



Financial Inclusion and Well-being- Is it Demand-Following or Supply-Leading?

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Title

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Summary

A two-way association can be established between financial inclusion and well-being. On the one hand, financial inclusion promotes well-being (supply-leading hypothesis), while an increase in well-being facilitates the generation of demand for financial products and services (demand-following hypothesis). This study attempts to objectively assess the significance of the demand-following and supply-leading hypotheses in the context of different-income economies to fill such gaps in the existing literature. It aims to investigate the evolving nature of financial inclusion and well-being (only physical dimensions) and establish an empirical relationship between the two. The canonical correlation technique is used to provide empirical evidence, and the supply-leading hypothesis holds for high-income countries. However, the demand-following approach is more effective than the supply-leading approach in middle-income and low-income countries. As the demand-following hypothesis is gaining momentum, policy efforts to raise the demand for financial products and services through financial literacy is vital, as are collaboration and investments to improve quality of life.

Track

Financial Management Track (Financial Intermediation)

Introduction

The goal of financial inclusion is to bring the weaker and more vulnerable members of society into the mainstream of the financial system (Karmakar, 2007; NABARD, 2008; World Bank, 2018). An all-encompassing financial system would undoubtedly improve efficiency and welfare (Kuri & Laha, 2011; Laha, 2015). Easy access to financial services can assist in improving daily transactions and reducing the usage of often predatory sources of finance (Pais, 2010). Financial inclusion must go beyond simply opening savings accounts and/or providing credit, and focus on asset building, risk mitigation, and well-being (Ansong, et.al., 2020; Arunachalam, 2008). This demonstrates the link between the process of financial inclusion and human development (Outreville 1999).

Increasing the supply side or delivery systems can significantly improve financial inclusion. Many locations, parts of the population, and sub-sectors of the economy have limited or weak demand for financial products and services. Increasing the supply side or delivery systems can significantly improve financial inclusion. Demand-side measures are required to raise the degree of inclusion. Financial inclusion is a key policy focus for governments around the world (Sarma, 2011). It is envisaged that the expansion of economic prospects will have an impact on several dimensions of well-being, thereby raising the national level of human development.

Since 1990, strong improvement in human development and well-being measures has been linked to a large fall in the poverty rate (Adams, 2003). According to the supply-leading hypothesis, as the financial sector matures, so does the supply of financial services. This results in improved choices supporting prudent financial decisions (Mckinnon, 1973; Shaw, 1973; Hurlin and Venet, 2008). On the other hand, the demand-following theory suggests that as the economy grows, increasing demand for financial services expands the financial sector (Robinson, 1952; Singh, 1999; Calderón and Liu, 2002). Patrick (1966) claims that as the economy grows, the causal relationship between financial development and economic growth shifts. The supply-leading and demand-following hypotheses are combined in what is known as the "stage of development" theory. According to Patrick (1966), the supply-ling hypothesis holds in a developing economy, but as the economy matures, the demand-following hypothesis takes over.

Given this backdrop, this study attempts to objectively assess the significance of the demand following and supply leading hypotheses in the context of different-income economies to fill such gaps in the existing literature. It aims to investigate the evolving nature of financial inclusion and well-being (only physical dimensions) and establish an empirical relationship between the two.

Brief review of literature

Financial development plays a substantial role in both current and future rates of economic growth (King & Levine, 1993; Levine & Zervos, 1998; Arranz Garcia & Vicente Lorente, 2014). Financial inclusion essentially reduces poverty and the dire need for essential services and diminishes income inequality (Kodan and Chhikara, 2013; Park and Mercado, 2015). The extension of rural finance, the development of the banking sector, and monetary integration have all proved to be instruments for economic growth and development (Nagadevara, 2009; Ayadi, et al., 2015; Raichoudhury, 2016; Rizwan-ul-Hassan, 2017). Financial intermediation plays a critical role in improving economic growth and hence spillover into influencing well-being (Iqbal and Sami, 2017; Mader, 2018; Jain, 2019). In many nations, rising healthcare costs, limited access to literacy and other factors reduce the quality of life and become barriers to inclusion (Ker, et. al., 2018; Kim, et. al., 2016).

There is a debate about whether well-being indicators should be measured in multidimensional or unidimensional ways (Torrance, 1987; Rejeski & Mihalko, 2001; Takuyama & Pillarisetti, 2009). The Human Development Index (HDI) is the most successful metric of societal well-being and represents Amartya Sen's "capabilities" approach (Sen, 1985). The HDI has its limitation, but overall can provide a simple impression of the development (Low & Aw, 1997; Mahbub ul Haq Human Development Centre, 2007; Porter & Purser, 2008).

The relationship between financial inclusion and human well-being has received a lot of attention in the empirical literature. Studies are divided into two types: cross-country studies (Asongu, 2011; Blando,

2013; Datta & Singh, 2019; Monacelli & Iovino, 2012; Outreville, 1999; Unnikrishnan & Jagannathan, 2014) and specific country-based studies (Burgess, et al., 2005; Desai & Surti, 2015; Gupta et al., 2014; Kuri & Laha, 2011; Nik, et. al., 2013; Wan, 2014). Outreville (1999), Asongu (2011), and Monacelli & Iovino (2012) looked at the relationship between financial intermediation and human development in developing countries highlighting a considerable positive impact of financial inclusion on human development. Cross-country studies provide empirical evidence suggesting a close association between financial inclusion and human development (Blando, 2013; Unnikrishnan and Jagannathan, 2014; Datta & Singh, 2019).

Evidence from country-specific studies indicates that social banking programmes and microfinance are successful channels of inclusive finance (Burgess et al., 2005). A high level of financial inclusion promotes human development, increased economic growth, improved literacy, etc. (Kuri and Laha, 2011; Surti, 2015). However, according to Gupta et al. (2014), the benefits were not distributed equally. Financial inclusion provides impetus to enhance the well-being of society's marginalised and underprivileged members. Literature indicates that financial inclusion improves several socio-economic parameters, and alleviates financial friction (Kodan and Chhikara, 2013; Agarwal et al., 2018; Mader, 2018).

Financial inclusion and well-being are two key development indicators that are constantly changing. This study contributes to the literature by attempting to incorporate more proxies for the ever-changing financial inclusion landscape. It also aims to adapt to shifting demographic requirements that are redefining human wellbeing.

Data and methodology

Data sources

The study is based on secondary sources of information on indicators of financial inclusion and well-being (Table 1) across 133 countries (high-income=45, middle-income=68, and low-income=20). The primary data source for variables indicating the level of financial inclusion in the World Bank's Global Findex database, which is based on individual and household survey data aggregated to the country level. The current study uses the 2017 data on several indicators to highlight the evolving dimensions of financial inclusion. The data source for variables indicating well-being is the World Bank indicators.

Table1: Variables used in the construction of financial inclusion and well-being index

Index	Category	Variable	Short description
Financial inclusion	Access	BRANCH	Bank branches per 100,000 adults
	Access	ATM	Automated Teller Machines per 100,000 adults
	Usage	ACCOUNT	Account at a formal financial institution (% age 15+)
	Usage	SAVINGS	Savings at a financial institution in the past year (% age 15+)
	Usage	LOAN	Loan from a financial institution in the past year (% age 15+)
	Technology	DP	Digital payments in the past year (% age 15+)
	Technology	MM	Paying utility bills using a mobile phone (% age 15+)
	Cashless	CC	Credit card (% age 15+)
	Cashless	DC	Debit card (% age 15+)
Well-being	Education	LITERACY	Literacy rate
	Health	LE	Life expectancy at birth
	Health	IS	Infant survival rate
	Housing & amenities	WATER	Basic drinking water services (% of population)
	Housing & amenities	ELECTRICITY	Access to electricity (% of population)
	Housing & amenities	SANITATION	Basic sanitation services (% of population)
	Communication	PHONE	Fixed telephone subscriptions
	Communication	MOBILE	Mobile cellular subscriptions

Source: Author's representation

Methodology

In the construction of the indices, the dimension index for the i^{th} dimension, d_i , is at first computed by the using the following formula.

$$d_i = \frac{A_i - m_i}{M_i - m_i} \dots \dots \dots (1)$$

where A_i =actual value of dimension I; m_i = minimum value of dimension I; M_i = maximum value of dimension I and ($0 \leq d_i \leq 1$). Minimum and maximum values of each dimension is empirically determined from the given data set. Higher value of d_i reflects better performance in the region in dimension i. The composite index is measured by the normalized inverse Euclidean distance of the position of the region from the ideal/best outcome. Algebraically, it is expressed as follows.

$$\text{Composite Index} = 1 - \sqrt{\frac{\sum_{i=1}^n (1-d_i)^2}{n}} \dots \dots \dots (2)$$

This study uses the Canonical Correlation Analysis (CCA), a multivariate data analysis technique to establish the relationship between financial inclusion and well-being. (Hotelling, 1936). CCA can treat many variables as 'dependent' and 'independent,' allowing for a more in-depth investigation (Hair, et. al., 2010). Please refer to Appendix A for more details.

Empirical results

The financial inclusion index (FI) and well-being index (WI) is seen to vary greatly among the different countries as presented in Appendix B. For ease of discussion, the analysis is done across three categories.

- *High FI and WI countries (values between 0.6 and 1)*
15 high-income countries have high financial inclusion. However, only 4 high-income countries and one upper-middle income experience higher well-being.
- *Medium FI and WI countries (values between 0.3 and 0.6)*
50 countries have medium FI values, of which 29 are high-income and 21 are middle-income countries. Unfortunately, none of the low-income countries appears in this category. 106 countries have medium WI values, of which 39 are high-income, 65 are middle-income countries, and 2 are low-income countries.
- *Low FI and WI countries (values less than 0.3)*
68 countries have low FI values, of which 56 are middle-income, and the remaining 12 are low-income countries. 22 countries have low WI values, of which 10 are middle-income, and the remaining 12 are low-income countries.

The CCA analysis presented in Table 2 demonstrates that for the whole sample the indicators of financial inclusion have a greater influence on the well-being dimensions and improving financial inclusion will provide an impetus to enhancing the well-being. With this preliminary insight, the paper examines if the same hypothesis holds for the different income categories of countries. For high-income countries supply leading hypothesis seems to hold true. However, for the middle-income and low-income countries, the empirical analysis provides evidence for the demand following hypothesis.

Table 2: Results of Canonical Correlation Analysis (CCA)

Sample	Estimated values of CC	Statistically significant functions	Financial Inclusion		Well-being		Evidence
			Significant indicators	Redundancy index	Significant indicators	Redundancy index	
Whole sample	0.8594, 0.6028, 0.4033, 0.3344, 0.2967, 0.1826, 0.0869, 0.0439	First and second	Account (1.02), DC (0.4), CC(0.3), ATM (0.12), Loan (0.1), Branches (0.06), MM (0.03)	0.36 (first) 0.04 (second)	Sanitation (0.26), Literacy (0.24)	0.34 (first) 0.01(second)	Supply-leading hypothesis

High-income	0.9194, 0.7546, 0.6784, 0.5424, 0.4438, 0.2709, 0.2215, 0.1316	First	Account (0.9), Savings (0.32), CC (0.38), ATM (0.07)	0.29	LI (2.1), Sanitation (0.88), Phone (0.74), Literacy (0.01)	0.09	Supply-leading hypothesis
Middle-income	0.769, 0.5504, 0.4937, 0.4129, 0.3511, 0.2622, 0.1755, 0.1447	First	Account (1.06), CC (0.4), Loan (0.2), ATM (0.12), Branches (0.10), MM (0.06)	0.15	Sanitation (0.3), Mobile (0.2), Literacy (0.1), LE (0.03)	0.25	Demand-following hypothesis
Low-income	0.8287, 0.6703, 0.4838, 0.4727, 0.3102, 0.2442, 0.2196, 0.1124	First and second	ATM (0.6), Account (0.5), MM (0.2), CC (0.19), Loan (0.11), Branches (0.01)	0.3 (first) 0.02 (second)	Phone (0.66), Literacy (0.3), Sanitation (0.2), Water (0.05)	0.29 (first) 0.06 second	Demand-following hypothesis

[DC: Debit Card; CC: Credit Card; ATM: Automated Teller Machine; MM: Mobile Money; LI: Literacy; LE: life Expectancy]

Source: Author's calculation

Conclusion

This paper sheds some light on the nature and degree of association between financial inclusion and well-being. A cross-country analysis of the empirical relationship between financial inclusion and well-being of 133 countries sustains the interest of the paper. The FI and WI suggest that identifying a consistent pattern across the sample is difficult. Though high-income countries have achieved higher financial inclusion and well-being, initiatives in middle-income countries are notable. The difficulties of financial exclusion and the poorer quality of life appear to be persisting in low-income countries. The index values underline that overall countries have performed worse in the well-being dimensions than in the financial inclusion dimensions, indicating the need for thought leadership and persistent investment.

The canonical correlation analysis for the overall sample demonstrates that financial inclusion indicators have a greater influence on well-being dimensions, underlining the importance of inclusive products and services for enhanced well-being. For high-income countries, the supply-leading hypothesis seems to hold. However, for the middle-income and low-income countries, the empirical analysis provides evidence for the demand following hypothesis. This means that if people's well-being improves, so will their demand for financial services, which will drive demand for financial inclusion. As a result, while the provision of financial services appears to be reducing exclusion *prima facie*, the demand-driven strategy is becoming more effective for many countries. Policy efforts to raise knowledge of financial services through financial literacy are vital in addressing the demand for financial services, as are collaboration and investments to improve quality of life. It is also interesting to see that the well-being variables driving the demand for financial inclusion vary in the two sub-samples. In middle-income countries, well-being is influenced primarily by the need for sanitation and mobile connectivity. While in the low-income countries well-being is driven by communication through fixed telephones and literacy rates mainly.

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Appendix A: Association between financial inclusion and well-being indicators using CCA

Let U be a $(1 \times m)$ vector representing X financial inclusion dimensions and V be a $(1 \times n)$ vector representing Y well-being dimensions, where m and n are the number of variables in each set. Given the weighted sum of variables of each variable set, CCA identifies the optimum linear combination of X and Y variables for the first latent association (U_1, V_1).

$$U_i = a_1x_1 + a_2x_2 + \dots + a_px_p \dots \dots \dots (3)$$

$$V_i = b_1y_1 + b_2y_2 + \dots + b_qy_q \dots \dots \dots (4)$$

where a and b are the vectors of weights for each variable set of financial inclusion and well-being. The maximum value of correlation is estimated by evaluating the linear combination of the following matrices:

$$U_i = a_i * \Omega_{11}^{0.5} * x \dots \dots \dots (5)$$

$$V_i = b_i * \Omega_{22}^{0.5} * y \dots \dots \dots (6)$$

The variance matrices for U and V are represented by Ω_{11} and Ω_{22} , respectively. The maximisation process will be carried out in stages, with the orthogonal canonical functions with declining canonical correlation values being determined first. The number of canonical correlation is determined by the minimal number of components in each situation. The Wilks' lambda (Λ) with degree of freedom α is used to examine the statistical significance of the canonical correlation coefficient (R_c).

The standardized canonical coefficients for the significant functions in the output highlight the most important dimensions. Intuitively the coefficients reflect the change in the canonical variate due to a change in the particular variable, other variables remaining constant. The Redundancy Index presents the amount of variance in a canonical variate explained by the other canonical variate in a canonical function.

Appendix B: Index of financial inclusion and well-being

Country	Category	Financial inclusion Index (FI)	FI Rank	Well-being Index (WI)	WI Rank
Afghanistan	Low-income	0.02551	133	0.397241	99
Albania	Upper-middle income	0.179555	96	0.550378	53
Algeria	Lower-middle income	0.128622	115	0.453557	85
Argentina	Upper-middle income	0.245094	75	0.338932	107
Armenia	Upper-middle income	0.306889	65	0.452084	87
Australia	High-income	0.718239	2	0.583161	12
Austria	High-income	0.59233	18	0.571367	32
Azerbaijan	Upper-middle income	0.140328	107	0.440501	94
Bahrain	High-income	0.424633	41	0.565442	35
Bangladesh	Lower-middle income	0.151875	104	0.477147	76
Belarus	Upper-middle income	0.405881	46	0.553399	50
Belgium	High-income	0.652085	8	0.579298	17
Benin	Lower-middle income	0.132839	112	0.23029	121
Bhutan	Lower-middle income	0.054038	127	0.500211	72
Bolivia	Lower-middle income	0.294833	68	0.485939	74
Bosnia and Herzegovina	Upper-middle income	0.273278	70	0.449648	89
Botswana	Upper-middle income	0.206135	86	0.380825	101
Brazil	Upper-middle income	0.362393	55	0.580955	15
Bulgaria	Upper-middle income	0.420045	43	0.54166	60
Burkina Faso	Low-income	0.138122	109	0.191152	128
Cambodia	Lower-middle income	0.183656	94	0.359725	105
Cameroon	Lower-middle income	0.116931	118	0.258459	116
Canada	High-income	0.779832	1	0.593036	9
Chad	Low-income	0.04384	130	0.154377	133
Chile	High-income	0.390932	50	0.572308	30
China	Upper-middle income	0.43028	39	0.616129	2
Colombia	Upper-middle income	0.227379	79	0.546753	56
Congo, Dem. Rep.	Low-income	0.054848	126	0.188247	129
Congo, Rep.	Lower-middle income	0.071357	124	0.236446	119
Costa Rica	Upper-middle income	0.357697	58	0.561487	44
Côte d'Ivoire	Lower-middle income	0.117797	116	0.327901	108
Croatia	High-income	0.533216	30	0.56244	43
Cyprus	High-income	0.450343	37	0.572862	27
Czech Republic	High-income	0.484196	35	0.565415	36
Denmark	High-income	0.627659	11	0.572664	29
Dominican Republic	Upper-middle income	0.298236	66	0.530389	65
Ecuador	Upper-middle income	0.208487	84	0.544239	57

Country	Category	Financial inclusion Index (FI)	FI Rank	Well-being Index (WI)	WI Rank
Egypt, Arab Rep.	Lower-middle income	0.112704	119	0.554577	49
El Salvador	Lower-middle income	0.153617	103	0.502771	70
Estonia	High-income	0.533232	29	0.564973	37
Ethiopia	Low-income	0.130332	114	0.175724	131
Finland	High-income	0.616836	14	0.577492	22
France	High-income	0.581356	20	0.604697	3
Gabon	Upper-middle income	0.21724	81	0.352555	106
Georgia	Upper-middle income	0.33727	62	0.54858	55
Germany	High-income	0.5953	16	0.596553	7
Ghana	Lower-middle income	0.216303	82	0.361967	104
Greece	High-income	0.358945	56	0.578091	21
Guatemala	Upper-middle income	0.21787	80	0.462987	81
Guinea	Low-income	0.061563	125	0.234339	120
Haiti	Lower-middle income	0.136095	111	0.248616	117
Honduras	Lower-middle income	0.207534	85	0.469238	80
Hong Kong SAR, China	High-income	0.544549	27	0.581095	14
Hungary	High-income	0.364288	54	0.556875	46
India	Lower-middle income	0.251036	74	0.489763	73
Indonesia	Lower-middle income	0.26012	72	0.443238	93
Iran, Islamic Rep.	Lower-middle income	0.549981	26	0.564759	38
Iraq	Upper-middle income	0.049502	128	0.449761	88
Ireland	High-income	0.58533	19	0.572758	28
Israel	High-income	0.615971	15	0.586096	11
Italy	High-income	0.574134	22	0.595647	8
Japan	High-income	0.592645	17	0.514294	69
Jordan	Upper-middle income	0.203639	87	0.528646	66
Kazakhstan	Upper-middle income	0.319937	63	0.562891	42
Kenya	Lower-middle income	0.414436	45	0.239493	118
Korea, Rep.	High-income	0.648167	9	0.601736	4
Kosovo	Upper-middle income	0.196738	90	0.219472	124
Kuwait	High-income	0.419964	44	0.457217	83
Kyrgyz Republic	Lower-middle income	0.155516	102	0.531958	63
Lao PDR	Lower-middle income	0.117141	117	0.474307	77
Latvia	High-income	0.462147	36	0.54905	54
Lebanon	Upper-middle income	0.263604	71	0.454509	84
Lithuania	High-income	0.397682	49	0.555768	47
Luxembourg	High-income	0.717105	3	0.563531	41
Madagascar	Low-income	0.034213	131	0.197801	126

Country	Category	Financial inclusion Index (FI)	FI Rank	Well-being Index (WI)	WI Rank
Malawi	Low-income	0.105688	121	0.196174	127
Malaysia	Upper-middle income	0.42739	40	0.543224	59
Mali	Low-income	0.106715	120	0.309775	110
Malta	High-income	0.530994	31	0.580577	16
Mauritania	Lower-middle income	0.084298	122	0.314418	109
Mauritius	High-middle income	0.398991	48	0.551946	51
Mexico	Upper-middle income	0.174865	97	0.565638	34
Moldova	Upper-middle income	0.230439	77	0.500546	71
Mongolia	Lower-middle income	0.561677	24	0.368144	102
Montenegro	Upper-middle income	0.355381	60	0.551878	52
Myanmar	Lower-middle income	0.136623	110	0.428181	97
Namibia	Upper-middle income	0.369732	53	0.276024	113
Nepal	Lower-middle income	0.165922	98	0.46119	82
Netherlands	High-income	0.57456	21	0.579102	19
New Zealand	High-income	0.705504	4	0.582499	13
Nicaragua	Lower-middle income	0.138934	108	0.38752	100
Niger	Low-income	0.028257	132	0.177102	130
Nigeria	Lower-middle income	0.165349	99	0.304195	111
North Macedonia	Upper-middle income	0.358135	57	0.449189	90
Norway	High-income	0.704923	5	0.578768	20
Pakistan	Lower-middle income	0.074999	123	0.445653	92
Panama	Upper-middle income	0.227567	78	0.517231	68
Peru	Upper-middle income	0.236138	76	0.522736	67
Philippines	Lower-middle income	0.140747	106	0.423664	98
Poland	High-income	0.509911	33	0.572957	26
Portugal	High-income	0.537313	28	0.579234	18
Romania	Upper-middle income	0.256464	73	0.54024	61
Russian Federation	Upper-middle income	0.44226	38	0.571607	31
Rwanda	Low-income	0.164986	100	0.261615	115
Saudi Arabia	High-income	0.382458	51	0.563867	40
Senegal	Lower-middle income	0.13166	113	0.363728	103
Serbia	Upper-middle income	0.356037	59	0.538987	62
Sierra Leone	Low-income	0.044155	129	0.278004	112
Singapore	High-income	0.563211	23	0.586763	10
Slovak Republic	High-income	0.500695	34	0.554754	48
Slovenia	High-income	0.555082	25	0.574478	24
South Africa	Upper-middle income	0.294939	67	0.477535	75
Spain	High-income	0.637826	10	0.597342	6
Sri Lanka	Lower-middle income	0.273809	69	0.543902	58

Country	Category	Financial inclusion Index (FI)	FI Rank	Well-being Index (WI)	WI Rank
Sweden	High-income	0.658046	7	0.473582	78
Switzerland	High-income	0.618147	13	0.575599	23
Tajikistan	Lower-middle income	0.195698	91	0.434067	96
Tanzania	Lower-middle income	0.161504	101	0.222443	123
Thailand	Upper-middle income	0.399036	47	0.472347	79
Togo	Low-income	0.144281	105	0.266755	114
Tunisia	Lower-middle income	0.186693	92	0.452333	86
Turkey	Upper-middle income	0.420121	42	0.573808	25
Uganda	Low-income	0.215048	83	0.167264	132
Ukraine	Lower-middle income	0.319305	64	0.439357	95
United Arab Emirates	High-income	0.522763	32	0.566651	33
United Kingdom	High-income	0.627193	12	0.601406	5
United States	High-income	0.662897	6	0.66294	1
Uruguay	High-income	0.382339	52	0.561096	45
Uzbekistan	Lower-middle income	0.198622	88	0.564346	39
Venezuela, RB	Upper-middle income	0.346233	61	0.530714	64
Vietnam	Lower-middle income	0.197657	89	0.448846	91
Zambia	Lower-middle income	0.186659	93	0.218361	125
Zimbabwe	Lower-middle income	0.181477	95	0.22545	122

Source: Author’s calculation