaLag(1)	-0.546	0.211	-2.58	0.0100					
Debt	0.150	0.086	1.75	0.0800	Debt	0.001	0.027	0.04	0.9700					
DebtSpend	-0.046	0.021	-2.24	0.0250	DebtTax	0.023	0.011	2.16	0.0310					
GDPG	-0.183	0.103	-1.78	0.0740	GDPG	-0.025	0.120	-0.21	0.8320					
r	38.112	7.158	5.32	0.0000	r	51.112	4.349	11.75	0.0000					

Appendix D Full Country estimation results contd.

D.1 Model 2. Driscoll Kraay Fixed Effects

xtsc Gini GiniLag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe					xtsc Gini GiniLag1 DDebt SDSPE MDSPE LDSPE VLDSPPE ELDSPE Inflation Unemp GDPG Stock, fe					xtsc Gini GiniLag1 DDebt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe				
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3				
Number of obs = 624 Number of groups = 16 F(11, 38) = 350.54 Prob > F = 0 within R-squared = 0.7862					Number of obs = 624 Number of groups = 16 F(11, 38) = 345.99 Prob > F = 0 within R-squared = 0.7849					Number of obs = 624 Number of groups = 16 F(11, 38) = 387.84 Prob > F = 0 within R-squared = 0.7873				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
Variable	Coef.	Std. Err.	t	P>t	Variable	Coef.	Std. Err.	t	P>t	Variable	Coef.	Std. Err.	t	P>t
GiniLag(1)	0.83353	0.02854	29.21	0.0000	GiniLag(1)	0.83385	0.02857	29.19	0.0000	GiniLag(1)	0.83364	0.02845	29.30	0.0000
Debt	-0.00021	0.00010	-1.98	0.0540	Debt	-0.00023	0.00010	-2.34	0.0250	Debt	-0.00019	0.00011	-1.69	0.1000
SDDAD	-0.00042	0.00082	-0.51	0.6100	SDDSPEND	-0.00035	0.00117	-0.30	0.7700	SDDTAX	-0.00107	0.00241	-0.44	0.6600
MDDAD	-0.00107	0.00138	-0.77	0.4440	MDDSPEND	-0.00131	0.00149	-0.88	0.3830	MDDTAX	-0.00122	0.00230	-0.53	0.6010
LDDAD	-0.00133	0.00059	-2.25	0.0300	LDDSPEND	-0.00165	0.00086	-1.93	0.0620	LDDTAX	-0.00358	0.00136	-2.63	0.0120
VLDDAD	-0.00042	0.00045	-0.94	0.3520	VLDDSPEND	-0.00031	0.00078	-0.40	0.6900	VLDDTAX	-0.00133	0.00104	-1.28	0.2090
ELDDAD	0.00120	0.00059	2.04	0.0480	ELDDSPEND	0.00131	0.00087	1.51	0.1400	ELDDTAX	0.00327	0.00093	3.51	0.0010
Inflation	-0.00050	0.00019	-2.68	0.0110	Inflation	-0.00050	0.00019	-2.63	0.0120	Inflation	-0.00053	0.00019	-2.85	0.0070
Unemployment	0.00022	0.00014	1.60	0.1180	Unemployment	0.00023	0.00013	1.76	0.0860	Unemployment	0.00017	0.00012	1.47	0.1510
GDPG	0.00014	0.00019	0.71	0.4810	GDPG	0.00011	0.00020	0.56	0.5810	GDPG	0.00016	0.00020	0.82	0.4190
Stock	0.00002	0.00002	0.94	0.3540	Stock	0.00002	0.00002	0.94	0.3530	Stock	0.00002	0.00002	0.94	0.3510
C	0.06625	0.01152	5.75	0.0000	C	0.06603	0.01150	5.74	0.0000	C	0.06648	0.01158	5.74	0.0000
xtsc Labour LabourLag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe					xtsc Labour LabourLag1 Debt SDSPE MDSPE LDSPE VLDSPPE ELDSPE Inflation Unemp GDPG Stock, fe					xtsc Labour LabourLag1 Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe				
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3				
Number of obs = 608 Number of groups = 16 F(11, 37) = 24.51 Prob > F = 0 within R-squared = 0.2404					Number of obs = 608 Number of groups = 16 F(11, 37) = 35.79 Prob > F = 0 within R-squared = 0.2482					Number of obs = 608 Number of groups = 16 F(11, 37) = 12.80 Prob > F = 0 within R-squared = 0.2164				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
Variable	Coef.	Std. Err.	t	P>t	Variable	Coef.	Std. Err.	t	P>t	Variable	Coef.	Std. Err.	t	P>t
LabourLag(1)	0.02282	0.11143	0.20	0.8390	LabourLag(1)	0.0168	0.1125	0.15	0.8820	LabourLag(1)	0.0344	0.1124	0.31	0.7610
Debt	0.00003	0.01461	0.00	0.9990	Debt	0.0032	0.0152	0.21	0.8360	Debt	-0.0097	0.0150	-0.65	0.5220
SDDAD	0.32673	0.16059	2.03	0.0490	SDDSPEND	0.3781	0.2376	1.59	0.1200	SDDTAX	0.9674	0.2531	3.82	0.0000
MDDAD	-0.47584	0.10344	-4.60	0.0000	MDDSPEND	-0.7540	0.1074	-7.02	0.0000	MDDTAX	-0.2647	0.2426	-1.09	0.2820
LDDAD	-0.08787	0.11604	-0.76	0.4540	LDDSPEND	-0.1774	0.1967	-0.90	0.3730	LDDTAX	-0.0459	0.2404	-0.19	0.8500
VLDDAD	-0.15993	0.03014	-5.31	0.0000	VLDDSPEND	-0.2865	0.0404	-7.10	0.0000	VLDDTAX	-0.1343	0.0880	-1.53	0.1350
ELDDAD	-0.14194	0.06212	-2.28	0.0280	ELDDSPEND	-0.2208	0.0796	-2.77	0.0090	ELDDTAX	-0.2260	0.1350	-1.67	0.1030
Inflation	0.03010	0.02987	1.01	0.3200	Inflation	0.0246	0.0312	0.79	0.4360	Inflation	0.0346	0.0295	1.17	0.2480
Unemployment	-0.14072	0.02889	-4.87	0.0000	Unemployment	-0.1347	0.0293	-4.60	0.0000	Unemployment	-0.1598	0.0326	-4.91	0.0000
GDPG	-0.23295	0.06721	-3.47	0.0010	GDPG	-0.2251	0.0654	-3.44	0.0010	GDPG	-0.2367	0.0709	-3.34	0.0020
Stock	0.00231	0.00249	0.93	0.3590	Stock	0.0020	0.0025	0.79	0.4320	Stock	0.0023	0.0024	0.95	0.3500
C	1.62478	0.35928	4.52	0.0000	C	1.5766	0.3533	4.46	0.0000	C	1.7109	0.3866	4.43	0.0000

SDDAD = (Small Debt Dummy*Adjustment Size): interacts small debt ratio dummy and adjustment size; MDDAD = (Medium Debt Dummy*Adjustment Size): interacts medium debt ratio dummy and adjustment size; LDDAD = (Large Debt Dummy*Adjustment Size): interacts large debt ratio dummy and adjustment size; VLDDAD = (Very Large Debt Dummy*Adjustment Size): interacts very large debt ratio dummy and adjustment size; ELDDAD = (Ext. Large Debt Dummy*Adjustment Size): interacts ext. large debt ratio dummy and adjustment size; SDDSPEND = (Small Debt Dummy*Spend): interacts small debt ratio dummy and spend; MDDSPEND = (Medium Debt Dummy*Spend): interacts medium debt ratio dummy and spend; LDDSPEND = (Large Debt Dummy*Spend): interacts large debt ratio dummy and spend; VLDDSPEND = (Very Large Debt Dummy*Spend): interacts very large debt ratio dummy and spend; ELDDSPEND = (Ext. Large Debt Dummy*Spend): interacts ext. large debt ratio dummy and spend; SDDTAX = (Small Debt Dummy*Tax): interacts small debt ratio dummy and tax; MDDTAX = (Medium Debt Dummy*Tax): interacts medium debt ratio dummy and tax; LDDTAX = (Large Debt Dummy*Tax): interacts large debt ratio dummy and tax; VLDDTAX = (Very Large Debt Dummy*Tax): interacts very large debt ratio dummy and tax; ELDDTAX = (Ext. Large Debt Dummy*Tax): interacts ext. large debt ratio dummy and tax.

D.1.1 Model 2. Driscoll Kraay Fixed Effects contd.

xtsc TOP1 TOP1Lag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3 Number of obs = 608 Number of groups = 16 F(11, 37) = 17.38 Prob > F = 0 within R-squared = 0.1253					xtsc TOP1 TOP1Lag1 Debt SDSPE MDSPE LDSPE VLSPE ELDSPE Inflation Unemp GDPG Stock, fe Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3 Number of obs = 608 Number of groups = 16 F(11, 37) = 20.53 Prob > F = 0 within R-squared = 0.1292					xtsc TOP1 TOP1Lag1 Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3 Number of obs = 608 Number of groups = 16 F(11, 37) = 14.68 Prob > F = 0 within R-squared = 0.1223				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
Variable	Coef.	Drisc/Kraay Std. Err.	t	P>t	Variable	Coef.	Drisc/Kraay Std. Err.	t	P>t	Variable	Coef.	Drisc/Kraay Std. Err.	t	P>t
TOP1Lag1	-0.20162	0.04572	-4.41	0.0000	TOP1Lag1	-0.20517	0.04550	-4.51	0.0000	TOP1Lag1	-0.19947	0.04642	-4.30	0.0000
Debt	0.00001	0.00007	0.15	0.8850	Debt	-0.00001	0.00007	-0.09	0.9310	Debt	0.00005	0.00006	0.73	0.4720
SDDAD	0.00069	0.00085	0.80	0.4280	SDDSPEND	0.00146	0.00108	1.36	0.1820	SDDTAX	-0.00092	0.00221	-0.41	0.6810
MDDAD	0.00090	0.00051	1.77	0.0860	MDDSPEND	0.00176	0.00066	2.66	0.0110	MDDTAX	-0.00023	0.00094	-0.25	0.8050
LDDAD	0.00001	0.00043	0.02	0.9850	LDDSPEND	0.00024	0.00063	0.38	0.7060	LDDETAX	-0.00055	0.00119	-0.46	0.6450
VLDDAD	0.00038	0.00035	1.08	0.2880	VLDDSPEND	0.00073	0.00052	1.41	0.1680	VLDDTAX	0.00022	0.00066	0.34	0.7370
ELDDAD	0.00042	0.00034	1.26	0.2170	ELDDSPEND	0.00074	0.00052	1.41	0.1660	ELDDTAX	0.00062	0.00059	1.04	0.3060
Inflation	-0.00001	0.00010	-0.14	0.8880	Inflation	-0.00001	0.00010	-0.06	0.9490	Inflation	-0.00001	0.00010	-0.11	0.9160
UnempIntp	0.00044	0.00011	4.01	0.0000	Unemployment	0.00042	0.00011	3.75	0.0010	Unemployment	0.00050	0.00011	4.70	0.0000
GDPG	0.00102	0.00023	4.52	0.0000	GDPG	0.00100	0.00022	4.53	0.0000	GDPG	0.00104	0.00024	4.41	0.0000
Stock	0.00001	0.00001	0.89	0.3770	Stock	0.00001	0.00001	0.93	0.3590	Stock	0.00001	0.00001	0.91	0.3710
C	-0.00516	0.00124	-4.18	0.0000	C	-0.00496	0.00124	-4.01	0.0000	C	-0.00545	0.00127	-4.30	0.0000
xtsc TOP10 TOP10Lag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3 Number of obs = 608 Number of groups = 16 F(11, 37) = 20.17 Prob > F = 0 within R-squared = 0.1039					xtsc TOP10 TOP10Lag1 Debt SDSPE MDSPE LDSPE VLSPE ELDSPE Inflation Unemp GDPG Stock, fe Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3 Number of obs = 608 Number of groups = 16 F(11, 37) = 18.72 Prob > F = 0 within R-squared = 0.1059					xtsc TOP10 TOP10Lag1 Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3 Number of obs = 608 Number of groups = 16 F(11, 37) = 25.59 Prob > F = 0 within R-squared = 0.1028				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
Variable	Coef.	Drisc/Kraay Std. Err.	t	P>t	Variable	Coef.	Drisc/Kraay Std. Err.	t	P>t	Variable	Coef.	Drisc/Kraay Std. Err.	t	P>t
TOP10Lag(1)	-0.20324	0.05015	-4.05	0.0000	TOP10Lag(1)	-0.20476	0.04990	-4.10	0.0000	TOP10Lag(1)	-0.20296	0.04978	-4.08	0.0000
Debt	-0.00008	0.00009	-0.87	0.3890	Debt	-0.00010	0.00009	-1.06	0.2950	Debt	-0.00005	0.00009	-0.57	0.5730
SDDAD	0.00059	0.00084	0.70	0.4860	SDDSPEND	0.00142	0.00112	1.27	0.2120	SDDTAX	-0.00138	0.00269	-0.51	0.6100
MDDAD	0.00097	0.00088	1.11	0.2740	MDDSPEND	0.00190	0.00099	1.91	0.0640	MDDETAX	-0.00019	0.00182	-0.10	0.9170
LDDAD	-0.00033	0.00053	-0.63	0.5320	LDDSPEND	-0.00028	0.00069	-0.40	0.6920	LDDETAX	-0.00126	0.00156	-0.81	0.4220
VLDDAD	-0.00001	0.00026	-0.06	0.9540	VLDDSPEND	0.00009	0.00041	0.22	0.8300	VLDDTAX	-0.00028	0.00039	-0.72	0.4770
ELDDAD	0.00025	0.00038	0.64	0.5230	ELDDSPEND	0.00046	0.00061	0.75	0.4560	ELDDTAX	0.00035	0.00066	0.53	0.5960
Inflation	0.00016	0.00015	1.04	0.3070	Inflation	0.00016	0.00016	1.03	0.3120	Inflation	0.00017	0.00015	1.09	0.2810
Unemployment	0.00054	0.00017	3.25	0.0020	Unemployment	0.00051	0.00016	3.15	0.0030	Unemployment	0.00058	0.00016	3.70	0.0010
GDPG	0.00095	0.00018	5.25	0.0000	GDPG	0.00093	0.00018	5.29	0.0000	GDPG	0.00096	0.00019	5.16	0.0000
Stock	0.00003	0.00002	1.47	0.1510	Stock	0.00003	0.00002	1.48	0.1460	Stock	0.00003	0.00002	1.50	0.1420
C	-0.00542	0.00131	-4.14	0.0000	C	-0.00520	0.00129	-4.02	0.0000	C	-0.00567	0.00129	-4.40	0.0000

D.1.2 Model 2. Driscoll Kraay Fixed Effects contd.

xtssc BOT40 BOT40Lag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe					xtssc BOT40 BOT40Lag1 Debt SDSPE MDSPE LDSPE VLSPE ELDSPE Inflation Unemp GDPG Stock, fe					xtsscBOT40 BOT40Lag1 Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe				
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3				
Number of obs = 624 Number ofgroups = 16 F(11, 38) = 271.12 Prob > F = 0 within R-squared = 0.7470					Number of obs = 608 Number ofgroups = 16 F(11, 38) = 248.55 Prob > F = 0 within R-squared = 0.7448					Number of obs = 608 Number of groups = 16 F(11, 38) = 308.44 Prob > F = 0 within R-squared = 0.7480				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
BOT40	Coef.	Std. Err.	t	P>t	BOT40	Coef.	Std. Err.	t	P>t	BOT40	Coef.	Std. Err.	t	P>t
BOT40Lag(1)	0.81366	0.03520	23.11	0.0000	BOT40Lag(1)	0.81270	0.03546	22.92	0.0000	BOT40Lag(1)	0.81517	0.03511	23.21	0.0000
Debt	0.00008	0.00005	1.43	0.1610	Debt	0.00010	0.00005	1.86	0.0700	Debt	0.00007	0.00006	1.15	0.2590
SDDAD	0.00059	0.00032	1.83	0.0750	SDDSPEND	0.00066	0.00045	1.46	0.1520	SDDTAX	0.00118	0.00081	1.46	0.1520
MDDAD	0.00089	0.00070	1.27	0.2120	MDDSPEND	0.00119	0.00086	1.38	0.1760	MDDTAX	0.00081	0.00084	0.96	0.3410
LDDAD	0.00080	0.00034	2.37	0.0230	LDDSPEND	0.00098	0.00045	2.17	0.0360	LDDTAX	0.00215	0.00087	2.48	0.0180
VLDDAD	0.00032	0.00021	1.54	0.1330	VLDDSPEND	0.00030	0.00033	0.91	0.3680	VLDDTAX	0.00086	0.00062	1.40	0.1710
ELDDAD	-0.00080	0.00025	-3.25	0.0020	ELDDSPEND	-0.00105	0.00041	-2.58	0.0140	ELDDTAX	-0.00190	0.00038	-4.98	0.0000
Inflation	0.00015	0.00008	1.96	0.0570	Inflation	0.00015	0.00008	1.89	0.0660	Inflation	0.00017	0.00008	2.21	0.0340
Unemployment	-0.00007	0.00005	-1.43	0.1590	Unemployment	-0.00008	0.00005	-1.65	0.1080	Unemployment	-0.00004	0.00005	-0.79	0.4370
GDPG	0.00007	0.00013	0.51	0.6150	GDPG	0.00008	0.00013	0.65	0.5200	GDPG	0.00006	0.00013	0.46	0.6510
Stock	-0.00001	0.00001	-1.03	0.3100	Stock	-0.00001	0.00001	-1.04	0.3070	Stock	-0.00001	0.00001	-1.03	0.3070
C	0.03066	0.00564	5.44	0.0000	C	0.03087	0.00569	5.42	0.0000	C	0.03020	0.00560	5.39	0.0000
xtssc BOT50 BOT50Lag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe					xtssc BOT50 BOT50Lag1 Debt SDSPE MDSPE LDSPE VLSPE ELDSPE Inflation Unemp GDPG Stock, fe					xtssc BOT50 BOT50Lag1 Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe				
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3				
Number of obs = 608 Number ofgroups = 16 F(11, 37) = 16.35 Prob > F = 0 within R-squared = 0.0712					Number of obs = 608 Number ofgroups = 16 F(11, 37) = 11.01 Prob > F = 0 within R-squared = 0.0631					Number of obs = 608 Number of groups = 16 F(11, 37) = 31.30 Prob > F = 0 within R-squared = 0.0778				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
Variable	Coef.	Std. Err.	t	P>t	Variable	Coef.	Std. Err.	t	P>t	Variable	Coef.	Std. Err.	t	P>t
BOT50Lag(1)	-0.17516	0.05030	-3.48	0.0010	BOT50Lag(1)	-0.17435	0.05131	-3.40	0.0020	BOT50Lag(1)	-0.17447	0.04887	-3.57	0.0010
Debt	0.00006	0.00006	0.96	0.3450	Debt	0.00009	0.00007	1.32	0.1940	Debt	0.00005	0.00007	0.69	0.4930
SDDAD	0.00055	0.00033	1.65	0.1080	SDDSPEND	0.00058	0.00051	1.15	0.2570	SDDTAX	0.00125	0.00081	1.54	0.1320
MDDAD	0.00049	0.00076	0.65	0.5190	MDDSPEND	0.00043	0.00096	0.44	0.6610	MDDTAX	0.00084	0.00108	0.78	0.4410
LDDAD	0.00098	0.00042	2.34	0.0250	LDDSPEND	0.00116	0.00056	2.08	0.0440	LDDTAX	0.00277	0.00102	2.73	0.0100
VLDDAD	0.00027	0.00025	1.07	0.2920	VLDDSPEND	0.00017	0.00038	0.44	0.6630	VLDDTAX	0.00088	0.00071	1.24	0.2220
ELDDAD	-0.00090	0.00033	-2.78	0.0090	ELDDSPEND	-0.00136	0.00053	-2.57	0.0140	ELDDTAX	-0.00190	0.00045	-4.25	0.0000
Inflation	-0.00020	0.00008	-2.58	0.0140	Inflation	-0.00022	0.00008	-2.73	0.0100	Inflation	-0.00018	0.00008	-2.33	0.0250
Unemployment	-0.00025	0.00007	-3.62	0.0010	Unemployment	-0.00024	0.00006	-3.87	0.0000	Unemployment	-0.00023	0.00006	-3.60	0.0010
GDPG	-0.00019	0.00014	-1.35	0.1860	GDPG	-0.00017	0.00014	-1.22	0.2310	GDPG	-0.00019	0.00015	-1.33	0.1930
Stock	-0.00001	0.00001	-0.96	0.3420	Stock	-0.00001	0.00001	-0.98	0.3320	Stock	-0.00001	0.00001	-0.98	0.3320
C	0.00195	0.00073	2.66	0.0110	C	0.00194	0.00070	2.79	0.0080	C	0.00181	0.00078	2.32	0.0260

SDDAD = (Small Debt Dummy*Adjustment Size): interacts small debt ratio dummy and adjustment size; MDDAD = (Medium Debt Dummy*Adjustment Size): interacts medium debt ratio dummy and adjustment size; LDDAD = (Large Debt Dummy*Adjustment Size): interacts large debt ratio dummy and adjustment size; VLDDAD = (Very Large Debt Dummy*Adjustment Size): interacts very large debt ratio dummy and adjustment size; ELDDAD = (Ext. Large Debt Dummy*Adjustment Size): interacts ext. large debt ratio dummy and adjustment size; SDDSPEND = (Small Debt Dummy*Spend): interacts small debt ratio dummy and spend; MDDSPEND = (Medium Debt Dummy*Spend): interacts medium debt ratio dummy and spend; LDDSPEND = (Large Debt Dummy*Spend): interacts large debt ratio dummy and spend; VLDDSPEND = (Very Large Debt Dummy*Spend): interacts very large debt ratio dummy and spend; ELDDSPEND = (Ext. Large Debt Dummy*Spend): interacts ext. large debt ratio dummy and spend; SDDTAX = (Small Debt Dummy*Tax): interacts small debt ratio dummy and tax; MDDTAX = (Medium Debt Dummy*Tax): interacts medium debt ratio dummy and tax; LDDTAX = (Large Debt Dummy*Tax): interacts large debt ratio dummy and tax; VLDDTAX = (Very Large Debt Dummy*Tax): interacts very large debt ratio dummy and tax; ELDDTAX = (Ext. Large Debt Dummy*Tax): interacts ext. large debt ratio dummy and tax.

D.1.3 Model 2. Driscoll Kraay Fixed Effects contd.

xtsc Palma PalmaLag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe					xtsc Palma PalmaLag1 Debt SDSPE MDSPE LDSPE VLSPE ELDSPE Inflation Unemp GDPG Stock, fe					xtsc Palma PalmaLag1 Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe				
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3				
Number of obs = 546 Number ofgroups = 14 F(11, 38) = 4070.90 Prob > F = 0 within R-squared = 0.9967					Number of obs = 546 Number ofgroups = 14 F(11, 38) = 3624.09 Prob > F = 0 within R-squared = 0.9964					Number of obs = 546 Number ofgroups = 14 F(11, 38) = 8199.72 Prob > F = 0 within R-squared = 0.9964				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
Palma	Coef.	Std. Err.	t	P>t	Palma	Coef.	Std. Err.	t	P>t	Palma	Coef.	Std. Err.	t	P>t
Palma(Lag1)	0.97073	0.00791	122.76	0.0000	Palma(Lag1)	0.97098	0.00798	121.75	0.0000	PalmaLag(1)	0.97035	0.00768	126.28	0.0000
Debt	-0.00038	0.00024	-1.58	0.1220	Debt	-0.00045	0.00022	-2.11	0.0410	Debt	-0.00033	0.00027	-1.22	0.2310
SDDAD	0.00018	0.00108	0.17	0.8660	SDDSPEND	0.00123	0.00165	0.75	0.4590	SDDTAX	-0.00151	0.00268	-0.56	0.5770
MDDAD	-0.00224	0.00175	-1.28	0.2080	MDDSPEND	0.00052	0.00153	0.34	0.7350	MDDTAX	-0.00910	0.00448	-2.03	0.0490
LDDAD	-0.00265	0.00193	-1.37	0.1770	LDDSPEND	-0.00511	0.00344	-1.49	0.1450	LDDTAX	-0.00374	0.00573	-0.65	0.5170
VLDDAD	0.00236	0.00255	0.92	0.3610	VLDDSPEND	0.00473	0.00350	1.35	0.1840	VLDDTAX	0.00188	0.00641	0.29	0.7710
ELDDAD	0.00363	0.00136	2.67	0.0110	ELDDSPEND	0.00561	0.00244	2.30	0.0270	ELDDTAX	0.00710	0.00337	2.11	0.0420
Inflation	0.00046	0.00022	2.11	0.0420	Inflation	0.00045	0.00023	1.96	0.0570	Inflation	0.00047	0.00023	2.07	0.0450
Unemployment	-0.00016	0.00038	-0.42	0.6750	Unemployment	-0.00020	0.00034	-0.60	0.5500	Unemployment	-0.00018	0.00035	-0.51	0.6140
GDPG	-0.00048	0.00036	-1.35	0.1850	GDPG	-0.00059	0.00034	-1.75	0.0890	GDPG	-0.00045	0.00035	-1.29	0.2040
Stock	0.00011	0.00007	1.59	0.1190	Stock	0.00011	0.00007	1.60	0.1180	Stock	0.00011	0.00007	1.59	0.1210
C	0.03457	0.01003	3.45	0.0010	C	0.03467	0.01010	3.43	0.0010	C	0.03525	0.01001	3.52	0.0010
xtsc TOP10BOT50 TOP10BOT50Lag1 Debt SDDAD MDDAD LDDAD VLDDAD ELDDAD Inflation Unemp GDPG Stock, fe					xtsc TOP10BOT50 TOP10BOT50Lag1 Debt SDSPE MDSPE LDSPE VLSPE ELDSPE Inflation Unemp GDPG Stock, fe					xtsc TOP10BOT50 TOP10BOT50Lag1Debt SDTAX MDTAX LDTAX VLDTAX ELDTAX Inflation Unemp GDPG Stock, fe				
Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3					Regression with Driscoll-Kraay standard errors Method: Fixed-effects regression Group variable (i): C_ID maximum lag: 3				
Number of obs = 624 Number ofgroups = 16 F(11, 38) = 670.70 Prob > F = 0 within R-squared = 0.7917					Number of obs = 624 Number ofgroups = 16 F(11, 38) = 368.13 Prob > F = 0 within R-squared = 0.7906					Number of obs = 624 Number ofgroups = 16 F(11, 38) = 616.97 Prob > F = 0 within R-squared = 0.7928				
Debt - Adjustment Model					Debt - Spend Model					Debt - Tax Model				
TOP10BOT50	Coef.	Std. Err.	t	P>t	TOP10BOT50	Coef.	Std. Err.	t	P>t	TOP10BOT50	Coef.	Std. Err.	t	P>t
TOP10BOT50Lag(1)	0.84804	0.03893	21.78	0.0000	TOP10BOT50Lag(1)	0.85088	0.03794	22.43	0.0000	TOP10BOT50Lag(1)	0.84602	0.03712	22.79	0.0000
Debt	-0.00051	0.00359	-0.14	0.8870	Debt	-0.00224	0.00372	-0.60	0.5500	Debt	-0.00020	0.00376	-0.05	0.9570
SDDAD	-0.11272	0.05724	-1.97	0.0560	SDDSPEND	-0.08754	0.07591	-1.15	0.2560	SDDTAX	-0.39295	0.11411	-3.44	0.0010
MDDAD	-0.06999	0.05084	-1.38	0.1770	MDDSPEND	-0.07416	0.05985	-1.24	0.2230	MDDTAX	-0.09333	0.06889	-1.35	0.1830
LDDAD	-0.02643	0.02080	-1.27	0.2120	LDDSPEND	-0.03417	0.03433	-1.00	0.3260	LDDTAX	-0.05754	0.04176	-1.38	0.1760
VLDDAD	-0.03232	0.01362	-2.37	0.0230	VLDDSPEND	-0.00971	0.02819	-0.34	0.7320	VLDDTAX	-0.12748	0.05071	-2.51	0.0160
ELDDAD	0.03963	0.01430	2.77	0.0090	ELDDSPEND	0.06601	0.02655	2.49	0.0170	ELDDTAX	0.08091	0.02311	3.50	0.0010
Inflation	-0.01621	0.00626	-2.59	0.0140	Inflation	-0.01565	0.00640	-2.44	0.0190	Inflation	-0.01787	0.00636	-2.81	0.0080
Unemplntp	0.00836	0.00471	1.77	0.0840	Unemployment	0.00728	0.00450	1.62	0.1140	Unemployment	0.00699	0.00430	1.63	0.1120
GDPG	0.02143	0.00719	2.98	0.0050	GDPG	0.02027	0.00700	2.89	0.0060	GDPG	0.02106	0.00763	2.76	0.0090
Stock	0.00140	0.00080	1.75	0.0890	Stock	0.00140	0.00080	1.75	0.0880	Stock	0.00139	0.00080	1.74	0.0900
C	1.04656	0.28469	3.68	0.0010	C	1.02920	0.27671	3.72	0.0010	C	1.07519	0.28339	3.79	0.0010

SDDAD = (Small Debt Dummy*Adjustment Size): interacts small debt ratio dummy and adjustment size; MDDAD = (Medium Debt Dummy*Adjustment Size): interacts medium debt ratio dummy and adjustment size; LDDAD = (Large Debt Dummy*Adjustment Size): interacts large debt ratio dummy and adjustment size; VLDDAD = (Very Large Debt Dummy*Adjustment Size): interacts very large debt ratio dummy and adjustment size; ELDDAD = (Ext. Large Debt Dummy*Adjustment Size): interacts ext. large debt ratio dummy and adjustment size; SDDSPEND = (Small Debt Dummy*Spend): interacts small debt ratio dummy and spend; MDDSPEND = (Medium Debt Dummy*Spend): interacts medium debt ratio dummy and spend; LDDSPEND = (Large Debt Dummy*Spend): interacts large debt ratio dummy and spend; VLDDSPEND = (Very Large Debt Dummy*Spend): interacts very large debt ratio dummy and spend; ELDDSPEND = (Ext. Large Debt Dummy*Spend): interacts ext. large debt ratio dummy and spend; SDDTAX = (Small Debt Dummy*Tax): interacts small debt ratio dummy and tax; MDDTAX = (Medium Debt Dummy*Tax): interacts medium debt ratio dummy and tax; LDDTAX = (Large Debt Dummy*Tax): interacts large debt ratio dummy and tax; VLDDTAX = (Very Large Debt Dummy*Tax): interacts very large debt ratio dummy and tax; ELDDTAX = (Ext. Large Debt Dummy*Tax): interacts ext. large debt ratio dummy and tax.

Appendix E Full Country estimation results contd.

E.1 Model 3. Pooled OLS Regression

Dependent Variable: GINI Method: Panel Least Squares Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: GINI Method: Panel Least Squares Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: GINI Method: Panel Least Squares Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
GINILAG(1)	0.98588	0.00717	137.5215	0.0000	GINILAG(1)	0.98629	0.0072	136.8618	0.0000	GINILAG(1)	0.98590	0.0071	138.8752	0.0000
DEBT	-0.00001	0.00012	-0.0597	0.9524	DEBT	-0.00003	0.0001	-0.2832	0.7771	DEBT	0.00002	0.0001	0.1737	0.8621
SDDAD	0.00090	0.00165	0.5439	0.5867	SDDSPEND	0.00126	0.0023	0.5575	0.5774	SDDTAX	0.00173	0.0042	0.4082	0.6832
MDDAD	-0.00031	0.00106	-0.2955	0.7677	MDDSPEND	-0.00009	0.0014	-0.0612	0.9512	MDDTAX	-0.00092	0.0020	-0.4493	0.6534
LDDAD	-0.00130	0.00067	-1.9369	0.0532	LDDSPEND	-0.00164	0.0011	-1.4976	0.1348	LDDTAX	-0.00361	0.0015	-2.3581	0.0187
VLDDAD	-0.00044	0.00074	-0.5946	0.5523	VLDDSPEND	-0.00030	0.0011	-0.2704	0.7869	VLDDTAX	-0.00147	0.0016	-0.9083	0.3641
ELDDAD	0.00138	0.00081	1.6972	0.0902	ELDDSPEND	0.00175	0.0014	1.2916	0.1970	ELDDTAX	0.00334	0.0017	1.9975	0.0462
INFLATION	-0.00001	0.00014	-0.0613	0.9511	INFLATION	0.000005	0.0001	0.0343	0.9726	INFLATION	-0.00002	0.0001	-0.1289	0.8975
UNEMPINTP	0.00008	0.00013	0.6009	0.5481	UNEMPINTP	0.00007	0.0001	0.5699	0.5690	UNEMPINTP	0.00007	0.0001	0.6037	0.5463
GDPG	0.00043	0.00025	1.7584	0.0792	GDPG	0.00041	0.0002	1.6514	0.0992	GDPG	0.00046	0.0002	1.8513	0.0646
STOCK	0.00002	0.00002	0.9191	0.3584	STOCK	0.00002	0.00002	0.9159	0.3601	STOCK	0.00002	0.00002	0.9345	0.3504
C	0.00533	0.00314	1.6939	0.0908	C	0.00518	0.0032	1.6417	0.1012	C	0.00530	0.0031	1.6954	0.0905
R-squared	0.9708	Mean dependent var		0.3910	R-squared	0.9707	Mean dependent var		0.3910	R-squared	0.9710	Mean dependent var		0.3910
Adjusted R-squared	0.9703	S.D. dependent var		0.0690	Adjusted R-squared	0.9701	S.D. dependent var		0.0690	Adjusted R-squared	0.9705	S.D. dependent var		0.0690
S.E. of regression	0.0119	Akaike info criterion		6.0058	S.E. of regression	0.0119	Akaike info criterion		6.0006	S.E. of regression	0.0119	Akaike info criterion		6.0109
Sum squared resid	0.0866	Schwarz criterion		5.9205	Sum squared resid	0.0871	Schwarz criterion		5.9152	Sum squared resid	0.0862	Schwarz criterion		5.9256
Log likelihood	1885.8200	Hannan-Quinn criter.		5.9727	Log likelihood	1884.1740	Hannan-Quinn criter.		5.9674	Log likelihood	1887.3930	Hannan-Quinn criter.		5.9777
F-statistic	1851.5290	Durbin-Watson stat		2.4355	F-statistic	1841.4940	Durbin-Watson stat		2.4429	F-statistic	1861.1700	Durbin-Watson stat		2.4330
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			

SDDAD = (Small Debt Dummy*Adjustment Size): interacts small debt ratio dummy and adjustment size; MDDAD = (Medium Debt Dummy*Adjustment Size): interacts medium debt ratio dummy and adjustment size; LDDAD = (Large Debt Dummy*Adjustment Size): interacts large debt ratio dummy and adjustment size; VLDDAD = (Very Large Debt Dummy*Adjustment Size): interacts very large debt ratio dummy and adjustment size; ELDDAD = (Ext. Large Debt Dummy*Adjustment Size): interacts ext. large debt ratio dummy and adjustment size; SDDSPEND = (Small Debt Dummy*Spend): interacts small debt ratio dummy and spend; MDDSPEND = (Medium Debt Dummy*Spend): interacts medium debt ratio dummy and spend; LDDSPEND = (Large Debt Dummy*Spend): interacts large debt ratio dummy and spend; VLDDSPEND = (Very Large Debt Dummy*Spend): interacts very large debt ratio dummy and spend; ELDDSPEND = (Ext. Large Debt Dummy*Spend): interacts ext. large debt ratio dummy and spend; SDDTAX = (Small Debt Dummy*Tax): interacts small debt ratio dummy and tax; MDDTAX = (Medium Debt Dummy*Tax): interacts medium debt ratio dummy and tax; LDDTAX = (Large Debt Dummy*Tax): interacts large debt ratio dummy and tax; VLDDTAX = (Very Large Debt Dummy*Tax): interacts very large debt ratio dummy and tax; ELDDTAX = (Ext. Large Debt Dummy*Tax): interacts ext. large debt ratio dummy and tax.

E.1.1 Model 3. Pooled OLS Regression contd.

Dependent Variable: LABOUR INCOME SHARE Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: LABOUR INCOME SHARE Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: LABOUR INCOME SHARE Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
LABOURLAG(1)	0.1148	0.0365	3.1413	0.0018	LABOURLAG(1)	0.1032	0.0365	2.8243	0.0049	LABOURLAG(1)	0.1249	0.0378	3.3001	0.0010
DEBT	-0.0066	0.0080	-0.8244	0.4101	DEBT	-0.0040	0.0081	-0.4965	0.6197	DEBT	-0.0168	0.0082	-2.0600	0.0398
SDDAD	0.2651	0.0878	3.0177	0.0027	SDDSPEND	0.3253	0.1266	2.5698	0.0104	SDDTAX	0.6237	0.2410	2.5882	0.0099
MDDAD	-0.4151	0.0601	-6.9099	0.0000	MDDSPEND	-0.6418	0.0829	-7.7421	0.0000	MDDTAX	-0.2821	0.1364	-2.0689	0.0390
LDDAD	-0.1052	0.0470	-2.2352	0.0258	LDDSPEND	-0.1995	0.0749	-2.6636	0.0079	LDDTAX	-0.1127	0.1098	-1.0270	0.3048
VLDDAD	-0.1432	0.0400	-3.5760	0.0004	VLDDSPEND	-0.2764	0.0623	-4.4372	0.0000	VLDDTAX	-0.1219	0.0826	-1.4757	0.1406
ELDDAD	-0.1547	0.0458	-3.3806	0.0008	ELDDSPEND	-0.2342	0.0722	-3.2421	0.0013	ELDDTAX	-0.2692	0.1068	-2.5204	0.0120
INFLATION	0.0314	0.0119	2.6487	0.0083	INFLATION	0.0266	0.0121	2.2021	0.0280	INFLATION	0.0317	0.0125	2.5343	0.0115
UNEMPINTP	-0.0291	0.0078	-3.7289	0.0002	UNEMPINTP	-0.0277	0.0078	-3.5702	0.0004	UNEMPINTP	-0.0387	0.0083	-4.6720	0.0000
GDPG	-0.1728	0.0204	-8.4552	0.0000	GDPG	-0.1665	0.0206	-8.0690	0.0000	GDPG	-0.1835	0.0205	-8.9445	0.0000
STOCK	0.0006	0.0013	0.4407	0.6596	STOCK	0.0004	0.0014	0.2482	0.8041	STOCK	0.0012	0.0013	0.9660	0.3344
C	0.5829	0.1128	5.1689	0.0000	C	0.5746	0.1106	5.1937	0.0000	C	0.6361	0.1142	5.5700	0.0000
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.2693	Mean dependent var	-0.0219		R-squared	0.2757	Mean dependent var	-0.0210		R-squared	0.1990	Mean dependent var	-0.0244	
Adjusted R-squared	0.2559	S.D. dependent var	1.1636		Adjusted R-squared	0.2624	S.D. dependent var	1.1652		Adjusted R-squared	0.1842	S.D. dependent var	1.1124	
S.E. of regression	1.0015	Sum squared resid	597.7406		S.E. of regression	1.0001	Sum squared resid	596.1514		S.E. of regression	1.0014	Sum squared resid	597.6430	
F-statistic	19.9732	Durbin-Watson stat	1.9141		F-statistic	20.6286	Durbin-Watson stat	1.9098		F-statistic	13.4615	Durbin-Watson stat	1.8742	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.1866	Mean dependent var	-0.0582		R-squared	0.1981	Mean dependent var	-0.0582		R-squared	0.1579	Mean dependent var	-0.0582	
Sum squared resid	973.7316	Durbin-Watson stat	1.8205		Sum squared resid	959.9112	Durbin-Watson stat	1.8090		Sum squared resid	1008.1280	Durbin-Watson stat	1.8089	

SDDAD = (Small Debt Dummy*Adjustment Size): interacts small debt ratio dummy and adjustment size; MDDAD = (Medium Debt Dummy*Adjustment Size): interacts medium debt ratio dummy and adjustment size; LDDAD = (Large Debt Dummy*Adjustment Size): interacts large debt ratio dummy and adjustment size; VLDDAD = (Very Large Debt Dummy*Adjustment Size): interacts very large debt ratio dummy and adjustment size; ELDDAD = (Ext. Large Debt Dummy*Adjustment Size): interacts ext. large debt ratio dummy and adjustment size; SDDSPEND = (Small Debt Dummy*Spend): interacts small debt ratio dummy and spend; MDDSPEND = (Medium Debt Dummy*Spend): interacts medium debt ratio dummy and spend; LDDSPEND = (Large Debt Dummy*Spend): interacts large debt ratio dummy and spend; VLDDSPEND = (Very Large Debt Dummy*Spend): interacts very large debt ratio dummy and spend; ELDDSPEND = (Ext. Large Debt Dummy*Spend): interacts ext. large debt ratio dummy and spend; SDDTAX = (Small Debt Dummy*Tax): interacts small debt ratio dummy and tax; MDDTAX = (Medium Debt Dummy*Tax): interacts medium debt ratio dummy and tax; LDDTAX = (Large Debt Dummy*Tax): interacts large debt ratio dummy and tax; VLDDTAX = (Very Large Debt Dummy*Tax): interacts very large debt ratio dummy and tax; ELDDTAX = (Ext. Large Debt Dummy*Tax): interacts ext. large debt ratio dummy and tax.

E.1.2 Model 3. Pooled OLS Regression contd.

Dependent Variable: TOP 1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP 1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP 1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1LAG(1)	-0.18148	0.03788	-4.7904	0.0000	TOP1LAG(1)	-0.19184	0.03790	-5.0621	0.0000	TOP1LAG(1)	-0.17362	0.03810	-4.5567	0.0000
DEBT	0.00009	0.00005	1.6841	0.0927	DEBT	0.00006	0.00005	1.1759	0.2401	DEBT	0.00012	0.00005	2.3234	0.0205
SDDAD	0.00113	0.00075	1.5148	0.1304	SDDSPEND	0.00212	0.00101	2.0950	0.0366	SDDTAX	-0.00026	0.00167	-0.1569	0.8754
MDDAD	0.00109	0.00045	2.4294	0.0154	MDDSPEND	0.00178	0.00060	2.9897	0.0029	MDDTAX	0.00022	0.00090	0.2416	0.8092
LDDAD	-0.00007	0.00031	-0.2238	0.8230	LDDSPEND	0.00022	0.00050	0.4505	0.6525	LDDTAX	-0.00094	0.00073	-1.2859	0.1990
VLDAD	0.00077	0.00026	2.9964	0.0028	VLDSPEND	0.00136	0.00039	3.4643	0.0006	VLDDTAX	0.00081	0.00061	1.3212	0.1869
ELDDAD	0.00055	0.00027	2.0071	0.0452	ELDDSPEND	0.00110	0.00046	2.3945	0.0170	ELDDTAX	0.00058	0.00061	0.9397	0.3477
INFLATION	0.00002	0.00006	0.3636	0.7163	INFLATION	0.00005	0.00006	0.8149	0.4154	INFLATION	0.00002	0.00006	0.2649	0.7911
UNEMPINTP	0.00008	0.00006	1.4321	0.1526	UNEMPINTP	0.00007	0.00006	1.2715	0.2040	UNEMPINTP	0.00012	0.00006	2.0603	0.0398
GDPG	0.00081	0.00011	7.4431	0.0000	GDPG	0.00079	0.00011	7.2678	0.0000	GDPG	0.00080	0.00011	7.1510	0.0000
STOCK	0.00003	0.00001	2.9398	0.0034	STOCK	0.00003	0.00001	2.9790	0.0030	STOCK	0.00003	0.00001	2.9267	0.0036
C	-0.00237	0.00066	-3.5898	0.0004	C	-0.00233	0.00066	-3.5249	0.0005	C	-0.00233	0.00068	-3.4372	0.0006
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.1524	Mean dependent var		0.1198	R-squared	0.1600	Mean dependent var		0.1184	R-squared	0.1357	Mean dependent var		0.1142
Adjusted R-squared	0.1368	S.D. dependent var		1.0878	Adjusted R-squared	0.1445	S.D. dependent var		1.0916	Adjusted R-squared	0.1198	S.D. dependent var		1.0781
S.E. of regression	1.0033	Sum squared resid		599.9214	S.E. of regression	1.0026	Sum squared resid		599.1099	S.E. of regression	1.0048	Sum squared resid		601.7723
F-statistic	9.7422	Durbin-Watson stat		2.0531	F-statistic	10.3202	Durbin-Watson stat		2.0504	F-statistic	8.5074	Durbin-Watson stat		2.0634
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.0940	Mean dependent var		0.0009	R-squared	0.0991	Mean dependent var		0.0009	R-squared	0.0869	Mean dependent var		0.0009
Sum squared resid	0.0314	Durbin-Watson stat		2.0299	Sum squared resid	0.0312	Durbin-Watson stat		2.0265	Sum squared resid	0.0317	Durbin-Watson stat		2.0340

Dependent Variable: TOP 10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP 10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP 10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1LAG(1)	-0.17257	0.03840	-4.4942	0.0000	TOP1LAG(1)	-0.17726	0.03820	-4.6406	0.0000	TOP1LAG(1)	-0.17193	0.03870	-4.4433	0.0000
DEBT	0.00002	0.00007	0.2476	0.8045	DEBT	0.00000	0.00007	-0.0501	0.9600	DEBT	0.00005	0.00007	0.6956	0.4870
SDDAD	0.00082	0.00092	0.8921	0.3727	SDDSPEND	0.00286	0.00128	2.2392	0.0255	SDDTAX	-0.00252	0.00199	-1.2646	0.2065
MDDAD	0.00124	0.00053	2.3244	0.0204	MDDSPEND	0.00227	0.00066	3.4357	0.0006	MDDTAX	-0.00051	0.00113	-0.4460	0.6558
LDDAD	0.00035	0.00039	0.8955	0.3709	LDDSPEND	0.00099	0.00063	1.5841	0.1137	LDDTAX	0.00006	0.00092	0.0689	0.9451
VLDAD	0.00027	0.00044	0.5994	0.5492	VLDSPEND	0.00054	0.00065	0.8359	0.4036	VLDDTAX	0.00013	0.00066	0.2018	0.8401
ELDDAD	0.00074	0.00046	1.5903	0.1123	ELDDSPEND	0.00149	0.00075	1.9977	0.0462	ELDDTAX	0.00080	0.00098	0.8104	0.4181
INFLATION	0.00023	0.00010	2.3567	0.0188	INFLATION	0.00024	0.00010	2.3863	0.0173	INFLATION	0.00023	0.00010	2.3498	0.0191
UNEMPINTP	0.00001	0.00009	0.1669	0.8675	UNEMPINTP	0.00000	0.00008	0.0016	0.9987	UNEMPINTP	0.00008	0.00009	0.9461	0.3445
GDPG	0.00082	0.00014	5.7152	0.0000	GDPG	0.00082	0.00014	5.7644	0.0000	GDPG	0.00083	0.00015	5.7266	0.0000
STOCK	0.00003	0.00001	2.5486	0.0111	STOCK	0.00003	0.00001	2.6919	0.0073	STOCK	0.00003	0.00001	2.6299	0.0088
C	-0.00134	0.00086	-1.5618	0.1189	C	-0.00131	0.00085	-1.5391	0.1243	C	-0.00150	0.00088	-1.7025	0.0892
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.1181	Mean dependent var		0.1632	R-squared	0.1348	Mean dependent var		0.1593	R-squared	0.1108	Mean dependent var		0.1583
Adjusted R-squared	0.1018	S.D. dependent var		1.0706	Adjusted R-squared	0.1188	S.D. dependent var		1.0795	Adjusted R-squared	0.0944	S.D. dependent var		1.0651
S.E. of regression	1.0038	Sum squared resid		600.5010	S.E. of regression	1.0027	Sum squared resid		599.2258	S.E. of regression	1.0030	Sum squared resid		599.5242
F-statistic	7.2557	Durbin-Watson stat		2.0050	F-statistic	8.4395	Durbin-Watson stat		2.0156	F-statistic	6.7504	Durbin-Watson stat		2.0021
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.0693	Mean dependent var		0.0014	R-squared	0.0722	Mean dependent var		0.0014	R-squared	0.0636	Mean dependent var		0.0014
Sum squared resid	0.0524	Durbin-Watson stat		2.0206	Sum squared resid	0.0522	Durbin-Watson stat		2.0258	Sum squared resid	0.0527	Durbin-Watson stat		2.0102

E.1.3 Model 3. Pooled OLS Regression contd.

Dependent Variable: BOTTOM 40 Method: Panel Least Squares Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: BOTTOM 40 Method: Panel Least Squares Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624					Dependent Variable: BOTTOM 40 Method: Panel Least Squares Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOT40LAG(1)	0.98735	0.00598	165.2536	0.0000	BOT40LAG(1)	0.98756	0.00602	164.0387	0.0000	BOT40LAG(1)	0.98823	0.00592	167.0584	0.0000
DEBT	0.00001	0.00006	0.1409	0.8880	DEBT	0.00003	0.00006	0.4523	0.6512	DEBT	0.000002	0.00006	0.0347	0.9723
SDDAD	0.00014	0.00077	0.1797	0.8574	SDDSPEND	0.00018	0.00105	0.1729	0.8628	SDDTAX	0.000003	0.00198	0.0018	0.9986
MDDAD	0.00061	0.00049	1.2362	0.2169	MDDSPEND	0.00071	0.00067	1.0513	0.2935	MDDTAX	0.00076	0.00095	0.8008	0.4235
LDDAD	0.00082	0.00032	2.5873	0.0099	LDDSPEND	0.00099	0.00052	1.9136	0.0561	LDDTAX	0.00226	0.00072	3.1641	0.0016
VLDDAD	0.00034	0.00034	0.9974	0.3190	VLDDSPEND	0.00032	0.00052	0.6045	0.5457	VLDDTAX	0.00092	0.00076	1.2168	0.2242
ELDDAD	-0.00092	0.00038	-2.4160	0.0160	ELDDSPEND	-0.00130	0.00064	-2.0464	0.0411	ELDDTAX	-0.00205	0.00078	-2.6301	0.0088
INFLATION	-0.00008	0.00007	-1.2927	0.1966	INFLATION	-0.00009	0.00007	-1.3974	0.1628	INFLATION	-0.00008	0.00007	-1.1665	0.2439
UNEMPINTP	-0.00003	0.00006	-0.4279	0.6689	UNEMPINTP	-0.00002	0.00006	-0.3738	0.7087	UNEMPINTP	-0.00002	0.00006	-0.3320	0.7400
GDPG	-0.00007	0.00012	-0.6100	0.5421	GDPG	-0.00006	0.00012	-0.4808	0.6309	GDPG	-0.00007	0.00012	-0.6288	0.5297
STOCK	-0.00001	0.00001	-0.5967	0.5509	STOCK	-0.00001	0.00001	-0.5925	0.5537	STOCK	-0.00001	0.00001	-0.5888	0.5562
C	0.00208	0.00119	1.7566	0.0795	C	0.00205	0.00120	1.7158	0.0867	C	0.00191	0.00117	1.6286	0.1039
R-squared	0.9792	Mean dependent var	0.1688		R-squared	0.9790	Mean dependent var	0.1688		R-squared	0.9793	Mean dependent var	0.1688	
Adjusted R-squared	0.9788	S.D. dependent var	0.0382		Adjusted R-squared	0.9786	S.D. dependent var	0.0382		Adjusted R-squared	0.9790	S.D. dependent var	0.0382	
S.E. of regression	0.0056	Akaike info criterion	-	7.5266	S.E. of regression	0.0056	Akaike info criterion	-	7.5174	S.E. of regression	0.0055	Akaike info criterion	-	7.5327
Sum squared resid	0.0189	Schwarz criterion	7.4413		Sum squared resid	0.0191	Schwarz criterion	7.4320		Sum squared resid	0.0188	Schwarz criterion	7.4474	
Log likelihood	2360.3010	Hannan-Quinn criter.	7.4935		Log likelihood	2357.4150	Hannan-Quinn criter.	7.4842		Log likelihood	2362.2040	Hannan-Quinn criter.	7.4996	
F-statistic	2619.8860	Durbin-Watson stat	2.3642		F-statistic	2595.2540	Durbin-Watson stat	2.3727		F-statistic	2636.2530	Durbin-Watson stat	2.3566	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Dependent Variable: BOTTOM 50 Method: Panel Least Squares Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: BOTTOM 50 Method: Panel Least Squares Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608					Dependent Variable: BOTTOM 50 Method: Panel Least Squares Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOTSOLAG(1)	-0.15746	0.03979	-3.9575	0.0001	BOTSOLAG(1)	-0.15730	0.03997	-3.9359	0.0001	BOTSOLAG(1)	-0.15740	0.03962	-3.9723	0.0001
DEBT	0.00003	0.00006	0.4859	0.6272	DEBT	0.00005	0.00006	0.8313	0.4061	DEBT	0.00001	0.00006	0.2139	0.8307
SDDAD	0.00012	0.00087	0.1387	0.8897	SDDSPEND	0.00003	0.00119	0.0257	0.9795	SDDTAX	0.00053	0.00226	0.2336	0.8153
MDDAD	0.00014	0.00056	0.2553	0.7986	MDDSPEND	-0.00004	0.00075	-0.0486	0.9612	MDDTAX	0.00054	0.00111	0.4873	0.6262
LDDAD	0.00092	0.00036	2.5831	0.0100	LDDSPEND	0.00106	0.00058	1.8244	0.0686	LDDTAX	0.00272	0.00081	3.3656	0.0008
VLDDAD	0.00031	0.00039	0.7899	0.4299	VLDDSPEND	0.00024	0.00059	0.4017	0.6880	VLDDTAX	0.00095	0.00085	1.1208	0.2628
ELDDAD	-0.00098	0.00043	-2.2937	0.0222	ELDDSPEND	-0.00147	0.00072	-2.0498	0.0408	ELDDTAX	-0.00205	0.00088	-2.3327	0.0200
INFLATION	-0.00016	0.00008	-1.8695	0.0620	INFLATION	-0.00017	0.00008	-2.0287	0.0429	INFLATION	-0.00014	0.00008	-1.7115	0.0875
UNEMPINTP	-0.00003	0.00007	-0.3722	0.7099	UNEMPINTP	-0.00002	0.00007	-0.2626	0.7929	UNEMPINTP	-0.00003	0.00007	-0.4397	0.6603
GDPG	-0.00015	0.00013	-1.1466	0.2520	GDPG	-0.00013	0.00013	-0.9990	0.3182	GDPG	-0.00016	0.00013	-1.1997	0.2307
STOCK	-0.00002	0.00001	-1.1706	0.2422	STOCK	-0.00002	0.00001	-1.1658	0.2441	STOCK	-0.00002	0.00001	-1.1928	0.2334
C	0.00006	0.00069	0.0811	0.9354	C	0.00004	0.00070	0.0634	0.9494	C	0.00005	0.00069	0.0734	0.9415
R-squared	0.0582	Mean dependent var	-	0.0007	R-squared	0.0502	Mean dependent var	-	0.0007	R-squared	0.0660	Mean dependent var	-	0.0007
Adjusted R-squared	0.0409	S.D. dependent var	0.0064		Adjusted R-squared	0.0327	S.D. dependent var	0.0064		Adjusted R-squared	0.0488	S.D. dependent var	0.0064	
S.E. of regression	0.0063	Akaike info criterion	-	7.2896	S.E. of regression	0.0063	Akaike info criterion	-	7.2811	S.E. of regression	0.0062	Akaike info criterion	-	7.2979
Sum squared resid	0.0234	Schwarz criterion	7.2025		Sum squared resid	0.0236	Schwarz criterion	7.1941		Sum squared resid	0.0232	Schwarz criterion	7.2108	
Log likelihood	2228.0330	Hannan-Quinn criter.	7.2557		Log likelihood	2225.4580	Hannan-Quinn criter.	7.2472		Log likelihood	2230.5560	Hannan-Quinn criter.	7.2640	
F-statistic	3.3506	Durbin-Watson stat	1.9891		F-statistic	2.8654	Durbin-Watson stat	1.9998		F-statistic	3.8301	Durbin-Watson stat	1.9840	
Prob(F-statistic)	0.0002				Prob(F-statistic)	0.0011				Prob(F-statistic)	0.0000			

E.1.4 Model 3. Pooled OLS Regression contd.

Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 14 Total panel (balanced) observations: 546 Linear estimation after one-step weighting matrix					Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 14 Total panel (balanced) observations: 546 Linear estimation after one-step weighting matrix					Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 14 Total panel (balanced) observations: 546 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
PALMALAG(1)	0.96070	0.00130	740.4687	0.0000	PALMALAG(1)	0.96092	0.00133	721.4294	0.0000	PALMALAG(1)	0.96045	0.00128	751.2471	0.0000
DEBT	-0.00005	0.00012	-0.3708	0.7110	DEBT	-0.00008	0.00012	-0.6533	0.5138	DEBT	-0.00008	0.00012	-0.6639	0.5070
SDDAD	-0.00022	0.00102	-0.2112	0.8328	SDDSPEND	-0.00054	0.00131	-0.4108	0.6814	SDDTAX	0.00062	0.00282	0.2191	0.8266
MDDAD	-0.00134	0.00085	-1.5756	0.1157	MDDSPEND	-0.00075	0.00118	-0.6326	0.5273	MDDTAX	-0.00298	0.00177	-1.6829	0.0930
LDDAD	-0.00209	0.00069	-3.0479	0.0024	LDDSPEND	-0.00390	0.00106	-3.6641	0.0003	LDDTAX	-0.00293	0.00156	-1.8760	0.0612
VLDDAD	-0.00125	0.00092	-1.3551	0.1760	VLDDSPEND	-0.00121	0.00144	-0.8362	0.4034	VLDDTAX	-0.00299	0.00201	-1.4864	0.1378
ELDDAD	0.00105	0.00112	0.9393	0.3480	ELDDSPEND	0.00103	0.00199	0.5157	0.6063	ELDDTAX	0.00389	0.00211	1.8418	0.0661
INFLATION	0.00058	0.00013	4.4357	0.0000	INFLATION	0.00055	0.00013	4.2563	0.0000	INFLATION	0.00064	0.00013	5.0197	0.0000
UNEMPINTP	0.00082	0.00013	6.5568	0.0000	UNEMPINTP	0.00080	0.00013	6.3620	0.0000	UNEMPINTP	0.00078	0.00012	6.4705	0.0000
GDPG	0.00090	0.00024	3.6840	0.0003	GDPG	0.00087	0.00024	3.6855	0.0003	GDPG	0.00092	0.00024	3.9236	0.0001
STOCK	-0.00001	0.00002	-0.2956	0.7677	STOCK	-0.00001	0.00002	-0.3044	0.7609	STOCK	0.00000	0.00002	-0.1843	0.8538
C	0.03617	0.00182	19.8408	0.0000	C	0.03617	0.00184	19.6591	0.0000	C	0.03630	0.00182	19.9886	0.0000
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.9993	Mean dependent var	105.0921		R-squared	0.9993	Mean dependent var	105.2679		R-squared	0.9994	Mean dependent var	107.9355	
Adjusted R-squared	0.9993	S.D. dependent var	97.7688		Adjusted R-squared	0.9993	S.D. dependent var	100.0243		Adjusted R-squared	0.9994	S.D. dependent var	109.8374	
S.E. of regression	0.9787	Sum squared resid	511.4621		S.E. of regression	0.9779	Sum squared resid	510.6441		S.E. of regression	0.9825	Sum squared resid	515.4220	
F-statistic	72385.9800	Durbin-Watson stat	1.6157		F-statistic	67823.0100	Durbin-Watson stat	1.6171		F-statistic	78009.2800	Durbin-Watson stat	1.6104	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.9982	Mean dependent var	1.2873		R-squared	0.9982	Mean dependent var	1.2873		R-squared	0.9982	Mean dependent var	1.2873	
Sum squared resid	0.5185	Durbin-Watson stat	1.2199		Sum squared resid	0.5184	Durbin-Watson stat	1.2099		Sum squared resid	0.5199	Durbin-Watson stat	1.2252	
Dependent Variable: TOP10BOT50 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624 Linear estimation after one-step weighting matrix					Dependent Variable: TOP10BOT50 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624 Linear estimation after one-step weighting matrix					Dependent Variable: TOP10BOT50 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 16 Total panel (balanced) observations: 624 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10BOT50LAG(1)	0.9875	0.0061	162.3101	0.0000	TOP10BOT50LAG(1)	0.9885	0.0061	162.2161	0.0000	TOP10BOT50LAG(1)	0.9879	0.0060	165.9529	0.0000
DEBT	0.0058	0.0030	1.9212	0.0552	DEBT	0.0044	0.0030	1.4805	0.1393	DEBT	0.0059	0.0031	1.9242	0.0548
SDDAD	-0.0239	0.0462	-0.5168	0.6055	SDDSPEND	-0.0020	0.0617	-0.0322	0.9743	SDDTAX	-0.1789	0.1276	-1.4023	0.1613
MDDAD	-0.0204	0.0287	-0.7097	0.4782	MDDSPEND	-0.0006	0.0371	-0.0163	0.9870	MDDTAX	-0.0837	0.0591	-1.4163	0.1572
LDDAD	-0.0152	0.0180	-0.8475	0.3971	LDDSPEND	-0.0080	0.0295	-0.2699	0.7873	LDDTAX	-0.0557	0.0398	-1.4009	0.1617
VLDDAD	-0.0070	0.0242	-0.2890	0.7727	VLDDSPEND	0.0318	0.0380	0.8361	0.4034	VLDDTAX	-0.0926	0.0517	-1.7905	0.0739
ELDDAD	0.0125	0.0218	0.5721	0.5674	ELDDSPEND	0.0395	0.0374	1.0556	0.2916	ELDDTAX	0.0022	0.0404	0.0549	0.9563
INFLATION	0.0014	0.0046	0.2940	0.7689	INFLATION	0.0017	0.0046	0.3722	0.7099	INFLATION	0.0015	0.0047	0.3203	0.7489
UNEMPINTP	0.0056	0.0038	1.4687	0.1424	UNEMPINTP	0.0041	0.0038	1.0860	0.2779	UNEMPINTP	0.0067	0.0037	1.7993	0.0725
GDPG	0.0373	0.0059	6.3312	0.0000	GDPG	0.0369	0.0058	6.3851	0.0000	GDPG	0.0360	0.0060	5.9960	0.0000
STOCK	0.0008	0.0008	1.0240	0.3062	STOCK	0.0009	0.0008	1.1295	0.2591	STOCK	0.0008	0.0008	1.0346	0.3012
C	0.0080	0.0539	0.1482	0.8822	C	0.0048	0.0536	0.0888	0.9293	C	0.0091	0.0536	0.1706	0.8646
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.9791	Mean dependent var	13.5242		R-squared	0.9791	Mean dependent var	13.5495		R-squared	0.9798	Mean dependent var	13.5367	
Adjusted R-squared	0.9788	S.D. dependent var	11.3926		Adjusted R-squared	0.9788	S.D. dependent var	11.6328		Adjusted R-squared	0.9794	S.D. dependent var	11.5080	
S.E. of regression	1.0027	Sum squared resid	615.2672		S.E. of regression	1.0033	Sum squared resid	616.0368		S.E. of regression	1.0017	Sum squared resid	614.0924	
F-statistic	2612.4180	Durbin-Watson stat	2.4511		F-statistic	2611.9410	Durbin-Watson stat	2.4576		F-statistic	2694.3680	Durbin-Watson stat	2.4666	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.9713	Mean dependent var	6.9343		R-squared	0.9712	Mean dependent var	6.9343		R-squared	0.9714	Mean dependent var	6.9343	
Sum squared resid	175.9715	Durbin-Watson stat	2.5731		Sum squared resid	176.1927	Durbin-Watson stat	2.5795		Sum squared resid	175.4405	Durbin-Watson stat	2.5722	

E.1.5 Model 3 – Top 1 & 10 Stock-GDP estimation

Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1LAG1	-0.18206	0.03792	-4.8013	0.0000	TOP1LAG1	-0.19264	0.03792	-5.0798	0.0000	TOP1LAG1	-0.17432	0.03817	-4.5672	0.0000
DEBT	0.00008	0.00005	1.4789	0.1397	DEBT	0.00005	0.00005	0.9548	0.3401	DEBT	0.00011	0.00005	2.1356	0.0331
SDDAD	0.00113	0.00075	1.5118	0.1311	SDDSPEND	0.00212	0.00102	2.0808	0.0379	SDDTAX	-0.00023	0.00170	-0.1372	0.8909
MDDAD	0.00114	0.00045	2.5219	0.0119	MDDSPEND	0.00186	0.00060	3.1033	0.0020	MDDTAX	0.00020	0.00090	0.2254	0.8218
LDDAD	-0.00008	0.00031	-0.2553	0.7986	LDDSPEND	0.00021	0.00050	0.4258	0.6704	LDDTAX	-0.00098	0.00073	-1.3485	0.1780
VLDDAD	0.00078	0.00026	3.0000	0.0028	VLDDSPEND	0.00137	0.00039	3.4907	0.0005	VLDDTAX	0.00078	0.00061	1.2782	0.2017
ELDDAD	0.00056	0.00027	2.0317	0.0426	ELDDSPEND	0.00111	0.00046	2.4278	0.0155	ELDDTAX	0.00059	0.00062	0.9549	0.3400
INFLATION	0.00003	0.00006	0.5710	0.5682	INFLATION	0.00006	0.00006	1.0302	0.3033	INFLATION	0.00003	0.00006	0.4581	0.6470
UNEMPINTP	0.00008	0.00006	1.3971	0.1629	UNEMPINTP	0.00007	0.00006	1.2479	0.2126	UNEMPINTP	0.00012	0.00006	2.0268	0.0431
GDPG	0.00082	0.00011	7.6081	0.0000	GDPG	0.00080	0.00011	7.4270	0.0000	GDPG	0.00081	0.00011	7.2947	0.0000
DEBTSTOCK	0.0000003	0.0000001	2.9344	0.0035	DEBTSTOCK	0.0000004	0.0000001	3.0146	0.0027	DEBTSTOCK	0.0000003	0.0000001	2.7974	0.0053
C	-0.00242	0.00066	-3.6706	0.0003	C	-0.00239	0.00066	-3.6228	0.0003	C	-0.00237	0.00068	-3.4953	0.0005
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.1486	Mean dependent var		0.1193	R-squared	0.1567	Mean dependent var		0.1180	R-squared	0.1309	Mean dependent var		0.1136
Adjusted R-squared	0.1329	S.D. dependent var		1.0853	Adjusted R-squared	0.1411	S.D. dependent var		1.0894	Adjusted R-squared	0.1148	S.D. dependent var		1.0750
S.E. of regression	1.0034	Sum squared resid		600.0094	S.E. of regression	1.0027	Sum squared resid		599.2455	S.E. of regression	1.0049	Sum squared resid		601.8027
F-statistic	9.4550	Durbin-Watson stat		2.0579	F-statistic	10.0667	Durbin-Watson stat		2.0549	F-statistic	8.1593	Durbin-Watson stat		2.0686
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.0949	Mean dependent var		0.0009	R-squared	0.1001	Mean dependent var		0.0009	R-squared	0.0875	Mean dependent var		0.0009
Sum squared resid	0.0314	Durbin-Watson stat		2.0287	Sum squared resid	0.0312	Durbin-Watson stat		2.0256	Sum squared resid	0.0316	Durbin-Watson stat		2.0312

Dependent Variable: TOP10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP10 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix				
DEBT-ADJ (DEBT*ADJUSTMENT SIZE) MODEL					DEBT-SPEND (DEBT*SPEND) MODEL					DEBT-TAX (DEBT*TAX) MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP10LAG1	-0.17450	0.03831	-4.5549	0.0000	TOP10LAG1	-0.17893	0.03811	-4.6946	0.0000	TOP10LAG1	-0.17239	0.03865	-4.4607	0.0000
DEBT	0.000002	0.00007	0.0226	0.9820	DEBT	-0.00002	0.00007	-0.2902	0.7718	DEBT	0.00004	0.00007	0.5117	0.6090
SDDAD	0.00092	0.00092	0.9925	0.3213	SDDSPEND	0.00292	0.00129	2.2681	0.0237	SDDTAX	-0.00224	0.00202	-1.1104	0.2673
MDDAD	0.00130	0.00053	2.4403	0.0150	MDDSPEND	0.00232	0.00066	3.5152	0.0005	MDDTAX	-0.00046	0.00113	-0.4087	0.6829
LDDAD	0.00038	0.00038	0.9939	0.3207	LDDSPEND	0.00103	0.00062	1.6711	0.0952	LDDTAX	0.00012	0.00090	0.1353	0.8924
VLDDAD	0.00028	0.00044	0.6353	0.5255	VLDDSPEND	0.00058	0.00065	0.8971	0.3700	VLDDTAX	-0.00012	0.00095	-0.1265	0.8994
ELDDAD	0.00080	0.00046	1.7523	0.0802	ELDDSPEND	0.00156	0.00074	2.1165	0.0347	ELDDTAX	0.00094	0.00098	0.9582	0.3383
INFLATION	0.00025	0.00010	2.5245	0.0118	INFLATION	0.00025	0.00010	2.5434	0.0112	INFLATION	0.00024	0.00010	2.4784	0.0135
UNEMPINTP	0.000004	0.00008	0.0460	0.9633	UNEMPINTP	-0.00001	0.00008	-0.1031	0.9179	UNEMPINTP	0.00008	0.00009	0.8964	0.3704
GDPG	0.00083	0.00014	5.8488	0.0000	GDPG	0.00083	0.00014	5.8963	0.0000	GDPG	0.00084	0.00014	5.8469	0.0000
DEBTSTOCK	0.0000004	0.0000002	2.8304	0.0048	DEBTSTOCK	0.0000005	0.0000002	2.9331	0.0035	DEBTSTOCK	0.0000004	0.0000002	2.6980	0.0072
C	-0.00136	0.00086	-1.5884	0.1127	C	-0.00134	0.00085	-1.5708	0.1168	C	-0.00153	0.00088	-1.7377	0.0828
Weighted Statistics					Weighted Statistics					Weighted Statistics				
R-squared	0.1209	Mean dependent var		0.1635	R-squared	0.1370	Mean dependent var		0.1594	R-squared	0.1108	Mean dependent var		0.1576
Adjusted R-squared	0.1047	S.D. dependent var		1.0727	Adjusted R-squared	0.1211	S.D. dependent var		1.0812	Adjusted R-squared	0.0944	S.D. dependent var		1.0660
S.E. of regression	1.0038	Sum squared resid		600.5406	S.E. of regression	1.0026	Sum squared resid		599.1491	S.E. of regression	1.0035	Sum squared resid		600.1230
F-statistic	7.4508	Durbin-Watson stat		2.0070	F-statistic	8.6003	Durbin-Watson stat		2.0177	F-statistic	6.7488	Durbin-Watson stat		2.0052
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics					Unweighted Statistics				
R-squared	0.0691	Mean dependent var		0.0014	R-squared	0.0721	Mean dependent var		0.0014	R-squared	0.0634	Mean dependent var		0.0014
Sum squared resid	0.0524	Durbin-Watson stat		2.0213	Sum squared resid	0.0522	Durbin-Watson stat		2.0279	Sum squared resid	0.0527	Durbin-Watson stat		2.0106

E.1.6 Model 3 - Private Debt estimation

Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix					Dependent Variable: TOP1 Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1982 2019 Cross-sections included: 16 Total panel (balanced) observations: 608 Linear estimation after one-step weighting matrix				
PUBLIC DEBT*HOUSEHOLD DEBT*ADJUSTMENT SIZE MODEL					PUBLIC DEBT*NON-FIN SECTOR DEBT*ADJUSTMENT SIZE MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP1LAG1	-0.18942	0.03752	-5.0485	0.0000	TOP1LAG1	-0.17955	0.03747	-4.7915	0.0000
DEBT	0.00008	0.00005	1.5300	0.1265	DEBT	0.00008	0.00005	1.6918	0.0912
INFLATION	0.00003	0.00006	0.4428	0.6581	INFLATION	0.00001	0.00006	0.2551	0.7987
UNEMPLOYMENT	0.00008	0.00006	1.3731	0.1702	UNEMPLOYMENT	0.00014	0.00006	2.4671	0.0139
GDPG	0.00067	0.00011	6.1789	0.0000	GDPG	0.00070	0.00011	6.6634	0.0000
STOCK	0.00003	0.00001	3.0367	0.0025	STOCK	0.00003	0.00001	3.0757	0.0022
SDD-HHC-ADJ	0.00046	0.00019	2.4139	0.0161	SDD-NFS-ADJ	0.00034	0.00022	1.5546	0.1206
MDD-HHC-ADJ	-0.00099	0.00020	-5.0555	0.0000	MDD-NFS-ADJ	-0.00014	0.00005	-3.1396	0.0018
LDD-HHC-ADJ	-0.00021	0.00008	-2.7665	0.0058	LDD-NFS-ADJ	-0.00014	0.00003	-4.0810	0.0001
VLD-HHC-ADJ	-0.00018	0.00012	-1.5466	0.1225	VLD-NFS-ADJ	0.00013	0.00005	2.7554	0.0060
ELD-HHC-ADJ	-0.00008	0.00011	-0.7127	0.4763	ELD-NFS-ADJ	-0.00002	0.00003	-0.5966	0.5510
C	-0.00160	0.00069	-2.3035	0.0216	C	-0.00213	0.00066	-3.2160	0.0014
Weighted Statistics					Weighted Statistics				
R-squared	0.1725	Mean dependent var	0.1203		R-squared	0.1787	Mean dependent var	0.1120	
Adjusted R-squared	0.1572	S.D. dependent var	1.0974		Adjusted R-squared	0.1636	S.D. dependent var	1.1012	
S.E. of regression	1.0014	Sum squared resid	597.6896		S.E. of regression	1.0014	Sum squared resid	597.6982	
F-statistic	11.2956	Durbin-Watson stat	2.0757		F-statistic	11.7911	Durbin-Watson stat	2.0721	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics				
R-squared	0.1104	Mean dependent var	0.0009		R-squared	0.0972	Mean dependent var	0.0009	
Sum squared resid	0.0309	Durbin-Watson stat	2.0699		Sum squared resid	0.0313	Durbin-Watson stat	2.0758	
Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 14 Total panel (balanced) observations: 546 Linear estimation after one-step weighting matrix					Dependent Variable: PALMA RATIO Method: Panel EGLS (Cross-section SUR) Sample (adjusted): 1981 2019 Cross-sections included: 14 Total panel (balanced) observations: 546 Linear estimation after one-step weighting matrix				
PUBLIC DEBT*HOUSEHOLD DEBT*ADJUSTMENT SIZE MODEL					PUBLIC DEBT*NON-FIN SECTOR DEBT*ADJUSTMENT SIZE MODEL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
PALMA	0.96055	0.00132	728.6717	0.0000	PALMA	0.96076	0.00134	716.4714	0.0000
DEBT	-0.00026	0.00010	-2.6773	0.0077	DEBT	-0.00019	0.00010	-1.8649	0.0627
INFLATION	0.00076	0.00013	5.6929	0.0000	INFLATION	0.00068	0.00012	5.7546	0.0000
UNEMPLOYMENT	0.00068	0.00011	6.2086	0.0000	UNEMPLOYMENT	0.00066	0.00011	6.0912	0.0000
GDPG	0.00076	0.00021	3.5615	0.0004	GDPG	0.00072	0.00022	3.2817	0.0011
STOCK	-0.000002	0.00002	-0.0878	0.9300	STOCK	-0.000002	0.00002	-0.0896	0.9286
SDD-HHC-ADJ	-0.00023	0.00017	-1.3845	0.1668	SDD-NFS-ADJ	-0.00001	0.00020	-0.0562	0.9552
MDD-HHC-ADJ	0.00015	0.00022	0.6831	0.4948	MDD-NFS-ADJ	-0.00010	0.00007	-1.3913	0.1647
LDD-HHC-ADJ	0.00115	0.00017	6.9118	0.0000	LDD-NFS-ADJ	0.00023	0.00007	3.0803	0.0022
VLD-HHC-ADJ	-0.00093	0.00028	-3.3174	0.0010	VLD-NFS-ADJ	-0.00033	0.00021	-1.5542	0.1207
ELD-HHC-ADJ	-0.00081	0.00033	-2.4371	0.0151	ELD-NFS-ADJ	-0.00028	0.00014	-2.0185	0.0440
C	0.03653	0.00183	19.9852	0.0000	C	0.03677	0.00187	19.7172	0.0000
Weighted Statistics					Weighted Statistics				
R-squared	0.9993	Mean dependent var	104.0078		R-squared	0.9992	Mean dependent var	111.7249	
Adjusted R-squared	0.9993	S.D. dependent var	93.1719		Adjusted R-squared	0.9992	S.D. dependent var	107.0061	
S.E. of regression	0.9973	Sum squared resid	531.1344		S.E. of regression	0.9904	Sum squared resid	523.7969	
F-statistic	67352.6300	Durbin-Watson stat	1.6242		F-statistic	64418.9900	Durbin-Watson stat	1.6341	
Prob(F-statistic)	0.0000				Prob(F-statistic)	0.0000			
Unweighted Statistics					Unweighted Statistics				
R-squared	0.9983	Mean dependent var	1.2873		R-squared	0.9982	Mean dependent var	1.2873	
Sum squared resid	0.5101	Durbin-Watson stat	1.1262		Sum squared resid	0.5172	Durbin-Watson stat	1.1845	

Appendix F Highly Indebted Countries estimation results

F.1 Model 4 – Quantile Panel Regression

Quantile Process Estimates											
Equation: TOTAL INCOME SHARE - DEBT-ADJ MODEL											
Specification: TOTAL INCOME SHARE DEBT DEBTADJ DEBTLTINTR INFLATION UNEMP GDPG STOCK C											
Estimated equation quantile tau = 0.5											
Number of process quantiles: 10											
	Quantile	Coefficient	Std. Error	t-Statistic	Prob.		Quantile	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.1	0.0022	0.0011	2.0163	0.0448	INFLATION	0.1	-0.0400	0.0115	-3.4737	0.0006
	0.2	0.0011	0.0014	0.7677	0.4433		0.2	-0.0398	0.0126	-3.1520	0.0018
	0.3	0.0032	0.0015	2.1983	0.0288		0.3	-0.0229	0.0157	-1.4603	0.1454
	0.4	0.0005	0.0021	0.2595	0.7954		0.4	-0.0157	0.0157	-1.0020	0.3172
	0.5	-0.0017	0.0021	-0.7902	0.4301		0.5	-0.0080	0.0157	-0.5103	0.6103
	0.6	-0.0039	0.0022	-1.7466	0.0818		0.6	-0.0106	0.0139	-0.7611	0.4472
	0.7	-0.0040	0.0037	-1.0918	0.2759		0.7	-0.0202	0.0255	-0.7916	0.4293
	0.8	-0.0037	0.0034	-1.0673	0.2868		0.8	-0.0564	0.0281	-2.0056	0.0459
	0.9	-0.0035	0.0047	-0.7318	0.4649		0.9	-0.0663	0.0337	-1.9675	0.0501
DEBT-ADJ	0.1	-0.0003	0.0008	-0.3829	0.7021	UNEMPLOYMENT	0.1	-0.0708	0.0128	-5.5293	0.0000
	0.2	-0.0002	0.0012	-0.1973	0.8438		0.2	-0.0749	0.0175	-4.2783	0.0000
	0.3	-0.0004	0.0007	-0.5236	0.6010		0.3	-0.0620	0.0209	-2.9661	0.0033
	0.4	-0.0004	0.0005	-0.7229	0.4704		0.4	-0.0486	0.0238	-2.0403	0.0423
	0.5	-0.0005	0.0005	-0.9680	0.3339		0.5	-0.0576	0.0261	-2.2097	0.0280
	0.6	-0.0013	0.0005	-2.6475	0.0086		0.6	-0.0913	0.0445	-2.0542	0.0409
	0.7	-0.0013	0.0005	-2.9288	0.0037		0.7	-0.1041	0.0583	-1.7849	0.0754
	0.8	-0.0001	0.0012	-0.0934	0.9256		0.8	-0.1471	0.0474	-3.1039	0.0021
	0.9	-0.0006	0.0009	-0.5993	0.5495		0.9	-0.1066	0.0547	-1.9499	0.0522
DEBT-LTINTR	0.1	-0.0005	0.0001	-4.0261	0.0001	GDPG	0.1	-0.0691	0.0180	-3.8493	0.0001
	0.2	-0.0004	0.0002	-1.6980	0.0907		0.2	-0.0823	0.0248	-3.3150	0.0010
	0.3	-0.0001	0.0004	-0.1434	0.8861		0.3	-0.0589	0.0241	-2.4432	0.0152
	0.4	0.0003	0.0004	0.7940	0.4279		0.4	-0.0678	0.0270	-2.5147	0.0125
	0.5	0.0005	0.0004	1.2679	0.2059		0.5	-0.0642	0.0280	-2.2950	0.0225
	0.6	0.0010	0.0001	7.6692	0.0000		0.6	-0.0874	0.0301	-2.9011	0.0040
	0.7	0.0010	0.0001	9.0855	0.0000		0.7	-0.0723	0.0503	-1.4364	0.1520
	0.8	0.0010	0.0001	9.5183	0.0000		0.8	-0.0776	0.0588	-1.3210	0.1876
	0.9	0.0009	0.0001	6.4585	0.0000		0.9	-0.0777	0.0273	-2.8408	0.0048
C	0.1	24.5385	0.1250	196.3803	0.0000	STOCK	0.1	0.0065	0.0010	6.2075	0.0000
	0.2	24.7781	0.1580	156.8696	0.0000		0.2	0.0072	0.0013	5.5613	0.0000
	0.3	24.4195	0.2390	102.1891	0.0000		0.3	0.0072	0.0016	4.5807	0.0000
	0.4	24.4048	0.2617	93.2398	0.0000		0.4	0.0113	0.0033	3.4068	0.0008
	0.5	24.5842	0.2722	90.3012	0.0000		0.5	0.0159	0.0041	3.8983	0.0001
	0.6	25.0668	0.5243	47.8081	0.0000		0.6	0.0171	0.0034	5.0411	0.0000
	0.7	25.4484	0.9156	27.7933	0.0000		0.7	0.0172	0.0045	3.8586	0.0001
	0.8	26.4024	0.6652	39.6929	0.0000		0.8	0.0109	0.0042	2.6039	0.0097
	0.9	26.6562	0.6169	43.2087	0.0000		0.9	0.0093	0.0053	1.7449	0.0821

F.1.1 Model 4. Quantile Panel Regression contd.

Quantile Process Estimates

Equation: TOTAL INCOME SHARE - DEBT-SPEND MODEL

Specification: TOTAL INCOME SHARE DEBT DEBTSPEND DEBTLTINTR INFLATION UNEMP GDPG STOCK C

Estimated equation quantile tau = 0.5

Number of process quantiles: 10

	Quantile	Coefficient	Std. Error	t-Statistic	Prob.		Quantile	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.1	0.0013	0.0012	1.1501	0.2511	INFLATION	0.1	-0.0425	0.0122	-3.4902	0.0006
	0.2	0.0015	0.0014	1.0697	0.2857		0.2	-0.0344	0.0123	-2.7903	0.0056
	0.3	0.0030	0.0015	2.0061	0.0458		0.3	-0.0236	0.0162	-1.4580	0.1460
	0.4	0.0008	0.0020	0.3967	0.6919		0.4	-0.0111	0.0151	-0.7348	0.4631
	0.5	-0.0015	0.0021	-0.7088	0.4790		0.5	-0.0055	0.0157	-0.3516	0.7254
	0.6	-0.0039	0.0022	-1.7951	0.0738		0.6	-0.0068	0.0140	-0.4888	0.6254
	0.7	-0.0038	0.0039	-0.9707	0.3326		0.7	-0.0235	0.0255	-0.9225	0.3571
	0.8	-0.0037	0.0036	-1.0296	0.3041		0.8	-0.0560	0.0282	-1.9813	0.0486
	0.9	-0.0035	0.0049	-0.6995	0.4849		0.9	-0.0663	0.0341	-1.9428	0.0531
DEBT-SPEND	0.1	0.0005	0.0006	0.9355	0.3503	UNEMPLOYMENT	0.1	-0.0644	0.0136	-4.7177	0.0000
	0.2	0.0009	0.0006	1.5611	0.1197		0.2	-0.0825	0.0179	-4.6147	0.0000
	0.3	0.0002	0.0008	0.2932	0.7696		0.3	-0.0705	0.0202	-3.4920	0.0006
	0.4	-0.0005	0.0008	-0.6062	0.5449		0.4	-0.0478	0.0235	-2.0345	0.0429
	0.5	-0.0008	0.0008	-0.9723	0.3318		0.5	-0.0604	0.0265	-2.2794	0.0234
	0.6	-0.0017	0.0008	-2.0756	0.0389		0.6	-0.1022	0.0445	-2.2966	0.0224
	0.7	-0.0023	0.0007	-3.2205	0.0014		0.7	-0.1018	0.0564	-1.8041	0.0723
	0.8	-0.0001	0.0025	-0.0380	0.9697		0.8	-0.1468	0.0474	-3.0967	0.0022
	0.9	-0.0011	0.0026	-0.4417	0.6591		0.9	-0.1066	0.0567	-1.8805	0.0611
DEBT-LTINTR	0.1	-0.0005	0.0001	-3.4824	0.0006	GDPG	0.1	-0.0696	0.0184	-3.7740	0.0002
	0.2	-0.0004	0.0002	-1.5128	0.1315		0.2	-0.0761	0.0236	-3.2314	0.0014
	0.3	-0.0001	0.0004	-0.2312	0.8173		0.3	-0.0600	0.0244	-2.4636	0.0144
	0.4	0.0003	0.0004	0.7017	0.4835		0.4	-0.0635	0.0266	-2.3908	0.0175
	0.5	0.0005	0.0004	1.2718	0.2045		0.5	-0.0574	0.0275	-2.0878	0.0378
	0.6	0.0010	0.0001	7.0841	0.0000		0.6	-0.0781	0.0292	-2.6776	0.0079
	0.7	0.0010	0.0001	9.6650	0.0000		0.7	-0.0629	0.0550	-1.1437	0.2537
	0.8	0.0010	0.0001	9.2626	0.0000		0.8	-0.0775	0.0597	-1.2979	0.1954
	0.9	0.0009	0.0001	6.2724	0.0000		0.9	-0.0777	0.0270	-2.8820	0.0043
C	0.1	24.5536	0.1292	190.0846	0.0000	STOCK	0.1	0.0065	0.0011	6.1008	0.0000
	0.2	24.7440	0.1572	157.4405	0.0000		0.2	0.0074	0.0013	5.5433	0.0000
	0.3	24.4816	0.2367	103.4344	0.0000		0.3	0.0074	0.0016	4.6143	0.0000
	0.4	24.3820	0.2589	94.1766	0.0000		0.4	0.0109	0.0031	3.4952	0.0006
	0.5	24.5436	0.2739	89.5994	0.0000		0.5	0.0158	0.0039	4.0582	0.0001
	0.6	25.0918	0.5217	48.0931	0.0000		0.6	0.0171	0.0035	4.9481	0.0000
	0.7	25.3874	0.9280	27.3569	0.0000		0.7	0.0171	0.0044	3.8682	0.0001
	0.8	26.3938	0.6772	38.9731	0.0000		0.8	0.0110	0.0042	2.6367	0.0089
	0.9	26.6562	0.6298	42.3222	0.0000		0.9	0.0093	0.0053	1.7399	0.0830

F.1.2 Model 4. Quantile Panel Regression contd.

Quantile Process Estimates

Equation: TOTAL INCOME SHARE - DEBT-TAX MODEL

Specification: TOTAL INCOME SHARE DEBT DEBTTAX DEBTLTINTR INFLATION UNEMP GDPG STOCK C

Estimated equation quantile tau = 0.5

Number of process quantiles: 10

	Quantile	Coefficient	Std. Error	t-Statistic	Prob.		Quantile	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.1	0.0019	0.0011	1.7914	0.0743	INFLATION	0.1	-0.0374	0.0112	-3.3504	0.0009
	0.2	0.0021	0.0013	1.6714	0.0958		0.2	-0.0279	0.0109	-2.5566	0.0111
	0.3	0.0019	0.0015	1.2263	0.2212		0.3	-0.0229	0.0131	-1.7428	0.0825
	0.4	0.0006	0.0021	0.3094	0.7572		0.4	-0.0124	0.0161	-0.7721	0.4407
	0.5	-0.0017	0.0020	-0.8794	0.3800		0.5	-0.0071	0.0159	-0.4492	0.6537
	0.6	-0.0039	0.0022	-1.7512	0.0810		0.6	-0.0106	0.0137	-0.7713	0.4412
	0.7	-0.0052	0.0031	-1.6441	0.1013		0.7	-0.0232	0.0240	-0.9684	0.3337
	0.8	-0.0038	0.0029	-1.3338	0.1834		0.8	-0.0637	0.0262	-2.4349	0.0155
	0.9	-0.0035	0.0046	-0.7483	0.4549		0.9	-0.0663	0.0332	-1.9952	0.0470
DEBT-TAX	0.1	-0.0015	0.0010	-1.4459	0.1494	UNEMPLOYMENT	0.1	-0.0812	0.0136	-5.9724	0.0000
	0.2	-0.0023	0.0019	-1.2103	0.2272		0.2	-0.0755	0.0150	-5.0226	0.0000
	0.3	-0.0038	0.0031	-1.2414	0.2155		0.3	-0.0708	0.0188	-3.7690	0.0002
	0.4	-0.0028	0.0037	-0.7593	0.4483		0.4	-0.0522	0.0231	-2.2638	0.0244
	0.5	-0.0032	0.0028	-1.1460	0.2528		0.5	-0.0573	0.0259	-2.2110	0.0279
	0.6	-0.0036	0.0016	-2.2812	0.0233		0.6	-0.0914	0.0493	-1.8526	0.0650
	0.7	-0.0034	0.0014	-2.4581	0.0146		0.7	-0.0999	0.0621	-1.6089	0.1088
	0.8	-0.0027	0.0043	-0.6301	0.5292		0.8	-0.1382	0.0434	-3.1832	0.0016
	0.9	-0.0009	0.0013	-0.7128	0.4766		0.9	-0.1066	0.0530	-2.0121	0.0452
DEBT-LTINTR	0.1	-0.0005	0.0001	-3.6623	0.0003	GDPG	0.1	-0.0735	0.0189	-3.8966	0.0001
	0.2	-0.0003	0.0003	-0.9586	0.3386		0.2	-0.0727	0.0217	-3.3536	0.0009
	0.3	0.0001	0.0004	0.1731	0.8627		0.3	-0.0761	0.0243	-3.1350	0.0019
	0.4	0.0003	0.0004	0.5818	0.5612		0.4	-0.0734	0.0270	-2.7185	0.0070
	0.5	0.0006	0.0004	1.4161	0.1579		0.5	-0.0690	0.0271	-2.5424	0.0116
	0.6	0.0010	0.0001	7.8813	0.0000		0.6	-0.0874	0.0295	-2.9576	0.0034
	0.7	0.0010	0.0001	9.4410	0.0000		0.7	-0.0797	0.0495	-1.6110	0.1083
	0.8	0.0010	0.0001	9.2041	0.0000		0.8	-0.0696	0.0301	-2.3081	0.0217
	0.9	0.0009	0.0001	6.4894	0.0000		0.9	-0.0777	0.0279	-2.7816	0.0058
C	0.1	24.6090	0.1257	195.7021	0.0000	STOCK	0.1	0.0066	0.0011	6.2736	0.0000
	0.2	24.6407	0.1553	158.6895	0.0000		0.2	0.0062	0.0013	4.9140	0.0000
	0.3	24.5757	0.2137	115.0139	0.0000		0.3	0.0075	0.0016	4.5693	0.0000
	0.4	24.4614	0.2688	91.0086	0.0000		0.4	0.0113	0.0034	3.3035	0.0011
	0.5	24.5544	0.2751	89.2455	0.0000		0.5	0.0162	0.0040	4.0442	0.0001
	0.6	25.0663	0.5552	45.1453	0.0000		0.6	0.0171	0.0035	4.9172	0.0000
	0.7	25.5507	0.9156	27.9071	0.0000		0.7	0.0173	0.0044	3.9020	0.0001
	0.8	26.4401	0.5685	46.5082	0.0000		0.8	0.0098	0.0038	2.5730	0.0106
	0.9	26.6562	0.6109	43.6373	0.0000		0.9	0.0093	0.0053	1.7598	0.0796

F.2 Quantile Panel Regression – Japan

Quantile Process Estimates											
Equation: TOTAL INCOME SHARE - DEBT-ADJ MODEL											
Specification: TOTAL INCOME SHARE DEBT DEBTADJ DEBTLTINTR INFLATION UNEMP GDPG STOCK C											
Estimated equation quantile tau = 0.5											
Number of process quantiles: 10											
Quantile Coefficient Std. Error t-Statistic Prob.						Quantile Coefficient Std. Error t-Statistic Prob.					
DEBT	0.1	-0.0059	0.0005	-10.98	0.0000	INFLATION	0.1	-0.0226	0.0154	-1.46	0.1540
	0.2	-0.0054	0.0006	-9.59	0.0000		0.2	-0.0048	0.0122	-0.40	0.6950
	0.3	-0.0056	0.0004	-12.50	0.0000		0.3	-0.0034	0.0132	-0.26	0.7980
	0.4	-0.0052	0.0005	-9.63	0.0000		0.4	-0.0028	0.0133	-0.21	0.8340
	0.5	-0.0052	0.0005	-10.91	0.0000		0.5	0.0010	0.0122	0.09	0.9320
	0.6	-0.0046	0.0006	-7.38	0.0000		0.6	-0.0019	0.0163	-0.12	0.9060
	0.7	-0.0043	0.0006	-7.25	0.0000		0.7	0.0029	0.0144	0.20	0.8400
	0.8	-0.0043	0.0007	-6.53	0.0000		0.8	0.0039	0.0115	0.34	0.7370
	0.9	-0.0044	0.0007	-6.57	0.0000		0.9	0.0091	0.0135	0.68	0.5050
DEBT-ADJ	0.1	0.0002	0.0012	0.16	0.8740	UNEMPLOYMENT	0.1	0.0308	0.0264	1.17	0.2520
	0.2	-0.0001	0.0012	-0.10	0.9240		0.2	0.0466	0.0282	1.65	0.1090
	0.3	-0.0003	0.0014	-0.20	0.8460		0.3	0.0566	0.0285	1.99	0.0560
	0.4	-0.0003	0.0012	-0.27	0.7860		0.4	0.0455	0.0328	1.39	0.1750
	0.5	-0.0003	0.0012	-0.28	0.7790		0.5	0.0612	0.0313	1.95	0.0600
	0.6	-0.0011	0.0012	-0.91	0.3700		0.6	0.0472	0.0338	1.40	0.1730
	0.7	-0.0007	0.0010	-0.73	0.4690		0.7	0.0612	0.0389	1.57	0.1260
	0.8	-0.0006	0.0007	-0.89	0.3800		0.8	0.0600	0.0419	1.43	0.1620
	0.9	-0.0002	0.0007	-0.21	0.8310		0.9	0.0773	0.0371	2.09	0.0450
DEBT-LTINTR	0.1	0.0001	0.0000	1.51	0.1400	GDPG	0.1	-0.0014	0.0084	-0.17	0.8650
	0.2	0.0001	0.0001	1.28	0.2120		0.2	-0.0004	0.0096	-0.04	0.9710
	0.3	0.0001	0.0001	1.51	0.1410		0.3	0.0051	0.0091	0.55	0.5830
	0.4	0.0001	0.0001	1.90	0.0660		0.4	0.0068	0.0105	0.65	0.5240
	0.5	0.0001	0.0001	1.74	0.0920		0.5	0.0111	0.0119	0.93	0.3580
	0.6	0.0002	0.0001	2.71	0.0110		0.6	0.0158	0.0150	1.06	0.2990
	0.7	0.0002	0.0001	3.51	0.0010		0.7	0.0170	0.0179	0.95	0.3490
	0.8	0.0002	0.0001	3.58	0.0010		0.8	0.0152	0.0174	0.87	0.3890
	0.9	0.0003	0.0001	3.44	0.0020		0.9	0.0146	0.0127	1.14	0.2610
C	0.1	26.6489	0.0969	275.14	0.0000	STOCK	0.1	0.0001	0.0006	0.24	0.8080
	0.2	26.5497	0.1115	238.17	0.0000		0.2	-0.0006	0.0007	-0.80	0.4280
	0.3	26.5582	0.1112	238.87	0.0000		0.3	-0.0003	0.0008	-0.46	0.6490
	0.4	26.5602	0.1215	218.61	0.0000		0.4	-0.0006	0.0008	-0.74	0.4680
	0.5	26.4959	0.1360	194.79	0.0000		0.5	-0.0005	0.0007	-0.60	0.5500
	0.6	26.5537	0.1502	176.74	0.0000		0.6	-0.0017	0.0009	-1.98	0.0570
	0.7	26.4887	0.1778	149.01	0.0000		0.7	-0.0018	0.0009	-2.04	0.0500
	0.8	26.4970	0.1621	163.46	0.0000		0.8	-0.0017	0.0011	-1.52	0.1380
	0.9	26.4521	0.1240	213.27	0.0000		0.9	-0.0016	0.0010	-1.54	0.1340

F.3 Quantile Panel Regression - Italy

Quantile Process Estimates											
Equation: TOTAL INCOME SHARE - DEBT-ADJ MODEL											
Specification: TOTAL INCOME SHARE DEBT DEBTADJ DEBTLTINTR INFLATION UNEMP GDPG STOCK C											
Estimated equation quantile tau = 0.5											
Number of process quantiles: 10											
	Quantile	Coefficient	Std. Error	t-Statistic	Prob.		Quantile	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.1	-0.00937	0.00384	-2.44	0.0200	INFLATION	0.1	-0.0139	0.0057	-2.43	0.0210
	0.2	-0.00694	0.00404	-1.72	0.0960		0.2	-0.0121	0.0045	-2.70	0.0110
	0.3	-0.00435	0.00376	-1.16	0.2570		0.3	-0.0097	0.0039	-2.51	0.0170
	0.4	-0.00016	0.00352	-0.05	0.9640		0.4	-0.0083	0.0037	-2.23	0.0330
	0.5	-0.00059	0.00349	-0.17	0.8660		0.5	-0.0078	0.0039	-2.01	0.0530
	0.6	0.00100	0.00302	0.33	0.7420		0.6	-0.0047	0.0046	-1.01	0.3200
	0.7	0.00138	0.00246	0.56	0.5790		0.7	-0.0050	0.0063	-0.80	0.4300
	0.8	0.00011	0.00214	0.05	0.9590		0.8	-0.0125	0.0073	-1.70	0.0980
	0.9	-0.00075	0.00194	-0.39	0.7010		0.9	-0.0148	0.0080	-1.85	0.0740
DEBT-ADJ	0.1	0.00009	0.00024	0.36	0.7210	UNEMPLOYMENT	0.1	0.0203	0.0150	1.36	0.1840
	0.2	0.00002	0.00023	0.07	0.9430		0.2	0.0128	0.0170	0.75	0.4580
	0.3	-0.00004	0.00017	-0.24	0.8110		0.3	0.0074	0.0131	0.56	0.5770
	0.4	-0.00017	0.00012	-1.41	0.1690		0.4	-0.0055	0.0162	-0.34	0.7360
	0.5	-0.00001	0.00013	-0.07	0.9450		0.5	-0.0032	0.0144	-0.23	0.8230
	0.6	-0.00004	0.00011	-0.37	0.7120		0.6	-0.0051	0.0108	-0.47	0.6390
	0.7	-0.00006	0.00009	-0.66	0.5170		0.7	-0.0062	0.0086	-0.72	0.4780
	0.8	-0.00004	0.00010	-0.39	0.7020		0.8	-0.0043	0.0090	-0.48	0.6380
	0.9	-0.00003	0.00011	-0.24	0.8130		0.9	-0.0013	0.0102	-0.13	0.8970
DEBT-LTINTR	0.1	-0.00012	0.00007	-1.77	0.0870	GDPG	0.1	-0.0012	0.0110	-0.10	0.9180
	0.2	-0.00010	0.00006	-1.62	0.1150		0.2	0.0045	0.0124	0.36	0.7220
	0.3	-0.00009	0.00005	-1.75	0.0900		0.3	0.0086	0.0108	0.80	0.4320
	0.4	-0.00006	0.00004	-1.37	0.1820		0.4	0.0193	0.0108	1.79	0.0830
	0.5	-0.00005	0.00003	-1.63	0.1130		0.5	0.0170	0.0124	1.37	0.1800
	0.6	-0.00007	0.00003	-1.95	0.0610		0.6	0.0210	0.0089	2.35	0.0250
	0.7	-0.00006	0.00003	-2.05	0.0490		0.7	0.0196	0.0077	2.56	0.0150
	0.8	-0.00003	0.00002	-1.25	0.2220		0.8	0.0159	0.0092	1.72	0.0950
	0.9	-0.00002	0.00003	-0.66	0.5150		0.9	0.0145	0.0090	1.61	0.1170
C	0.1	27.54181	0.39304	70.07	0.0000	STOCK	0.1	0.0000	0.0005	0.08	0.9410
	0.2	27.33242	0.3638168	75.13	0.0000		0.2	-0.0002	0.0005	-0.29	0.7710
	0.3	27.10947	0.32792	82.67	0.0000		0.3	-0.0003	0.0005	-0.60	0.5530
	0.4	26.76559	0.25507	104.94	0.0000		0.4	-0.0007	0.0005	-1.35	0.1870
	0.5	26.78649	0.2617347	102.34	0.0000		0.5	-0.0006	0.0004	-1.42	0.1670
	0.6	26.65370	0.25295	105.37	0.0000		0.6	-0.0008	0.0003	-2.63	0.0130
	0.7	26.63299	0.20805	128.01	0.0000		0.7	-0.0008	0.0002	-3.55	0.0010
	0.8	26.75271	0.18528	144.39	0.0000		0.8	-0.0006	0.0002	-3.24	0.0030
	0.9	26.81913	0.15220	176.21	0.0000		0.9	-0.0006	0.0002	-3.05	0.0050

Appendix G Low Indebted Countries estimation results

G.1 Model 4. Quantile Panel Regression

Quantile Process Estimates Equation: TOTAL INCOME SHARE - DEBT-ADJ MODEL Specification: TOTAL INCOME SHARE DEBT DEBTADJ DEBTLTINTR INTR INFLATION UNEMP GDPG STOCK C Estimated equation quantile tau = 0.5 Number of process quantiles: 10											
	Quantile	Coefficient	Std. Error	t-Statistic	Prob.		Quantile	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.1	0.0108	0.0158	0.6784	0.4979	INFLATION	0.1	0.0285	0.0486	0.5866	0.5579
	0.2	0.0265	0.0057	4.6394	0.0000		0.2	0.0947	0.0302	3.1389	0.0018
	0.3	0.0313	0.0053	5.8666	0.0000		0.3	0.1265	0.0380	3.3285	0.0010
	0.4	0.0295	0.0056	5.2536	0.0000		0.4	0.0959	0.0418	2.2944	0.0224
	0.5	0.0263	0.0057	4.6203	0.0000		0.5	0.0784	0.0412	1.9042	0.0577
	0.6	0.0192	0.0046	4.1559	0.0000		0.6	0.0551	0.0378	1.4568	0.1461
	0.7	0.0183	0.0052	3.5428	0.0004		0.7	0.0531	0.0337	1.5761	0.1159
	0.8	0.0148	0.0054	2.7301	0.0067		0.8	0.0479	0.0338	1.4166	0.1575
	0.9	0.0042	0.0052	0.7983	0.4252		0.9	0.0095	0.0293	0.3232	0.7467
DEBT-ADJ	0.1	-0.0019	0.0018	-1.0515	0.2937	UNEMPLOYMENT	0.1	0.0076	0.0473	0.1615	0.8718
	0.2	-0.0095	0.0036	-2.6493	0.0084		0.2	0.0947	0.0178	5.3258	0.0000
	0.3	-0.0070	0.0021	-3.2798	0.0011		0.3	0.0766	0.0175	4.3798	0.0000
	0.4	-0.0046	0.0013	-3.5671	0.0004		0.4	0.0585	0.0204	2.8650	0.0044
	0.5	-0.0045	0.0019	-2.4160	0.0162		0.5	0.0066	0.0214	0.3073	0.7588
	0.6	-0.0041	0.0015	-2.6449	0.0085		0.6	-0.0105	0.0189	-0.5540	0.5799
	0.7	-0.0040	0.0014	-2.8893	0.0041		0.7	-0.0199	0.0187	-1.0601	0.2898
	0.8	-0.0018	0.0016	-1.1475	0.2519		0.8	-0.0470	0.0179	-2.6235	0.0091
	0.9	-0.0004	0.0014	-0.2628	0.7929		0.9	-0.0592	0.0160	-3.6958	0.0003
DEBT-LTINTR	0.1	-0.0003	0.0010	-0.2946	0.7685	GDPG	0.1	-0.0041	0.0215	-0.1895	0.8498
	0.2	-0.0009	0.0004	-2.4984	0.0129		0.2	0.0295	0.0327	0.9039	0.3667
	0.3	-0.0013	0.0004	-3.4823	0.0006		0.3	0.0235	0.0384	0.6136	0.5399
	0.4	-0.0007	0.0004	-2.0559	0.0405		0.4	0.0560	0.0423	1.3248	0.1861
	0.5	-0.0001	0.0004	-0.2578	0.7967		0.5	0.0473	0.0665	0.7112	0.4774
	0.6	0.0006	0.0004	1.5516	0.1217		0.6	-0.0115	0.0530	-0.2170	0.8284
	0.7	0.0007	0.0004	1.8695	0.0624		0.7	0.0149	0.0495	0.3009	0.7637
	0.8	0.0010	0.0003	3.3270	0.0010		0.8	0.0307	0.0455	0.6744	0.5005
	0.9	0.0014	0.0003	5.3341	0.0000		0.9	0.0682	0.0409	1.6659	0.0966
C	0.1	22.8111	0.6781	33.6386	0.0000	STOCK	0.1	-0.0004	0.0013	-0.3494	0.7270
	0.2	21.6334	0.2986	72.4450	0.0000		0.2	-0.0009	0.0009	-1.0483	0.2952
	0.3	21.8032	0.3410	63.9333	0.0000		0.3	-0.0012	0.0011	-1.0415	0.2983
	0.4	22.3749	0.4010	55.7992	0.0000		0.4	-0.0019	0.0014	-1.3681	0.1721
	0.5	23.6447	0.4834	48.9181	0.0000		0.5	0.0015	0.0043	0.3356	0.7373
	0.6	24.3008	0.3742	64.9458	0.0000		0.6	0.0029	0.0035	0.8394	0.4018
	0.7	24.4853	0.3156	77.5791	0.0000		0.7	0.0062	0.0025	2.4326	0.0155
	0.8	24.9929	0.3023	82.6774	0.0000		0.8	0.0079	0.0018	4.3142	0.0000
	0.9	25.7171	0.2762	93.1147	0.0000		0.9	0.0109	0.0021	5.2406	0.0000

G.1.1 Model 4. Quantile Panel Regression contd.

Quantile Process Estimates											
Equation: TOTAL INCOME SHARE - DEBT-SPEND & DEBT-TAX MODEL											
Specification: TOTAL INCOME SHARE DEBT DEBTPEND DEBTTAX DEBTLTINTR INFLATION UNEMP GDPG STOCK C											
Number of process quantiles: 10											
	Quantile	Coefficient	Std. Error	t-Statistic	Prob.		Quantile	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.1	0.0154	0.0166	0.9277	0.3542	DEBTLTINTR	0.1	-0.0005	0.0010	-0.4854	0.6277
	0.2	0.0228	0.0067	3.3934	0.0008		0.2	-0.0006	0.0004	-1.5545	0.1210
	0.3	0.0290	0.0054	5.3435	0.0000		0.3	-0.0010	0.0003	-2.9057	0.0039
	0.4	0.0297	0.0057	5.2635	0.0000		0.4	-0.0007	0.0004	-2.1187	0.0348
	0.5	0.0272	0.0061	4.4658	0.0000		0.5	-0.0002	0.0005	-0.4152	0.6783
	0.6	0.0197	0.0047	4.1635	0.0000		0.6	0.0005	0.0004	1.4563	0.1462
	0.7	0.0206	0.0054	3.8209	0.0002		0.7	0.0005	0.0004	1.4543	0.1468
	0.8	0.0149	0.0056	2.6825	0.0077		0.8	0.0009	0.0003	2.9981	0.0029
	0.9	0.0042	0.0053	0.7950	0.4271		0.9	0.0014	0.0003	5.2776	0.0000
DEBT-SPEND	0.1	-0.0040	0.0021	-1.9193	0.0558	INFLATION	0.1	0.0376	0.0453	0.8288	0.4078
	0.2	-0.0116	0.0036	-3.2506	0.0013		0.2	0.0913	0.0297	3.0692	0.0023
	0.3	-0.0089	0.0037	-2.3865	0.0175		0.3	0.1167	0.0368	3.1735	0.0016
	0.4	-0.0061	0.0021	-2.8417	0.0048		0.4	0.0950	0.0423	2.2457	0.0253
	0.5	-0.0053	0.0026	-2.0660	0.0396		0.5	0.0719	0.0427	1.6823	0.0934
	0.6	-0.0042	0.0022	-1.9464	0.0524		0.6	0.0573	0.0380	1.5078	0.1325
	0.7	-0.0040	0.0020	-2.0388	0.0422		0.7	0.0553	0.0336	1.6461	0.1006
	0.8	-0.0032	0.0021	-1.5110	0.1317		0.8	0.0438	0.0339	1.2916	0.1973
	0.9	-0.0002	0.0027	-0.0711	0.9434		0.9	0.0095	0.0293	0.3225	0.7472
DEBT-TAX	0.1	0.0043	0.0024	1.8121	0.0708	UNEMPLOYMENT	0.1	0.0236	0.0409	0.5762	0.5648
	0.2	-0.0052	0.0026	-2.0189	0.0443		0.2	0.1091	0.0169	6.4525	0.0000
	0.3	-0.0054	0.0021	-2.5282	0.0119		0.3	0.0728	0.0178	4.0937	0.0001
	0.4	-0.0043	0.0019	-2.2908	0.0226		0.4	0.0524	0.0219	2.3930	0.0172
	0.5	-0.0033	0.0020	-1.6329	0.1034		0.5	0.0115	0.0221	0.5191	0.6040
	0.6	-0.0032	0.0017	-1.8337	0.0676		0.6	-0.0114	0.0192	-0.5917	0.5544
	0.7	-0.0026	0.0015	-1.6860	0.0927		0.7	-0.0244	0.0190	-1.2807	0.2011
	0.8	0.0003	0.0022	0.1239	0.9015		0.8	-0.0445	0.0182	-2.4459	0.0149
	0.9	-0.0005	0.0014	-0.3785	0.7053		0.9	-0.0592	0.0161	-3.6837	0.0003
C	0.1	22.5843	0.5983	37.7494	0.0000	GDPG	0.1	0.0039	0.0219	0.1778	0.8590
	0.2	21.6976	0.2995	72.4475	0.0000		0.2	0.0228	0.0303	0.7514	0.4529
	0.3	21.8373	0.3355	65.0909	0.0000		0.3	0.0309	0.0378	0.8172	0.4144
	0.4	22.4146	0.3981	56.2977	0.0000		0.4	0.0601	0.0427	1.4072	0.1603
	0.5	23.6243	0.5104	46.2833	0.0000		0.5	0.0479	0.0654	0.7316	0.4649
	0.6	24.2810	0.3681	65.9689	0.0000		0.6	-0.0094	0.0530	-0.1784	0.8585
	0.7	24.4904	0.3117	78.5669	0.0000		0.7	0.0136	0.0495	0.2748	0.7836
	0.8	24.9595	0.3058	81.6099	0.0000		0.8	0.0439	0.0455	0.9659	0.3348
	0.9	25.7171	0.2770	92.8380	0.0000		0.9	0.0682	0.0409	1.6654	0.0967
						STOCK	0.1	-0.0015	0.0014	-1.0125	0.3120
							0.2	-0.0009	0.0009	-0.9656	0.3349
							0.3	-0.0009	0.0011	-0.7995	0.4245
							0.4	-0.0018	0.0014	-1.3330	0.1834
							0.5	0.0011	0.0046	0.2398	0.8106
							0.6	0.0029	0.0034	0.8511	0.3953
							0.7	0.0057	0.0026	2.1855	0.0295
							0.8	0.0080	0.0019	4.3188	0.0000
							0.9	0.0109	0.0021	5.2279	0.0000

5 CONCLUDING REMARKS AND POLICY IMPLICATION

In the last few decades, income inequality levels have grown in nearly all the regions of the world albeit at different speeds with levels lowest and highest in Europe and the Middle East regions respectively (wir 2018, 2022). A large array of empirical literature (e.g. Atkinson 1999, 2017; Charles-Coll 1999; Gradin et al. 2006; Pressman 2007; IMF 2014, 2017; Piketty 2014; wir 2018, 2020, 2022) can be found on the broad area of income inequality, its causes (which range from global to domestic factors) and ways it can be tackled. Rising income inequality levels have underlying negative consequences on economic growth, health & well-being as well as social cohesion. It can also be influenced by institutions and policies which contribute towards shaping its trajectory - with one of such policies being fiscal policy. Since the Global Financial Crisis, rising inequality levels have been at the fore of global policy debate with a strand of the empirical literature (van Treeck and Sturén 2012; Calcagno 2012) alluding to its role in exacerbating global economic crisis. The right mix of policies and institutions is therefore essential in tackling inequality and improving equity. Fiscal sustainability concerns due to increasing debt levels have arisen post the Great Recession and underpin most austerity considerations. Such considerations in recent times have led to a resurgence of contentious sentiments thereby further reigniting the austerity debate with particular regards to (i) the economic consequences of such actions and (ii) regarding distributional and equity concerns since lower income deciles tend to be more adversely impacted if adjustment implementation leads to a rise in income inequality levels (Alesina and Drazen 1991; IMF 2017).

Motivated therefore by the large body of conflicting empirical literature as to the economic and distributional consequences of austerity implementation, this thesis sets out to enrich our understanding pertaining to the effects of fiscal consolidation programmes on output and income

inequality. Therefore as first steps, a systematic review of the extant literature was undertaken in order to disentangle the large body of literature with findings revealing that the academic discourse on austerity (*which has shaped economic policy*) has primarily been guided by the prevailing ideologies or theoretical constructs (*i.e. Classical, Keynesian, Neoclassical, Neoliberal, Post-Keynesian, etc*) regarding its short-term economic effects. In this regard, while the Keynesian views find austerity as deeply contractionary and so prescribe countercyclical fiscal measures i.e. austerity during boom times (to offset inflation due to possible overheating of the economy) and deficit spending via *capital account expenditure* during slumps i.e. recessionary times (to stimulate aggregate demand by countering unemployment), the supply side views recommend procyclical policies. More recently neoliberal and Post-Keynesian sentiments have clashed; while neoliberal sentiments have advocated austerity policies particularly via cuts to government's social expenditure programmes, the Post-Keynesian views while imbibing the spirit of Keynesian prescription, have additionally highlighted distributional concerns which arise during austerity implementation. In disentangling the substantial literature, evidence therefore appears to indicate that fiscal retrenchment programmes tend to be: (i) contractionary on output in the short run and (ii) associated with an increase in inequality. To that effect, the systematic review of the extant literature makes three distinct contributions: first and foremost, to the best of our knowledge, this is the first study in this area to employ a systematic literature review methodology; secondly, it provides a comprehensive analysis of the impact of austerity by identifying relevant aspects of the distributional channels and implications of austerity implementation for the economy and thirdly; it proposes directions for future research pertinent to both academic researchers and policymakers.

The systematic review of the literature also identified several understudied areas regarding distributional impacts from austerity implementation – two of which are covered in this thesis and

pertain to: (i) the long-term distributional effects of fiscal adjustment programmes and (ii) the impact of high (low) public indebtedness on income inequality during adjustment implementation. With regards to the long-term distributional effects of fiscal adjustment programmes, although, growing interest as to the distributional consequences of fiscal adjustments has led to a surge in the output of literature on the subject – the dynamic consequences of fiscal adjustments on income inequality is an area in the literature which is comparatively under-researched. Seminal work in this area as seen in Ball et al. (2013) – and subsequently Furceri et al. (2016); Bova et al. (2018) and Heimberger (2020) explore these and provide empirical support indicative that adverse distributional effects following the implementation of fiscal adjustments tend to persist up to the medium term. Specifically, by estimating impulse response functions from local projections, Ball et al. (2013), Furceri et al. (2016) and Bova et al. (2018) show findings indicating that short- and medium-term inequality increases act more persistently via the unemployment channel with attendant consequences on labour's share of income. Heimberger (2020) similarly by employing the same empirical framework, additionally delivers insights pertaining to how the adjustment size and duration as well as the economy's business cycle position impacts inequality both in the short and medium term. Therefore, since the literature is relatively silent on the long-term impact of consolidation programmes on inequality, exploring the far-reaching effects and the fiscal tools (expenditure and revenue) responsible for driving these enable us assess how long these linger into the future and the extent of impact from these tools since the literature (for instance IMF 2014) shows that those at the lower end of the income distribution tend to be more disproportionately affected during instances of fiscal adjustments. By estimating impulse response functions from local projections for a panel of 16 OECD countries over a 40-year period, this study contributes to the literature by providing novel evidence suggestive that government's adjustment decisions tend

to (i) have persistent adverse effects which last up to the 15th year of adjustment implementation (ii) by making use of a wider set of inequality indicators (comprising the Gini, Labour income share, Top income share *as well as* Bottom & Middle income share, ratios of top/bottom income share), we further provide evidence suggestive that adverse effects tend to be steeper for the Bottom 40 with peak estimates at the 15th period higher than previous peak estimates (iii) furthermore, by exploring the channels i.e. spend and revenue driving these since the literature (e.g. Agnello and Sousa 2011, 2012; Woo et al. 2013; IMF 2014; Clements et al. 2015; Paulus et al. 2017; Brinca et al. 2020) provides evidence to show that spend-based instruments especially those targeted at social benefits and public wage costs are more detrimental on income inequality than tax, we show findings indicative that although adverse effects are both persistent via the expenditure and revenue fiscal tools, however the impact through the expenditure channel tend to be steeper.

On the impact of high (low) public indebtedness on income inequality during adjustment implementation - while there is a large body of empirical literature pertaining to public debt and economic growth, public debt and debt stabilisation policies, as well as the impact of austerity policies (with regards to the composition of the adjustment, size, duration, pace and the business cycle position during adjustment implementation) on income inequality, however the literature is relatively silent regarding the role (if any) of public debt in impacting distributional outcomes during adjustment implementation. While Bartak et al. (2022) explore the possibility of a causal relationship between public debt and income inequality and find for a non-causal linear relationship, Klein and Winkler on the other hand in exploring the *private debt-adjustment-inequality nexus* (i.e. in exploring distributional effects resulting from private debt overhang during austerity implementation) find for adverse distributional effects at low public debt thresholds. In

the aftermath of the covid-19 pandemic, with global authorities faced with high and unprecedented debt levels (as a result of policy responses implemented to combat the pandemic and, the ensuing recession caused by sharp output decline) amidst debt sustainability and distributional concerns, it becomes essential to investigate if high (low) public debt levels influence distributional outcomes during austerity implementation. Although the benefits of sustainable finances cannot be denied, a strand of the literature (see for instance, Ghosh et al. 2013; Ostry et al. 2015; Charmon et al. 2021) puts forward the notion that despite high and rising debt levels, should ample fiscal space remain, that countries gain no additional “crisis-insurance” benefit from implementing austerity policies because of the inherent costs associated with these policies. Nevertheless, with fiscal authorities faced with weak growth, rising prices and more pressing debt issues than hitherto experienced, - exploring the *public debt-austerity-income inequality nexus* becomes crucial in assisting policymakers make effective decisions regarding debt stabilisation. This study therefore by utilising time series data for a panel of countries over a 40-year period (1980 – 2019) and by employing the panel threshold methodology contributes and shows evidence suggestive that public debt levels matter during adjustment implementation – with adverse distributional effects worsening over medium to extreme debt levels. Furthermore, findings are indicative that revenue-based instruments are more prone to deliver adverse distributional effects than expenditure-based instruments.

The findings for this thesis are inherently crucial and contribute to the existing literature by highlighting the extent of dynamic effects following austerity implementation as well as the impact public debt levels play in these circumstances. Nevertheless, we note that despite the lessons learnt from fiscal retrenchment programmes implemented post the 2007/8 global financial crisis, the new austerity ideology (adjudicating for austerity policies as a firm commitment by

governments towards sustainable finances) which caters to the “market” (i.e. the global financial market and the holders of government bonds) still very much persists. However, as noted by Born et al. (2019) “financial markets are schizophrenic about austerity in that they demand austerity measures as public debt builds up but fail to reward them as austerity slows down output growth” p.324. Notwithstanding the need for sustainable finances, evidence as seen from the extant literature and this study tends to back the legitimacy of equity concerns raised during austerity considerations due to resulting adverse distributional consequences. For countries with ample fiscal space (and also for those which have run out), the policy message would ostensibly align with the Post-Keynesian prescription and focus on growth enhancing measures rather than embarking on premature adjustment programmes which could threaten growth recovery. However, should countries be under pressure from the ‘market’ to embark on debt sustainability campaigns, then attention should be geared towards deepening of the tax base by encompassing reach and progressivity. For instance, corporate tax increases could be implemented and geared towards closing the gap between top income shares in order to mitigate problems related to tax shifting (wir2022). Increases such as this would potentially help to moderate inequality and at the same time act to re-assure (and allay the fears of) the market that governments are geared towards sustainable finances.