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Financial inclusion, rather than size, is the key to tackling income inequality

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Abstract

In this paper we assess empirically whether financial inclusion contributes to reducing income inequality when controlling for other key factors, such as economic development and fiscal policy. We conclude that financial inclusion contributes to reducing income inequality to a significant degree, while the size of the financial sector does not. The policy implication of this result is that financial inclusion should be at the forefront of government policies to reduce income inequality in a given economy. Given the broad way in which we have defined inequality in our empirical analysis, this means facilitating the use of credit to both households, especially low-income ones, as well as to small and medium-sized enterprises.

Keywords: income distribution, income inequality, Kuznets curve, financial development, financial deepening, financial inclusion.

JEL: D63, F63, F65, G21, H23, O15.

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1 Motivation

Income inequality has become a hot issue after years of irrelevance. In the developed world, the amazing success of Thomas Piketty's book[1] in 2014 is clearly a good example. In the emerging world. unprecedented reduction in poverty and a flourishing middle class co-exist with either more uneven income distributions – like in India or China - or persistently high inequality – as in Latin America.

We could find one feasible explanation for these dynamics in a theory that proposes income inequality and GDP per capita to relate in the form of an inverted U, or a so-called Kuznets curve[2]. In other words, increasing inequality in countries in early stages of development would be no surprise when growth is high and persistent, and workers are able to transition from low to medium or high productivity industries. This was the case of Korea after the 50s and of China since the 90s. In the same way, we would expect that countries in the middle income group would stabilise the degree of inequality, first, and then start to reduce it as most of the workers enter the medium-high productivity industries and a welfare system starts being introduced. This would be the case of several Latin American countries: Malaysia in Asia or Turkey in Europe. Finally, the Kuznets curve anticipates a progressive reduction of income inequality for countries reaching high-income levels. This was the case of Western economies from World War II until the 70s and 80s, when their welfare states continued to expand.

However, some developments point to shortcomings in the Kuznets theory. Among developed countries, the income distribution seems to have worsened in many of them during the last few decades. In the same vein, some emerging economies show significant deviations from the Kuznets curve when looking at the relation between their GDP per capita and degree of inequality. To give two examples, this is the case of Vietnam or Bangladesh.

Factors accounting for Kuznets-unexplained inequality could be either very persistent or founded on historical reasons (e.g. through past land ownership or colonised conditions), or could be the result of differentiated policies.

In this sense, the existing literature has devoted quite a lot of attention to the role of fiscal policies in taming excessive inequality[3], either through redistribution instruments (taxes and transfers), which mostly affect the current income distribution, or in-kind policies (mainly education and health programmes), which have a lagged impact on inequality, as relevant determinants of future income. Beyond this fiscal link, there is growing interest in the impact of financial development on income inequality. In fact, one of the main drawbacks faced by low-income individuals is the fact that they cannot smooth their income-savings path due to the lack of access to financial instruments[4]. Access and use of credit should, thus, help to reduce income inequality.

Financial development, as a concept, has been traditionally interpreted as financial deepening, which itself has been proxied by the size of the financial system. In other words, for the same income per capita, a more developed (i.e. larger) financial sector should be associated with a more evenly distributed income in a given country.

While aware of the importance of financial constraints for the income of poorer households to grow, we argue that a large financial system does not necessary coincide with easy access to and use of financial services by those that are most financially constrained, namely households and especially lower-income

1: Piketty, Thomas, 2014, "Capital in the Twenty-First Century", Harvard University Press.
2: Kuznets (1955).
3: See for example recent works by Journard, Pisu and Bloch (2014) and the IMF (2014).
4: Quadrini and Ríos-Rull (2014) includes a complete review of literature linking inequality and financial markets.

ones, or Small and Medium Enterprises (SMEs) relative to large companies. In other words, we argue that financial inclusion should be much more instrumental than financial deepening in reducing income inequality.

In this paper we assess empirically what role both dimensions of financial development (on the one hand the size of the financial sector, and on the other access to and use of financial services) may have in reducing income inequality. To that end, we show empirically that financial inclusion does contribute to reducing income inequality while financial deepening does not when controlling for relevant factors, especially economic development and fiscal policy.

The paper is distributed as follows. In Section 2 we review different measures for financial inclusion and income distribution, underlining their advantages and disadvantages. In Section 3 we state our choices in terms of variable definitions and proxies as well as the sources of our dataset and we also explain the methodology used. In Section 4 some stylised facts are reviewed on the relation between financial inclusion and income inequality. In Section 5 we show our results, and, finally, in Section 6 conclusions and implications are drawn.

2 Income inequality and financial inclusion: measurement issues

Income inequality and financial inclusion are much harder to measure than more straight forward concepts in economics. As for the former, the most common measure of income inequality is the GINI index, which is a synthetic measure of how unevenly income is distributed among a ranked population. Other indicators only capture a part of the distribution, such as the amount of income earned by a certain quantile or the ratio of income per capita between different groups. Given its broader nature, we prefer to use the GINI coefficient for our analysis.

Regardless of the preferred inequality measure, the main drawback when dealing with income distribution data is heterogeneity across different countries (sometimes even across time). There are very few sources of cross-country information on income distribution. One is the World Income Inequality Database (WIID) but – unfortunately – countries report their information in very heterogeneous ways. In fact, they may use consumption instead of income, or sometimes expenditure. Furthermore, when reporting income it may be computed in gross or net terms (net standing for disposable income, namely after taxes and transfers). Another disturbing issue is that the unit of analysis could be either the person or the household; in other words the number of persons in the household may not be taken into account. Finally, and more generally, the quality of the information differs across surveys[5].

Unfortunately, due to the fact that income data are not collected on a continuous basis, there is usually a strong trade-off between availability and homogeneity, the former being the predominant criterion in most studies. In the same way, ours being a cross-country study, we need to choose the timeframe which maximises the number of countries covered in our sample with the most homogenous data possible. With that constraint in mind, cross-country GINI indices are most abundant after 2000, so that is our starting point in time. We also filter the data by a number of criteria, to achieve as much homogeneity as possible.

The first one refers to the variable definition. We consider disposable income to be a more accurate measure than gross income, particularly for those countries with a developed welfare state. Consumption or expenditure could also fit with this idea, but surveys based on this concept are much less frequent and we want to include emerging markets in our sample.

The second criterion is to use only surveys in which households are the statistical unit. Surveys covering single individuals are usually limited to employees or taxpayers, excluding the rest and thus probably underestimating inequality.

Finally, we include only data with full coverage on the area, population and age dimensions. Otherwise we would be underestimating inequality, as we would expect people to be more homogeneous among certain groups, such as urban or rural areas, young or older people.

Regarding the second concept of interest for this paper, financial inclusion, it is relatively recent and thus quite difficult to define, let alone to measure. Sarma (2008) defines financial inclusion as “a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy”. In the same vein, Cámara and Tuesta (2014) define an inclusive financial system as “one that maximises usage and access, while minimising involuntary financial exclusion”.

5: The WIID User Guide explains thoroughly the methodology and data issues of each income survey: http://bit.ly/1Ct7KN7

A number of surveys have been conducted[6], trying to cover the different aspects of such definitions, but samples are short in the time dimension, with most of the data starting after 2000. The lack of time series calls for exploiting the cross-country differences in a cross-section analysis.

Based on the definitions above, and aware of the data constraints, we look for a set of variables which cover at least one of the aspects previously mentioned. We look into both single variables on the households' and SMEs' realms, but also into synthetic indicators of financial inclusion.

As a single indicator of households' related financial inclusion, we take the percentage of adults with a bank account, as provided by the World Bank and as compiled by Honohan (2007). As a single indicator of firms' financial inclusion, and lacking data on loan distribution among companies, we take the amount of credit to SMEs, either as a percentage of GDP or as a percentage of total outstanding loans from commercial banks.

Regarding more comprehensive – synthetic - indicators of financial inclusion, we use those developed so far for a large enough group of countries. First of all, Sarma (2008) develops an index of financial inclusion considering two dimensions; availability of banking services (bank branches per 1,000 population) and usage (volume of credit and deposit as a %age of GDP). Second, Sarma (2008) also develops a three-dimension indicator, namely adding the banking penetration dimension (number of bank accounts as a %age of total population) to the previous two-dimension indicator. More recently Sarma (2012) compiles an index of financial inclusion with one more variable, namely the number of Automatic Teller Machines (ATMs) per 100,000 inhabitants. In the same vein, Amidžić et al. (2014) offer a relatively similar four-variable index of financial inclusion, namely the number of ATMs per 1,000 square kilometres, number of branches of Other Depositary Corporations (ODCs) per 1,000 square kilometres, total number of resident household depositors with ODCs per 1,000 adults and total number of resident household borrowers with ODCs per 1,000 adults. Finally, Cámara and Tuesta (2014) compile an even more comprehensive index of financial inclusion considering three dimensions: usage (percentage of adults holding an account, savings and loans), access (ATMs and branches per capita and per area) and perceived barriers, which are not included in any other index, such as distance to branches, affordability, documentation requirements and trust in the financial system. Unfortunately, none of these synthetic indexes covers the financial inclusion of SMEs, so we will need to use individual indicators as previously described.

6: Extensive and valuable information can be found in the Financial Access Survey (FAS) hosted by the IMF (http://fas.imf.org/), as well in the Global Findex Database (http://datatopics.worldbank.org/financialinclusion/) and the Global Financial Development Database (GFDD) (http://bit.ly/YhNr6n), both of them promoted by the World Bank.

3 Our dataset and methodology

3.1 Data issues

The most constraining problem is the limited number of observations. Restrictions come essentially from financial inclusion variables, which, as aforementioned, only cover a short timespan (2004-10 for Sarma (2012), 2004-12 for loans by SMEs and 2009-12 for Amidžić et al. (2014)) or available only for one single year[7]. These availability restrictions are exacerbated when building common samples with other variables included in estimations, particularly income distribution, our dependent variable (see Table 1). This is because our chosen measurement of income inequality, the GINI index, is not collected on a continuous basis, and for several countries only one or two surveys have been conducted in the last few decades.

To ease the data constraint, and aware that both income inequality and financial inclusion are very persistent variables, we use moving averages for variables with multi-year observations. We eventually carry out estimations for three periods, the first centred around 2000 (1998-2002 average), the second centred around 2004 (2002-06 average) and the third centred around 2011 (2009-13 average)[8].

Table 1
Number of observations in individual and common samples

	c.2000	c.2004	c.2011	Source
GINI (disposable inc.)	69	65	50	WIID
GDP per capita	148	148	148	BBVA Research/IMF
Government Cons.	143	143	133	Penn World Table
Trade Openness	144	144	138	Penn World Table
Credit to Priv.Sector	144	145	137	World Bank
Ad.w/acc.			131	GFDD/WB
common sample			*43*	
Credit SMEs		16	44	FAS/WB
common sample		*8*	*18*	
Honohan_07	137			Honohan (2007)
common sample	*60*			
Sarma_08_2d		96		Sarma (2008)
common sample		*53*		
Sarma_08_3d		53		Sarma (2008)
common sample		*27*		
Sarma_12		52	78	Sarma (2012)
common sample		*29*	*32*	
Cám.&Tue._14			79	Cámara and Tuesta (2014)
common sample			*37*	
Amidžić et al._14			24	Amidžić et al. (2014)
common sample			*5*	

Note: Individual samples restricted to a maximum initial group of 150 countries; research papers might have available information for further economies
Note: Common sample for each financial inclusion variable and the following explanatory variables: GINI, GDP per capita, Government Consumption, Trade Openness and Credit to Private Sector
Source: BBVA Research

7: For example, the measure offered by Honohan (2007) is only available for 2000; that of Sarma (2008) for 2004 and that of Cámara and Tuesta (2014) for 2011.
8: The index built in Amidžić et al. (2014) is dropped because there are only five common observations across the variables considered for estimation.

Another problem we face is related to measurement errors in the dependent variable. In fact, as remarked in Section 2, the GINI index is not a homogenous variable both for intra- and cross-country samples. There are many methodological issues that make observations not fully comparable.

In order to reduce the heterogeneity of the dependent variable to the extent possible, we use only GINI indexes based on disposable income with full coverage for the geographical area, age and population group dimensions as defined in the WIID. Despite these filters, some sources of heterogeneity remain, such as the survey quality or the accounting method for household composition but should not be large enough to affect our conclusions.

3.2 Methodology

Several variables could affect the income inequality, as measured by the GINI index. We, thus, would like to control for them when estimating the impact of financial inclusion on income inequality. However, as the sample is limited, we can only choose the most relevant ones.

As previously mentioned, the most important variable is obviously the fact that income per capita and income inequality are expected to follow a Kuznets curve. We account for this by using the level and the square value of the natural log of the GDP per capita (measured in real PPP-adjusted terms). The second widely recognised determinant of income inequality is fiscal policy. To account for it, we include the ratio of government consumption over GDP as a proxy for government size, and hence the fiscal power for redistribution[9]. Finally, the degree of trade openness over GDP should capture the impact of external developments in income distribution. While the literature is less unanimous on the direction of the sign of the effect of openness on income distribution[10], our *a priori* is that trade – being welfare enhancing – should, in principle, improve income inequality.

Finally, we do not only need to introduce measures of financial inclusion but also of financial size, to test our hypothesis that the use of financial services may be more important that the actual size of the financial sector. To that end, we measure size as bank credit to GDP.

Given data constraints, we can only run a two-period panel for single indicators of financial inclusion and a simple cross-section for the synthetic indicators previously mentioned.

As for the estimation methodology, we face several problems.

The first is collinearity between regressors, particularly between the GDP per capita and fiscal and financial variables. As shown in Tables 2 and 3, collinearity between variables other than GDP per capita is substantially reduced when we use residuals of a simple regression of these variables over GDP per capita. The details on how to read our results under collinearity can be found in Section 5 below, with particular focus on the distortion generated on variable contributions.

9: We prefer to use this measure rather than tax revenues since, as highlighted in IMF (2014), most of the redistribution is achieved through expenditure rather than revenue.
10: See for example Barro (2008) and Chakrabarti (2000).

Table 2
Coefficient of correlation

	GINI (disp.inc.)	GDP per capita	Gov.Cons. (original / residuals)	Trade Op. (original / residuals)
Government Cons.	-0.62	0.50		
Residuals	*-0.44*	*0.18*		
Trade Openness	-0.31	0.14	0.17	
Residuals	*-0.13*	*-0.13*	*0.09*	
Credit to Priv.Sector	-0.42	0.68	0.34	0.05
Residuals	*-0.10*	*0.23*	*0.04*	*-0.10*

Note: Common sample for the explanatory variable and four main regressors
Source: BBVA Research

Table 3
Coefficient of correlation

	GINI (disp.income)	GDP per capita	Credit (original / residuals)
Ad.w/acc. WB	-0.77	0.85	0.63
Residuals	*-0.58*	*0.37*	*0.27*
Credit SMEs %GDP	-0.57	0.65	0.80
Residuals	*-0.38*	*0.37*	*0.68*
Honohan_07	-0.67	0.90	0.71
Residuals	*-0.45*	*0.47*	*0.13*
Sarma_08_2d	-0.49	0.75	0.84
Residuals	*-0.13*	*0.24*	*0.66*
Sarma_08_3d	-0.76	0.84	0.90
Residuals	*-0.44*	*0.33*	*0.72*
Sarma_12	-0.55	0.64	0.68
Residuals	*-0.11*	*-0.09*	*0.39*
Cám.&Tue._14	-0.60	0.67	0.55
Residuals	*-0.34*	*0.22*	*0.18*
Amidžić et al._14	-0.81	0.73	0.65
Residuals	*-0.74*	*0.58*	*0.47*

Note: Common sample for the explanatory variable, the four main regressors and each financial inclusion variable
Source: BBVA Research

The second potential estimation problem is related to the endogeneity of some explanatory variables, which may bias our estimated coefficients. One important source of potential endogeneity is reverse-causality. In fact, persistent high income inequality could have a negative impact on economic development through socioeconomic and institutional channels[11]. An uneven income distribution could also trigger the implementation of fiscal measures to better distribute income[12]. Potential endogeneity is less obvious for trade openness.

11: Acemoglu and Robinson (2014).
12: IMF (2014).

For the variables of interest for this study, namely financial inclusion and size, Honohan (2007) points out that such potential endogeneity is not likely to be as serious a problem when we try to explain income inequality (or poverty, for that matter), as it would be if we were trying to explain income levels or growth[13].

Another source of potential endogeneity comes from common unobserved factors driving both the dependent and the explanatory variables. This problem, however, should have been minimised in our analysis, given robust control variables and lower correlations conditional on GDP per capita. Furthermore, other studies on income inequality do not include a much larger set of regressors. In any case, potential endogeneity issues as well as data limitations call for caution when interpreting our results.

Finally, another methodological challenge stems from the cross-country nature of our sample, which introduces heteroskedasticity issues. We could expect variance of residuals to be different for countries with diverse characteristics, for a number of reasons. The first is related to heterogeneity of the dependent variable commented on in Section 2, and particularly to measurement errors: that we would expect them to be higher in less-developed countries. Another source of heteroskedasticity would be the omission of explanatory variables that asymmetrically affect different groups of countries. We analyse the potential extent of these problems in Section 5.

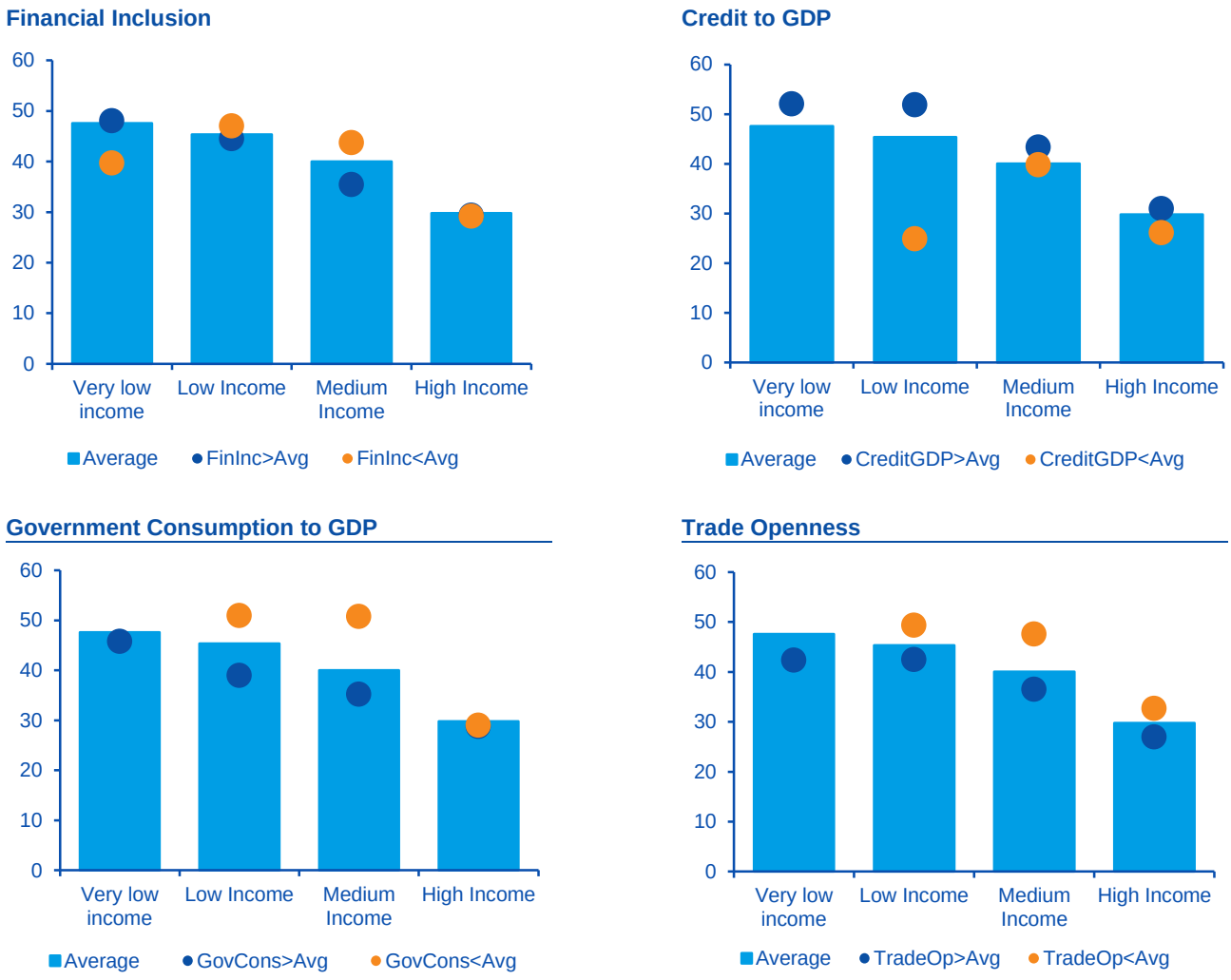
13: This view is supported by other literature references which test the impact of different variables on income inequality and find no meaningful differences between OLS and GMM results. See for example Chakrabarti (2000) which focuses on the impact of trade openness on inequality or Gupta et al. (1998) on corruption and income inequality).

4 Stylised facts

Before presenting the results of our estimations, we provide a quick overview on the relation between financial inclusion – and financial size - with income inequality.

For this purpose, we first divide up the available observations of the GINI index according to the development stage of each country: very low income (less than USD3,000 of GDP per capita), low income (USD3,000-8,000), medium income (USD8,000-22,000) and high income (higher than USD22,000). We then regress our key variables (financial inclusion and financial size) against the level and square values of GDP per capita and split each sub-sample into those observations with significantly positive or negative residuals. We conduct the same exercises for other control variables (Figure 1).

Figure 1
Average of GINI index for income groups and regressors conditioned on GDP per capita



Note: Regressors are Credit to Private Sector (% of GDP), Trade Openness (%GDP), Government Consumption (%GDP) and average for all financial inclusion variables
Note: Values above average correspond to residuals of regressions on GDP per capita (level and square values) that are one standard deviation above mean (0)
Source: BBVA Research

Interestingly, we find that - relative to the estimated expected values conditioned on GDP per capita - higher income inequality is generally associated with less financial inclusion but more financial size. In the same vein, and as one would expect, a more unequal income distribution is associated with lower fiscal redistribution proxied by government consumption. According to the figures, this variable would have the larger incidence on inequality, particularly for low- and medium-income countries. Finally, trade openness shows in our analysis a negative association with inequality when controlling for economic development. In other words, a more open economy – other things being given – tends to experience lower income inequality.

In a second analysis, we now divide the observations according both to the IMF classification between developed and emerging countries and, among the latter, to the geographical location of the countries (Eastern Europe, Asia, Latin America and Africa).

Results are in this case less conclusive as when dividing by income per capita (Figure 2). In general terms, dispersion within group is lower, suggesting geographical common drivers of inequality, as we will highlight in the next section.

Figure 2
Average of GINI index for regions and regressors conditioned on GDP per capita

Note: Regressors are Credit to Private Sector (% of GDP), Trade Openness (%GDP), Government Consumption (%GDP) and average for all financial inclusion variables
Note: Values above average correspond to residuals of regressions on GDP per capita (level and square values) that are one standard deviation above mean (0)
Source: BBVA Research

5 Results

In this section we present the results of our estimations, using either panel or pooled Ordinary Least Squares (OLS).

A first regression just accounts for the so-called Kuznets curve, which includes the level and the square value of income per capita (Column 1 in Table 4). Both variables are highly significant and with the expected sign, which means that income inequality, measured by the GINI index, does follow an inverted U-shaped curve as income per capita increases.

Table 4
Results for OLS estimations

	1			2			3a			3b			3c		
	Kuznets curve			Aug. Kuznets curve			Honohan			Ad. acc. WB			Adults acc.		
	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.
GDP per capita (log)	15.91	24.27	***	17.79	24.95	***	17.09	9.02	***	13.65	7.45	***	16.00	12.24	***
GDP per capita (squared-log)	-1.25	-18.71	***	-1.28	-16.42	***	-1.18	-5.13	***	-0.84	-4.06	***	-1.06	-6.91	***
Gov. Consump. Exp. (%GDP)				-0.72	-6.14	***	-0.54	-2.28	**	-0.20	-0.78		-0.49	-2.94	***
Trade Openness (%GDP)				-0.04	-3.23	***	-0.04	-1.45		-0.03	-1.77	**	-0.03	-2.15	**
Credit to Private Sector (%GDP)				0.02	1.70	*	0.05	1.42		0.04	2.46	***	0.04	2.62	**
Financial Inclusion															
a) Honohan (2007)							-0.11	-1.39							
b) Adults w/ account (%) - WB										-0.21	-3.47	***			
c) Adults w/ accont [a)+b) sample]													-0.14	-2.83	***
d) Sarma (2008) - 2 dim.															
e) Sarma (2008) - 3 dim.															
f) Sarma (2012)															
g) Cámara&Tuesta (2014)															
h) Credit to SMEs (%GDP)															
i) Credit to SMEs (% loans)															
Adjisted R-squared	0.46			0.60			0.56			0.65			0.61		
#observations	182			172			60			43			103		
#countries	75			72			60			43			68		
Developed	*31*			*30*			*24*			*25*			*29*		
Emerging	*44*			*42*			*36*			*18*			*39*		
Year/Period	2000, 2004, 2011			2000, 2004, 2011			2000			2011			2000, 2011		

Continued on next page

Table 4 (cont.)
Results for OLS estimations

	3d			3e			3f			3g			3h			3i		
	Sarma1-2d			Sarma1-3d			Sarma2			Cám&Tue			SME GDP			SME weight		
	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.	Coef.	t-st.	Sig.
GDP per capita (log)	17.89	15.08	***	16.89	10.32	***	16.50	14.46	***	19.43	10.49	***	18.38	9.92	***	19.59	8.96	***
GDP per capita (squared-log)	-1.28	-9.35	***	-1.15	-5.99	***	-1.15	-9.42	***	-1.54	-7.54	***	-1.37	-6.44	***	-1.50	-6.18	***
Gov. Consump. Exp. (%GDP)	-0.70	-3.43	***	-0.44	-1.74	*	-0.49	-2.39	**	-0.43	-1.88	*	-0.79	-2.65	**	-0.57	-1.88	*
Trade Openness (%GDP)	-0.07	-3.55	***	-0.10	-3.26	***	-0.04	-3.23	***	-0.06	-3.28	***	-0.01	-0.40		-0.04	-1.01	
Credit to Private Sector (%GDP)	0.02	0.77		0.04	0.79		0.04	2.37	**	0.08	4.05	***	0.10	2.97	***	0.05	1.89	*
Financial Inclusion																		
a) Honohan (2007)																		
b) Adults w/ account (%) - WB																		
c) Adults w/ accont [a)+b) sample]																		
d) Sarma (2008) - 2 dim.	0.01	0.14																
e) Sarma (2008) - 3 dim.				-0.14	-1.17													
f) Sarma (2012)							-0.10	-2.27	**									
g) Cámara&Tuesta (2014)										-2.40	-2.01	*						
h) Credit to SMEs (%GDP)													-0.35	-2.68	**			
i) Credit to SMEs (% loans)																-0.16	-1.65	
Adjisted R-squared	0.70			0.80			0.61			0.73			0.77			0.73		
#observations	52			27			61			37			26			26		
#countries	52			27			41			37			19			19		
Developed	*27*			*11*			*23*			*20*			*8*			*8*		
Emerging	*25*			*16*			*18*			*17*			*11*			*11*		
Year/Period	2004			2004			2004, 2011			2011			2004, 2011			2004, 2011		

Note: ***, ** and * correspond to significance levels at 99%, 95% and 90% respectively
Note: The value for financial inclusion variables used in regressions 3a to 3f and 3h potentially range from 0 to 100, while that in 3h is computed as a percentage ratio over GDP. Finally, values for the financial inclusion index in 3g range in the sample from -1.59 to 2.20
Source: BBVA Research

We include other control variables in a second regression – called here the augmented Kuznets curve - (Column 2 in the same Table). As pointed out in the previous section, government consumption is the most significant variable, showing the expected negative sign when explaining inequality. Trade openness is also significant at 99% confidence level; according to the estimation, increasing international trade would contribute to a more even income distribution. Finally, credit to the private sector – as a measure of financial deepening - shows a positive relation with inequality, although significance holds in this case at 90%.

The main set of regressions (Columns 3a to 3i) adds each of the variables related to financial inclusion to the augmented Kuznets curve. In virtually all cases, a higher degree of financial inclusion is related to lower inequality[14]. Significance levels reach 99% confidence for the share of adults with bank accounts using either the World Bank's data or the combination of them with Honohan (2007), while Sarma (2012)'s index and the ratio of loans to SMEs over GDP are significant at 95% confidence levels and Cámara and Tuesta (2014)'s index at 90%. The relation between income inequality and financial inclusion is significant at levels below

14: The only exception are the results stemming from the 2-dimension version of Sarma (2008)'s index of financial inclusion.

90% confidence for Honohan (2007), the three-dimension version of Sarma (2008)'s index and the share of loans to SMEs over total loans. All in all, signs and coefficients remain relatively stable for control variables across the different regressions. The degree of significance is acceptable, being higher for the Kuznets curve and lower on average for the ratio of credit to private sector over GDP.

5.1 Estimation issues

As raised in Section 3, one estimation concern is collinearity of regressors. In order to analyse the extent of this problem, we now compare results from regressions using original explanatory variables (those in Table 4) with regressions using residuals of explanatory variables on GDP per capita – to be more precise, on level and square values of GDP per capita[15].

Our analysis (Figure 3) shows that collinearity between GDP per capita and other explanatory variable is a relevant issue when reading results of regressors.

On the one hand, using original values for explanatory variables leads – even though keeping the expected inverted U shape - to very different patterns of the Kuznets curve, all of which are drawn above the one estimated in the first regression. The pattern is, however, more robust once we adjust for collinearity and use residuals of bilateral regresssions on GDP per capita.

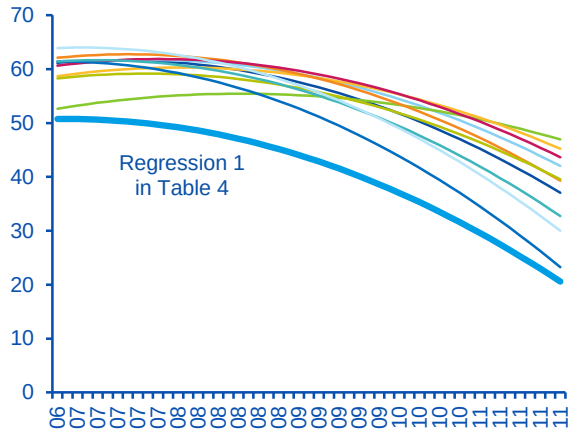
And on the other hand, actual contributions of other explanatory variables are also distorted without any adjustment as they co-move with economic development. Contributions – either positive or negative - are overestimated under collinearity conditions. The reading is more genuine when we use residuals of regressions on GDP per capita; and easier, too, as the sign of contributions now depends on whether the original variable is above or below the value that we would expect according to economic development.

A second estimation issue is robustness of results conditional on certain characteristics, in line with the *a priori* analysis made in Section 4. For this purpose, we compute the average and standard deviation of residuals for country groups according to the following criteria: first we divide countries in two groups, namely developed and emerging, following the IMF definition; second we focus on emerging economies and classify them by geographical location, and third we classify them by income per capita.

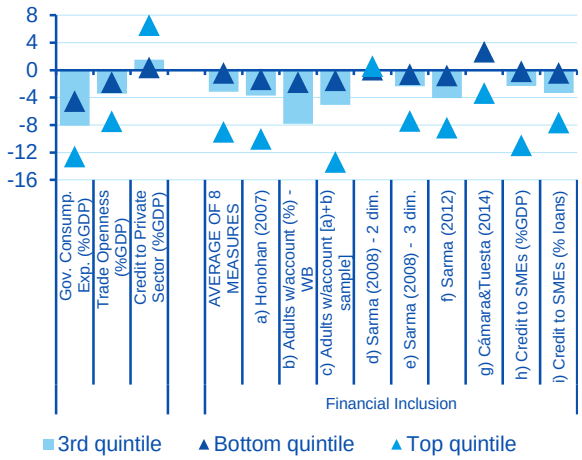
15: This second set of regressions only affects the Kuznets curve coefficients.

Figure 3
Contribution of explanatory variables to income inequality. Explanatory variables: original

Kuznets curve (window between min and max GDPpc)

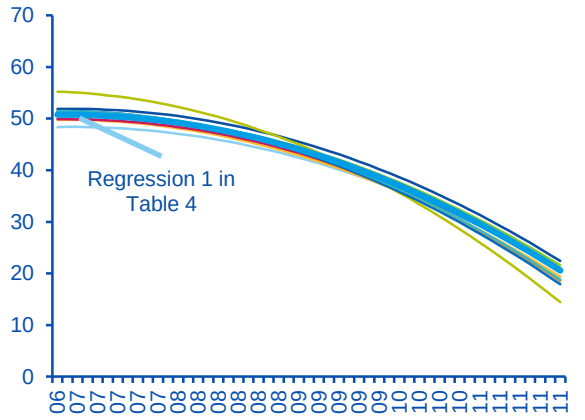


Contribution of explanatory variables (quintile average)

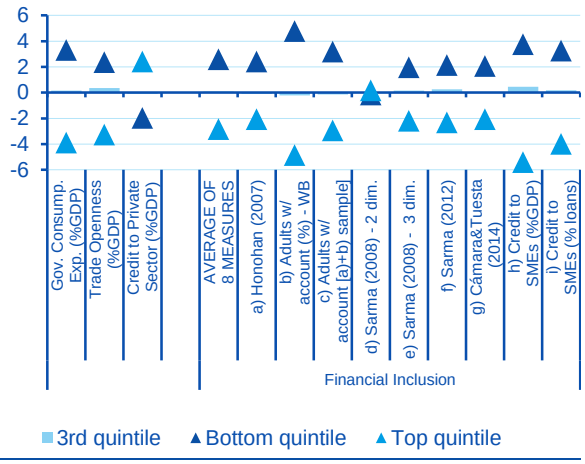


Explanatory variables: residuals of regressions on GDPpc

Kuznets curve (window between min and max GDPpc)



Contribution of explanatory variables (quintile average)



Source: BBVA Research

According to the analysis (Figure 4), the most relevant estimation bias is related to geographical location. The GINI index is overestimated on average for countries in Eastern Europe and Emerging Asia, regardless of the financial inclusion variable included in the regression. The opposite happens for countries in Africa and Latin America. Although it would be useful to reduce this bias, the inclusion of dummies to account for these regional effects is discarded on sample limitations.

Finally, as warned in Section 3, heteroskedasticity problems may arise as a result of measurement errors or missing variables. In this sense, our analysis confirms the existence of different patterns for residual variance conditional on characteristics mentioned above. As both the standard deviation and the average of residuals are high for certain groups, heteroskedasticity seems to be related to potential missing variables rather than measurement errors – that we generally assume not to move in the same direction. Again, the small data sample does not allow for any additional measure to deal with this issue.

Figure 4
Residual statistics by country group

Note: Statistics for geographical grouping are computed only for emerging economies
Source: BBVA Research

5.2 How to read results

Estimation results in Table 4 suggest that there is a significant positive relation between income equality and financial inclusion and that the opposite is true for the size of the financial sector[16].

According to our analysis, the positive relation between financial inclusion and income equality seems to be, on average, as intense as the negative relation between financial deepening and income inequality. Regarding the several aspects of financial inclusion that we measure, the share of adults with a bank account and the ratio of loans to SMEs over GDP are the indicators with the largest impact on income distribution. Comprehensive financial inclusion indexes show more moderate contributions, although they are still significant.

A second key question arises at this point, related to the power of alternative redistribution tools; namely, how do these figures fare with the impact of fiscal redistribution? We estimate the range of impact for the ratio of government consumption to be a similar figure for the average of all financial inclusion measures. In other words, financial inclusion seems to contribute to reducing income inequality as much as fiscal policy.

16: Honohan (2007) reached similar results in a cross-country regression.

6 Conclusions

This papers uses virtually all available measures of financial inclusion (defined as access and use of financial services by households and/or small and medium enterprises) to evaluate whether a country with a higher degree of financial inclusion can be expected to have a more equal income distribution after controlling for key relevant factors, mainly economic development and fiscal policy.

To that end, the paper distinguishes between a more general concept of financial development, namely the size of the financial sector, and financial inclusion. Interestingly, the paper finds that financial size does not really contribute to a more equal income distribution, measured by the GINI coefficient, while financial inclusion does so in a very significant way. This is so much the case that the role of financial inclusion can be compared with that of fiscal policy, based on the size of our estimated coefficients.

While our results should be treated with caution, given the limited comparable data available both for income distribution and for financial inclusion, they do constitute an initial point of analysis of a topic which has been widely disregarded in the literature, namely the role of financial development in income distribution and, more specifically, which kind of financial development is most conducive to a better distribution of income.

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