Cross-country variation in financial inclusion: a global perspective

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"Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way." (World Bank, 2018)

Background

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- Global commitment to advancing financial inclusion as a key enabler for 8 of the Sustainable Development Goals (SDGs) 2030 including; lower **poverty**, higher **development**, and **equal opportunity**

- According to the World Bank there has been **some improvement** in financial inclusion as the share of adults owning an account increased from 51% in 2011 to 62% in 2014 and 69% in 2017

- Progress has been mainly driven by **government policies** and the use of **technology**. However **variation across countries** is still very high
  - For example in the Sub-Saharan Africa region the progress has been mainly achieved through new mobile accounts. In India, mainly through financial institutions

- In addition financial inclusion is not just about having an account; **the actual use is what matters** for achieving the benefits of financial inclusion

Aims of Study

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- The heterogeneity in financial inclusion has highlighted the need for a **multidimensional measure** of financial inclusion that is **comparable** across economies to identify the current state, set targets and policies, and monitor progress

  - In this study we construct a financial inclusion index that captures different dimensions: **use, access, and depth** of financial services. This is motivated by the inadequacy of focusing on a single measure to represent and summarise the extent of financial inclusion in a country

- Additionally, high variation in financial inclusion between countries motivates the need to investigate **factors** that explain it. This is also useful for policy

  - We examine the relationship between financial inclusion and different **country characteristics**, with a special focus on **banking** conditions

Selected Literature Review 1/2

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- One strand of the literature focuses on single measures of financial inclusion
  - The proportion of adults that have an account (Allen et al., 2016)
  - Account "usage" that captures the frequency or the volume of account use (Demirguc-Kunt, Klapper, & Singer, 2013)
  - Branch penetration and mobile money (Ardic et., 2011)

- A second more recent strand of literature proposes **composite indices of financial inclusion** capturing its multidimensional and complex nature. **Methods** include:
  - a **non-parametric** approach where the weights for the components of the financial inclusion index are assigned exogenously, based on a judgement element (Sarma, 2008, 2012)
  - a **parametric approach** that allows for the weights to be assigned endogenously, based on the information structure of the data (Camara & Tuesta, 2014)

Selected Literature Review 2/2

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- In terms of factors affecting inclusion, the empirical literature points to certain country characteristics that play a role in determining the level of financial inclusion**:**
  - **Macro-economic** factors: level of income, employment, and inflation (Ardic et al., 2011; Allen et al., 2012; Park and Mercado, 2018)
  - **Banking system conditions**: competition, concentration, financial freedom, and regulation (Rojas-Suarez, 2010)
  - **Institutional environment**: government integrity (Demirgüç-Kunt and Klapper, 2013)
  - **Technological factors**: internet usage (Kabakova and Plaksenkov, 2018)
  - **Social factors**: human development (Kabakova & Plaksenkov, 2018)

Contributions

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- We construct a multidimensional financial inclusion index using both a **non-parametric** and a **parametric approach**, namely, a standard geometric mean and a more sophisticated principal component analysis

- We expand the time span of the existing research on financial inclusion. Specifically, we focus on a sample of 95 economies over a relatively long time period (2004-15) that enables us to analyse trends and perform regression analysis

- We assess a comprehensive set of factors in their relation to financial inclusion, including banking system conditions

- Finally, we test whether the relation between these factors and financial inclusion varies across countries with different income level

Data

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- The data are drawn from the following sources:
  - Country-level **financial inclusion** data - the IMF Financial Access survey (FAS) dataset
  - Country-level **economic and technological** data - World Bank Development Indicators
  - Country-level **banking structure and competition** data - Global financial development database
  - Banking **regulation** data - World Bank Surveys on bank regulation (by Barth et., al 2012)
  - Banks' **financial freedom and institutional quality** - the Heritage foundation
  - **Social** factors - UN Human Development reports

Methodology: Index Construction

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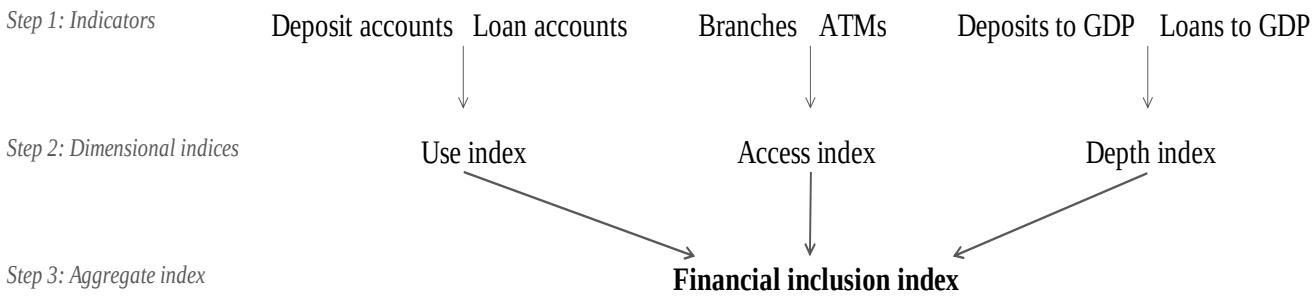
- We employ a non-parametric approach to derive an equally-weighted composite index:
  1. Normalise the six indicators of financial inclusion using **empirical normalisation** to arrive at a common scale ranging from 0 to 1
  2. Theses indicators are used to calculate three dimensional indices - use index, access index, and depth index. Each dimensional index is derived by taking the **arithmetic mean** of the two corresponding indicators
  3. The three dimensional indices are aggregated into the composite financial inclusion index using the **geometric mean** as follows:

$$\boldsymbol{Financial\ inclusion\ index} = (\boldsymbol{Use\ index} \times \boldsymbol{Access\ index} \times \boldsymbol{Depth\ index})^{1/3}$$



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Index Results (1)

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- The average score of our financial inclusion index shows that the most inclusive systems are **developed countries** that have high or upper-middle income. Spain, Japan, and Portugal score the highest average over the period

- While low income countries such as **Congo and South Sudan** have the lowest financial inclusion and **India** ranks 54th

Index Results (2)

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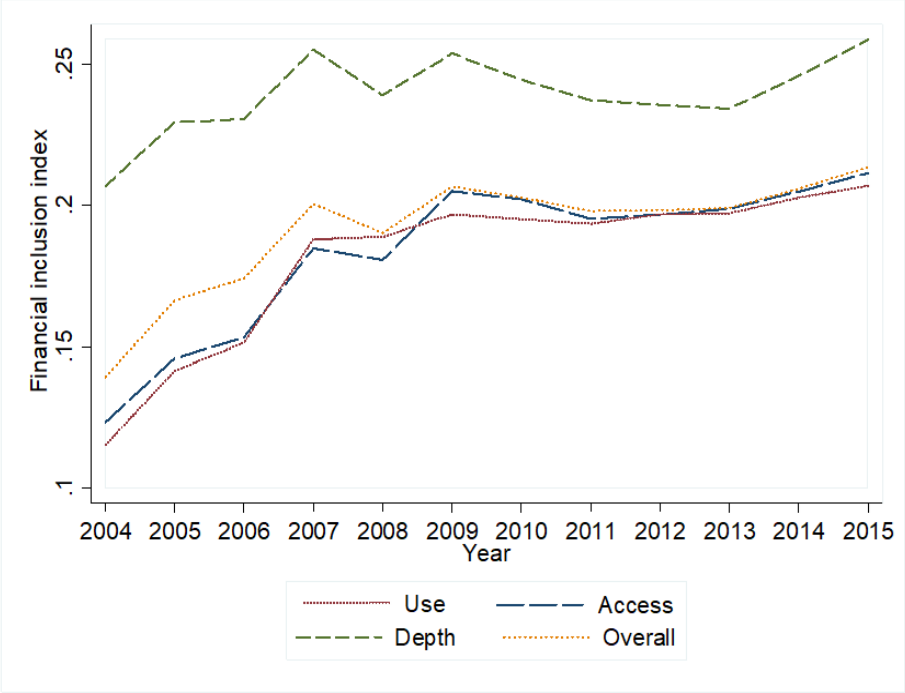
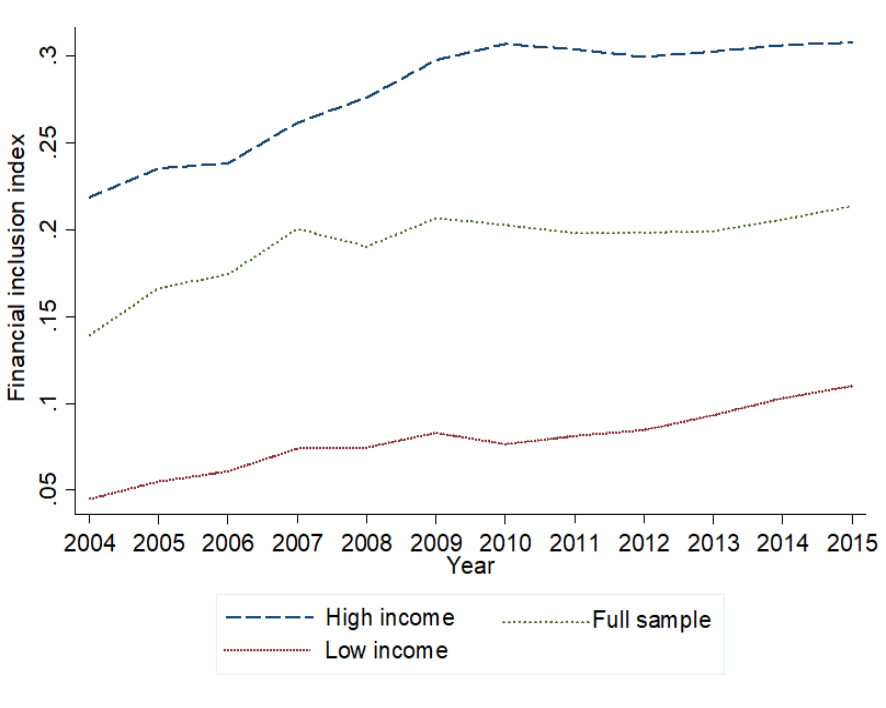
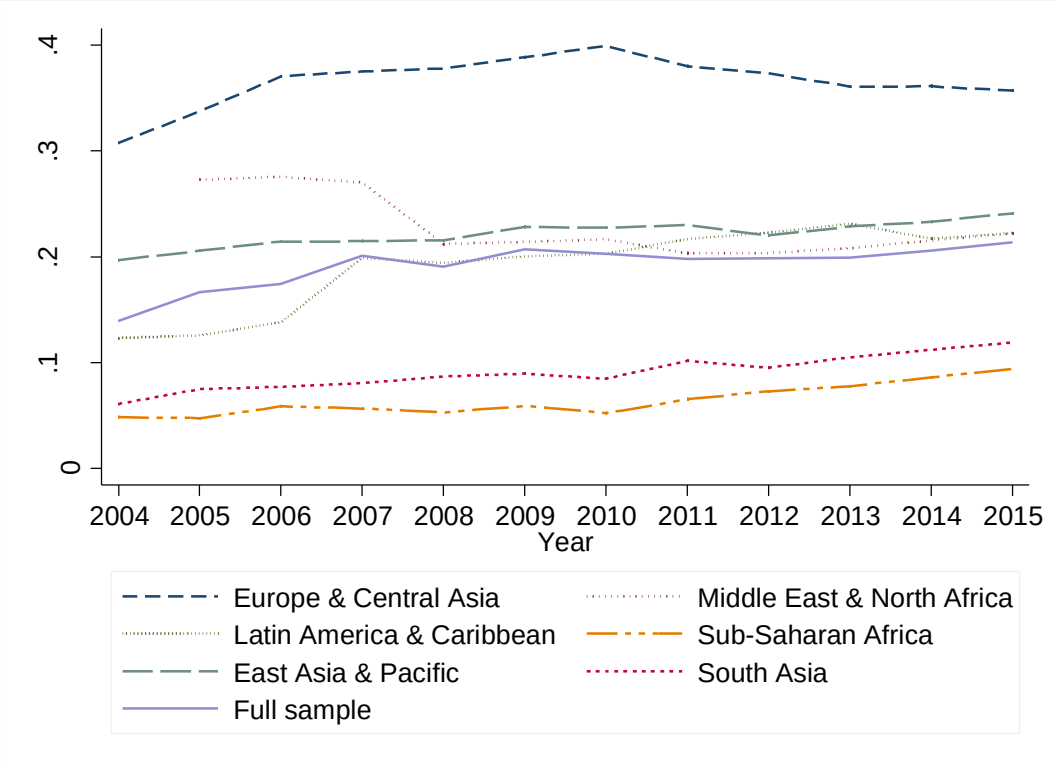




- On average:
  - There seems to be **progress** in financial inclusion over the sample period
  - The progress appears most prominent in the **use** and **access** dimensions
  - **High and upper-middle income** countries over-rank low and lower-middle income countries

Index Results (3)



- On average:
  - European countries over-rank other regions
  - The Sub-Saharan African region ranks the lowest
  - Sub-Saharan Africa and South Asia show improvement in financial inclusion over time

Financial inclusion and country-level characteristics

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	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
GDP per capita$_{t-1}$	0.1168**	0.0987**			
	(3.99)	(5.08)			
Unemployment$_{t-1}$	-0.0005	-0.0015**	-0.0033**	-0.0029**	-0.0033**
	(-0.61)	(-2.07)	(-3.23)	(-2.64)	(-2.96)
Inflation$_{t-1}$	-0.0007**	-0.0009**	-0.0003	-0.0004	-0.0004
	(-2.13)	(-2.86)	(-1.08)	(-1.24)	(-1.10)
Boone indicator$_{-1}$		-0.0583**	-0.0435**	-0.0433**	-0.0330**
		(-3.24)	(-3.34)	(-2.92)	(-2.62)
Bank concentration$_{t-1}$		0.0009**	0.0012**	0.0010**	0.0009**
		(2.16)	(2.35)	(2.09)	(2.08)
Capital regulation$_{t-1}$		0.0025	0.0028	0.0031	0.0042**
		(1.16)	(1.25)	(1.41)	(2.03)
Financial freedom$_{t-1}$		0.0006	0.0008	0.0005	0.0012**
		(1.26)	(1.56)	(0.97)	(2.37)
Government integrity$_{t-1}$			0.0012**		
			(2.14)		
HDI$_{t-1}$				1.1572**	
				(3.92)	
Individuals using internet$_{t-1}$					0.0019**
					(3.36)
Constant	-0.7453**	-0.6886**	0.1096	-0.6633**	0.0797
	(-2.91)	(-3.63)	(1.52)	(-2.92)	(1.39)
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Clustering	Yes	Yes	Yes	Yes	Yes
Observations	449	343	343	342	343
Adjusted R-squared (within)	0.267	0.309	0.208	0.233	0.272

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

- Greater banking system competition, concentration, bank capital regulation , and financial freedom are associated with higher financial inclusion
- Higher levels of income, government integrity, human development, and internet usage are positively related to financial inclusion
- While high unemployment and inflation are negatively associated with financial inclusion

Other results

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- We re-construct the financial inclusion index using a two-stage **principal component analysis** (PCA) and re-estimate the baseline regressions with this index as the dependent variable
  - Results largely **confirm the baseline findings**

- We examine whether the association between financial inclusion and the country-level factors varies across countries with **different income levels**
  - We find that **bank competition and internet usage** appear to be more important for enabling financial inclusion in low income countries

- We conduct a number of robustness tests including:
  - ✓ reconstructing the index setting the minimum and maximum values for our six financial inclusion indicators as the "natural zeros" and "aspirational targets", respectively
  - ✓ controlling for the potential impact of the financial crisis on financial inclusion by dropping the crisis years 2008-09 from our sample
    - The results of the tests are largely consistent with our baseline findings

Sum up / Conclusions

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- Our results suggest considerable progress in financial inclusion over the period under investigation, most markedly in the use and access dimensions

- Our findings indicate that financial inclusion is positively and significantly associated with GDP per capita, employment, bank competition, human development, government integrity, and internet usage

- Our evidence also highlights the importance of considering the level of national income when designing policies to boost financial inclusion

- Policy-makers worldwide should consider taking more action, particularly in countries with lower income, to improve the environment to stimulate bank competition and the use of technology in conjunction to achieve greater financial inclusion

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Thank you!

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Variables	Definition	Source
Financial inclusion		
Financial inclusion index	An aggregate financial inclusion indicator at a country level based on three dimensions: use, access, and depth. It ranges from 0 to 1, with a higher value indicating greater financial inclusion.	Authors' calculations
Use	Deposit accounts with commercial banks (per 1,000 adults).	FAS
	Loan accounts with commercial banks (per 1,000 adults).	FAS
Access	Branches of commercial banks (per 100,000 adults).	FAS
	ATMs (per 100,000 adults).	FAS
Depth	Bank deposits (% of GDP).	GFDD
	Domestic credit to private sector by banks (% of GDP).	GFDD
Macroeconomic factors		
GDP per capita	Gross domestic product divided by mid-year population (log).	WDI
Unemployment	Share of the total labour force that is without work but available for and seeking employment (%).	WDI
Inflation	Inflation measured as the annual growth rate of the GDP implicit deflator. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.	WDI
Banking system conditions		
Boone indicator	A measure of degree of competition based on profit-efficiency in the banking market. It is calculated as the elasticity of profits to marginal costs. A higher value of the Boone indicator implies a lower level of competition.	GFDD
Bank concentration	The degree of concentration of deposits in the 5 largest banks.	Bank Regulation Surveys (Barth et al., 2012)
Capital regulation	Sum of Overall Capital Stringency and Initial Capital Stringency. It ranges between 0-10, where a higher value indicates a higher level of capital stringency.	Bank Regulation Surveys (Barth et al., 2012)
Financial freedom	An indicator of banking efficiency as well as a measure of independence from government control and interference in the financial sector. It ranges between 0-100, where a higher value indicates a higher level of financial freedom.	Heritage

Institutional environment		
Government integrity	Derived by averaging scores for the following factors, all of which are weighted equally: public trust in politicians, irregular payments and bribes, transparency of government policymaking, absence of corruption, perceptions of corruption, and governmental and civil service transparency. It ranges between 0-100, where a higher value indicates a higher level of government integrity.	Heritage
Socioeconomic factors		
HDI (Human development index)	Summary measure of average achievement in key dimensions of human development: health, education, and standard of living. It ranges between 0-1, where a higher value indicates a higher level of human development.	UN human developments reports
Technological factors		
Individuals using internet	Internet users are individuals who have used the internet (from any location) in the last 3 months (% of population). The internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV, etc.	WDI

Note: The table defines the variables used in the analysis and data sources.

Panel A: Full sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Deposit accounts with commercial banks (per 1,000 adults)	779	1092.14	1148.59	13.23	7211.21
Loan accounts with commercial banks (per 1,000 adults)	779	293.77	295.57	1.30	1275.83
Branches of commercial banks (per 100,000 adults)	779	16.77	17.81	0.61	99.24
ATMs (per 100,000 adults)	779	34.65	35.05	0.05	157.36
Bank deposits (% of GDP)	779	49.82	38.83	5.07	217.53
Domestic credit to private sector by banks (% of GDP)	779	44.54	33.40	2.63	156.12
Financial inclusion index	773	0.20	0.16	0.00	0.68
GDP per capita	779	8.24	1.30	5.45	10.81
Unemployment	508	9.49	7.09	0.50	32.20
Inflation	779	5.45	6.15	-15.71	29.05
Boone indicator	688	-0.06	0.11	-0.65	0.24
Bank concentration	524	74.24	19.05	37.01	100.00
Capital regulation	583	6.64	2.11	1.00	10.00
Financial freedom	721	50.79	15.66	20.00	90.00
Government integrity	727	36.67	16.01	10.00	87.00
HDI	771	0.66	0.14	0.34	0.91
Individuals using internet	770	29.54	24.22	0.51	89.63

Panel B: Income groups

	High income group		Low income group		Difference in means (%)
	Obs	**Mean**	**Obs**	**Mean**	
Deposit accounts with commercial banks (per 1,000 adults)	425	1629.66	354	446.82	256***
Loan accounts with commercial banks (per 1,000 adults)	425	455.55	354	99.56	358***
Branches of commercial banks (per 100,000 adults)	425	23.69	354	8.46	180***
ATMs (per 100,000 adults)	425	53.94	354	11.49	370***
Bank deposits (% of GDP)	425	63.95	354	32.86	95***
Domestic credit to private sector by banks (% of GDP)	425	60.44	354	25.46	137***
Financial inclusion index	425	0.29	348	0.09	239***

Note: The table reports descriptive statistics Panel A reports summary statistics for variables used in the analysis for the full sample of 95 countries over the period 2004-15. Panel B reports the comparison of financial inclusion variables between the sub-samples of high (and upper middle) income and low (and lower middle) income countries, with the t-test for the equality of means reported in the last column. *, **, *** indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. Definitions of the variables are provided in Appendix B.

Indices	Indicators	Normalised weights
Use	Deposit accounts with commercial banks (per 1,000 adults)	0.633
	Loan accounts with commercial banks (per 1,000 adults)	0.367
Access	Branches of commercial banks (per 100,000 adults)	0.591
	ATMs (per 100,000 adults)	0.409
Depth	Bank deposits (% of GDP)	0.574
	Domestic credit to private sector by banks (% of GDP)	0.426
Aggregate	Use	0.298
	Access	0.293
	Depth	0.408

Note: The table reports the weights of (i) financial inclusion indicators in the respective dimensional indices and (ii) dimensional indices in the aggregate financial inclusion index, both obtained from principal component analysis. Definitions of the variables are provided in Appendix B.