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Does financial development reduce income inequality and poverty? Evidence from emerging countries

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ABSTRACT

The objective of this paper is to examine whether bank and stock market development contributes to reducing income inequality and poverty in emerging countries. Using dynamic panel data methods with an updated dataset for the period 1987–2011, we assess the finance–inequality–poverty nexus by taking the separate and simultaneous impacts of banks and stock markets into account. Mixed explanatory findings on panel studies suggest that although financial development promotes economic growth, this does not necessarily benefit those on low-incomes in emerging countries. For the finance–poverty link, we find that neither banks nor stock markets play a significant role in poverty reduction.

1. Introduction

Inequality and poverty are persistent phenomena and fundamental issues of concern. Much effort has been expended by scientists to explore the sources and the socio-economic consequences of income inequality and poverty, and the disadvantages of the persistence. Unequal access to finance has long been recognized as a critical mechanism for generating persistent income inequality and slower economic growth. One strand

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of the related literature stresses that capital market imperfections and lending constraints that limit access to finance may affect inequality and poverty during economic development. Persistent financial market imperfections have been the key determinants of poverty in many inequality and poverty models (see Greenwood and Jovanovic, 1990; Banerjee and Newman, 1993, among others). These imperfections prevent those on low-incomes from investing in human capital, health, and entrepreneurial activities. However, although it is known that income inequality has increased and absolute poverty has decreased over the past quarter-century in many countries, the exact impact of financial development on income inequality and poverty reduction has not been well defined in either empirical studies or the theoretical literature. Moreover, crisis periods, the recent global financial crisis, and macroeconomic instabilities have also increased the attention paid to the finance–growth–inequality–poverty (FGIP) nexus. In this aspect, it is argued in the literature that financial systems have a potentially important role to play in equalizing economic opportunities and reducing inequalities, and therefore, it is important to consider the link between financial sector development, income inequality and poverty reduction. But, interestingly, even where there is development in the size/liquidity of the financial system (specifically involving banks and stock markets), this development may not help the less well off because of the lack of democratized access to financial services and products. In other words, if the access to financial services for the poor is limited compared to the rest of the population, financial development may not contribute to reducing inequality and poverty.

The objective of the paper is to examine whether developments in the banking sector and stock markets, as well as overall financial sector, have contributed to a reduction in income inequality and poverty, and to identify the channels through which financial development affects income inequality and poverty. Although financial development may affect inequality and poverty in two ways,[2] directly and indirectly, this study mainly focuses on the former. In this respect, the paper empirically investigates whether improved access to banking or stock market opportunities is the main channel through which financial development contributes to a reduction in income inequality and poverty. In other words, we assess the finance–inequality–poverty (FIP) nexus by taking both the separate and simultaneous impacts of banks and stock markets into account. The paper makes five main contributions to the literature. The first contribution of our study to the FIP literature is that we develop aggregate measures to examine the separate and simultaneous impacts of developments of stock market and banks on income inequality and poverty. To the best of our knowledge, this is one of the first comprehensive studies that examines the simultaneous and separate impacts of two components of the financial sector, namely banking and stock markets, on income inequality and poverty reduction by constructing aggregate measures to represent banking and stock market development as well as the overall financial sector development. This is an original approach to the analysis of the relationship between bank and stock market development and inequality/poverty, and changes in the relationship occurred by considering the separate and simultaneous effects of finance, and by the choices of financial development indicators. Second, it is important to note that we also examine the impact of stock markets, which was generally ignored in the early literature on the FGIP nexus in emerging economies. On the other hand, since the choice of proxy used for financial development has been one of the major issues, and seriously influenced the findings in empirical literature, it is important to construct reliable indicators of bank and stock market development. A third contribution is the utilization of principal component analysis to construct satisfactory financial development proxies. Fourth, our sample period provides an opportunity to better understand the connections among local/regional/global financial crisis, development of banks and stock markets, and inequality/poverty trends in emerging countries. Finally, we re-examine the finance–growth (FG) nexus to test whether a well-functioning financial system is successful in promoting economic growth in emerging countries. In addition to all these, we also provide a broad review for the literature of the research field involving the financial system/intermediation and growth nexus, FG nexus, finance–law nexus, FIP nexus, and FGIP nexus.

Two key points have been debated intensively in the emerging market context: whether growth in the financial sector would be also beneficial for the poor, and if so, whether inequality and poverty would be reduced by financial sector growth. These highly debated issues have complex socio-economic and political dimensions. To examine the relationship between financial development and inequality/poverty, we specifically focus on the experience of emerging countries, with a more diverse selection of countries to identify

[2] First, financial development may help the poor by reducing the credit constraints and high unit costs of small loans (Greenwood and Jovanovic, 1990), hence improving the access of the poor to financial services. Second, financial development promotes economic growth and growth is good for those on low-incomes (see Jalilian and Kirkpatrick, 2002).

patterns between financial structure, economic development, and inequality/poverty. Emerging market experiences provide an interesting case study for four main reasons. First, examining the role of the financial sector/intermediation in the growth–development process of emerging countries would be an important research area, as it views FG nexus from a new perspective. Second, as the main focus of the research, the paper provides further evidence and policy suggestions on the FIP nexus, which has conflicting results in the literature, from an emerging markets' perspective. Third, the analysis on emerging countries would also contribute to discussions on interactions between growing globalization/liberalization and income inequality/poverty levels in the emerging market context ever since the post-1980 period marked the starting point of market liberalization for most of emerging countries, with a specific emphasis on the importance of financial markets. A final reason is the importance of policy implication of empirical findings, which can support policymakers by enabling them to understand whether, and in which context finance is an instrument that can influence income inequality/poverty. Because there is no consensus on the role of financial development in reducing inequality and poverty, further empirical investigation is needed to distinguish between the competing conjectures, especially in emerging economies.

Methodologically, we construct a panel with data averaged over four-year non-overlapping intervals from 1987 to 2011 to smooth out short-term fluctuations in growth rates. We use a dynamic panel data approach to address the omitted variable and endogeneity issues. The empirical part of this study employs the Generalized-Method-of-Moments (GMM) approach developed by Arellano and Bover (1995), and Blundell and Bond (1998). In order to increase the explanatory power of financial development on inequality and poverty, we use the following as control variables; secondary school enrolment rate, government consumption share in GDP, inflation rate, trade as a ratio of GDP, lagged values of inequality and poverty indicators, real per capita GDP, and real per capita GDP growth. The results suggest that while financial sector development contributes to long-run economic growth, it may not be beneficial for those on low-incomes in a sample of 45 emerging countries. We find a positive and statistically significant relationship between bank development and the growth of the Gini coefficient, suggesting that improvements in banking sector may increase income inequality in emerging economies. Our results show that bank development – compared to stock market development – has a greater and significant impact on income inequality and poverty. However, we find mixed but statistically insignificant results for the relationship between stock market development and inequality/poverty measures. The results also show no evidence of a statistically significant relation between financial development and inequality/poverty measures when the combined impact of banks and stock markets (the overall development in the financial sector) is tested.

The remainder of the paper is structured as follows. Section 2 reviews the broad literature of the research field. Section 3 describes the measures of financial development, income inequality, and poverty. This section also discusses the construction of the aggregate measures for bank and stock market development. Section 4 discusses the methodology. Section 5 is reserved for empirical analysis. Section 6 draws conclusions and offers policy recommendations.

2. Literature review

The “great divergence” between rich and poor countries has continued beyond the end of the twentieth century. Although many studies show that a large group of rich- and middle-income countries has been converging to parallel growth paths over the past 50 years or so, the gap between these countries as a whole and the very poorest countries as a whole has continued to widen (Aghion et al., 2005). On the other hand, the post-1980 period marked the starting point of the liberalization era for most of emerging countries, with a specific emphasis on the importance of financial markets. However, interestingly, despite evidence provided by the literature and belief of the positive impacts of financial markets, income inequality has been on the rise, or, at best, stagnant, in most countries since the early 1980s (see OECD, 2008). In view of the general, but over optimized belief in the positive impact of financial development on income inequality and poverty reduction, this fact provides the motivation for analysing financial development and income inequality/poverty linkages in the context of bank/stock market development. Kuznets (1955) argued that effective work in the field of economic growth of nations necessarily calls for a shift from market economics to political and social economy. There can be no real purpose in addressing the research question without an understanding of the political economy of the linkages. However, as the limitation, this research specifically focuses on economic parts of the FIP nexus from the perspective of emerging markets. To have better understanding of the link

between finance and inequality/poverty, we first review functions of financial intermediation, FG, and finance–law literatures. Then, we move to the FIP nexus, by analysing the relevant literature.

2.1. The role of financial system/intermediation in an economy

The literature has highlighted that financial system and intermediaries perform critical functions in domestic and global economies. For example, Merton and Bodie (1995) point out that financial system is also considered to provide ways of transferring economic resources through time, across borders, and among industries, and to provide ways of managing risks. Allen and Santomero (1997) suggest that the literature's emphasis on the role of intermediaries as reducing the frictions of transaction costs and asymmetric information is too strong. The authors indicate that intermediaries currently play two different roles: facilitation of risk transfer and participation in the sector. Johnston et al. (2000) suggest that financial intermediaries arise as a particular solution to the problem of asymmetric information. Niemeyer (2001) indicates that financial markets make it possible for corporations and individuals to efficiently handle economic uncertainties by hedging, pooling, sharing and pricing risks. Scholtens and Wensveen (2003) argue that information asymmetries were found not to be the driving force behind intermediation activity, and their elimination is not the commercial motive for financial intermediaries. They argue that the concept of value creation in the context of the value chain might serve as an alternative paradigm to express the essence of the intermediation process, while risk and risk management drive this value creation.

The main role of the financial markets and institutions in all economies is to improve the efficiency of capital allocation, mobilize savings, lead to more capital formation, manage risks, and facilitate transactions. Many researchers are becoming increasingly convinced that well-functioning financial systems can boost economic growth and reduce poverty by ameliorating information and transaction costs (King and Levine, 1993a; Beck and Levine, 2004; Bencivenga et al., 1995). In this respect, for example, Beck et al. (2000) find that there is a robust, positive link between financial intermediary development and both real per capita GDP growth and total factor productivity growth. Moreover, Saunders (1997) indicates that in an economy without financial intermediaries, the level of fund flows between the household saver and the corporate sectors is likely quite low. The importance of financial system/intermediaries has also been reviewed in the following section.

2.2. Finance–growth nexus

In the field of FG nexus, an extensive body of research is concerned with testing the linkage between financial development and economic growth at firm/industry level and in a cross-country framework. Fundamentally, the theoretical literature reveals that financial development via enhancing asset size, depth, liquidity (in stock exchange), stability, variety of instruments, legal/regulatory background, competition, access to financial services, contract quality, number of participants, and effectiveness of intermediaries, etc. may lead to economic growth via mobilizing saving–investment, expand opportunities and providing risk sharing channels. However, from an empirical perspective, the findings provide conflicting results on the FG link, but the majority of studies suggest a positive linkage between finance (more specifically, size of financial sector) and economic growth.

The nexus has been analysed in several different contexts involving various factors such as; interactions among macroeconomic variables (i.e. saving, investment), impacts of short/long term positive/negative shocks (i.e. financial crisis/liberalization and financial integration), development stages of countries, impacts of non-financial factors (i.e. legal system, institutional structure, education and technological improvements), and country specific conditions. Empirical studies adopt one of two general broad econometrics methodologies: cross sectional modelling approach, or time series modelling (see Arestis and Demetriades, 1997; Shan, 2005). To keep the discussion within reasonable limits, we give a brief summary of the relevant literature.[3] The early contributions were made by Goldsmith (1969), McKinnon (1973), and Shaw (1973). Later, Greenwood and Jovanovic (1990) find a causal relationship between financial development and economic growth, and indicate that financial intermediation and economic growth are inextricably linked in accord with the Goldsmith–McKinnon–Shaw view on economic development. Using data on 80 countries over the period 1960–1989, King and Levine (1993a,b,c) argue that an integral part of Schumpeterian story is that

[3] Levine (2005) provides an excellent literature survey on the link between financial development and economic growth.

financial intermediaries make possible technological innovation and economic development, therefore, Schumpeter may have been correct to highlight the importance of finance for economic development. Levine (1997) indicates that a growing body of empirical analyses, including firm/industry-level studies and individual/cross-country-studies, demonstrate a strong positive link between the functioning of the financial system and long-run economic growth. Luintel and Khan (1999) analyse the long-run relationship between financial development and economic growth, finding bi-directional causality between financial development and economic growth in a sample of 10 countries.

From stock market development–growth perspective, Atje and Jovanovic (1993) as well as Levine and Zervos (1998) show that stock market development has a positive effect on economic growth. Boubakari and Jin (2010) find that stock market growth and economic growth have long-run relationship in some Euronext countries. Analysing nine MENA countries over the period of 1991–2009, Falahaty and Hook (2013) find that financial development is a statistically significant determinant of economic growth, but the impact is more apparent on the development of the stock market rather than banking sector. More recently, Seven and Yetkiner (2016), using panel data from 1991 to 2011, find that stock market development has a positive impact on economic growth in high- and middle-income countries.

The literature provides evidence on special circumstances, which may have positive and negative effects on the FG link. Jayaratne and Strahan (1996) show that economic growth accelerated following bank deregulation (interstate branching reform) in the U.S. The findings are consistent with theoretical models, which stress the faster growth of economies with financial systems channelling savings into more effective projects. Arestis et al. (2001) argue that while the medium-term costs of financial liberalization are now recognized, its longer-term benefits, albeit widely accepted, remain unproven. Moreover, its effects on financial development are ambiguous. Investigating the channels through which financial development influences economic growth in a panel of 74 countries for the period 1961–1995, Rioja and Valev (2004) find that in low-income countries, finance affects economic growth predominantly through capital accumulation. In contrast, in middle- and especially in high-income economies, financial development enhances productivity growth. Using five-year averages of standard measures of financial development, inflation, and growth for 84 countries from 1960 to 1995, Rousseau and Wachtel (2002) find that disinflation is associated with a positive effect of financial depth on growth, and in higher inflation environment, finance ceases to increase economic growth. As an extension of the FG nexus, Acemoglu et al. (2006) show that relatively backward economies may exit the investment-based strategy too soon, so certain policies, such as limits on product market competition or investment subsidies, which encourage the investment-based strategy, may be beneficial. Moreover, contribution to growth may be different at financial sub-sector level. In this context, Fang and Jiang (2014) suggest that empirical results show that the banking and insurance sectors provide significant stimulus to economic growth; the stimulating effect of the securities sector is uncertain.

FG literature also provides counter-evidence on the hypothesis. For example, Arestis and Demetriades (1997) suggest that econometric evidence using time-series estimations on individual countries suggests that the results exhibit substantial variation across countries, and illustrate the concerns over findings on Germany and the U.S., which reveal important differences in the links between finance and growth. Shan (2005) finds little evidence that financial development 'leads' economic growth in 11 countries in variance decomposition analysis. The author underlines an interesting phenomenon that the financial sector was less developed during economic take-off periods of China, Japan, and Korea. Gantman and Dabos (2012) demonstrate that financial development has no statistically significant effect on economic growth. This suggests that the FG link is not as strong as portrayed in the literature, which is limited to the specific sample of countries and time periods considered. Rioja and Valev (2014) show that in low-income countries, banks have a sizable positive effect on capital accumulation. Stock markets, however, have not contributed to capital accumulation or productivity growth in these countries.[4]

2.3. Finance–law nexus

The effects of legal origin and financial development or the role of legal system in FG nexus have been documented in literature (La Porta et al., 1997, 1998; Levine, 1999; Levine et al., 2000; Glaeser et al., 2001;

[4] For more counter evidence on the hypothesis from developing country perspective, see Gantman and Dabos (2012: 519–520).

Djankov et al., 2003; Demirguc-Kunt and Levine, 2001). In this context, La Porta et al. (1997) consider that French civil law countries have both the weakest investor protection and the least developed capital markets, especially as compared to common law countries. Discussions on finance–law nexus would be specifically important for developing countries. As a result of constructing an index of procedural formalism of dispute resolution for each country, Djankov et al. (2003) point to the negative effects of high level of procedural formalism, particularly in developing countries. Haas (2004) underlines that limited empirical results suggest that improvements in laws and especially their enforcement are important for the development of financial systems in transition countries. By employing granger causality tests, Yu et al. (2012) show the short-run relationship between finance and growth. They also contend that it is possible for under-development countries to experience slower economic growth despite financial and stock market development in the short-run (e.g. less than 10 years), mainly due to ill-enforced legal systems and political instability.

2.4. Finance–inequality–poverty nexus

When financial markets and institutions work well, they provide opportunities for all market participants to take advantage of effective investment by diverting funds to more productive use, hence boosting economic growth. It may be expected that this framework would also reduce income inequality and poverty. On the other hand, if financial markets do not work well, opportunities for growth are missed and inequalities persist. In the case of the existence of financial market imperfections, the least wealthy, and the smallest enterprises may be the most affected by information asymmetries, contract enforcement costs, and transaction costs, namely lack of finance (Galor and Zeira, 1993). As a result, financially constrained entrepreneurs need to rely on their own limited personal wealth or internal resources to invest in their own projects, and thus remain in poverty, perpetuating inequality in the country.

The question of whether deeper financial markets leads to greater economic growth but also less income inequality and poverty has long been examined throughout the FGIP nexus over the last two decades. Although a large body of literature has shown that financial sector development is correlated with subsequent economic growth (see Section 2.2), theory provides conflicting predictions about the impact of finance on income inequality and poverty reduction. Several theoretical models suggest that financial system development can help reduce income inequality and poverty as well as boost economic growth, due to several positive externalities. For example, by improving the efficiency of capital allocation and relaxing the constraints of funding from financial markets, financial development may reduce income inequality through improving collateral use and credit histories (Galor and Zeira, 1993; Aghion and Bolton, 1997; Galor and Moav, 2004).

By employing data for 40 developed and developing countries for the period 1947–1994, Li, Squire and Zou (1998) find that financial development leads to less income inequality. Jalilian and Kirkpatrick (2002) show that financial development makes a clear contribution to poverty reduction. By analysing 47 developing economies from 1984 to 2008, Kpodar and Singh (2011) find that when institutions are weak, bank-based financial systems are better at reducing poverty but, as institutions develop, market-based financial systems become more effective towards this end. Clarke et al. (2006) examine the relationship between finance and income inequality for 83 developed and developing countries between 1960 and 1995, and find that, in the long-run, inequality is less when financial development is greater, consistent with Galor and Zeira (1993) and Banerjee and Newman (1993). According to Beck et al. (2007), financial development disproportionately raises the income of the poorest quintile and reduces income inequality. They also find that financial development is strongly associated with poverty alleviation. Similarly, Deininger and Squire (1998), Dollar and Kraay (2002), White and Anderson (2001) and Ravallion (2001) have explained that finance has a positive effect on poverty reduction. Kappel (2010) finds that financial development can reduce both poverty and income inequality, but the effect of financial development on poverty in particular is not only significant in itself, but also clearly greater than the effect on income inequality. Banerjee and Newman (1993) underline that countries with larger financial market imperfections such as information asymmetries and transaction costs that limit access to finance, are more exposed to income inequality. That is, there is a potential of a negative relationship between financial sector development and income inequality. According to this view, finance alleviates poverty both by improving the access to finance and by boosting economic growth. More recently, Uddin et al. (2014) investigate short- and long-run relationships between financial development, economic growth and poverty reduction in Bangladesh. The authors show that a long-run relationship exists between these variables. Similarly, Abosedra et al. (2015) analyse the linkages between financial development and

poverty reduction in Egypt using data for the period of 1975Q1–2011Q4. The authors find that financial development reduces poverty when domestic credit to the private sector is used as proxy for financial development.

In contrast, other studies predict that financial development may fail to reduce income inequality and poverty. Claessens and Perotti (2007) argue that in countries with historically high levels of inequality, distortion in the institutional environment produces unequal access to finance, and ultimately leads to unequal opportunities, which in turn reinforces any initial economic inequality. These authors believe that limited access to funding and financial services not only reflects economic constraints, but also barriers erected by insiders. Charlton (2008) argues that stock market liquidity does not directly benefit the poor in developing countries. Law and Tan (2009) examine the role of bank and stock market developments on income inequality in Malaysia for the period 1980–2000, finding that developments in banks and stock markets are not significantly associated with income inequality. Furthermore, Jauch and Watzka (2015) analyse the link between financial development and income inequality for a broad unbalanced dataset of up to 138 developed and developing countries between 1960 and 2008. The authors find that financial development increases income inequality, after controlling for country fixed effects and possible endogeneity problems. Furthermore, Sehrawat and Giri (2015) investigate the finance–inequality nexus in India for the period 1982–2012, and suggest that financial development aggravates the income inequality in both long-run and short-run. Discussions on the FGIP nexus have also been connected with socio-economic and political settings in their broadest meanings, for each country. Acemoglu and Robinson (2013) attempt to theorize prosperity's link with inclusive economic and political institutions, suggesting that the latter can enforce property rights, create a level playing field, and encourage investments in new technologies and skills and are therefore more conducive to economic growth than extractive economic institutions. Such institutions also pave the way for technology and education as the engines of prosperity. However, it has been long recognized that creating prosperity does not necessarily create equal distribution of income/wealth in a society. Moreover, the growth of the financial markets, specifically after the 1980s, with substantial governmental support may play a role in this inequality picture. Stiglitz (2013) contends that the financial sector has contributed so powerfully to inequality in the US through several channels. The author underlines that while financial firms pursue their own benefits via several rent seeking channels, inefficient regulation/supervision/enforcement framework and regulatory capture have also played roles, with consequences for distribution.

Another reason for the possible negative effect of financial sector development on income inequality and poverty is that the rapid financial liberalization without strong political/economic institutions, and lack of prudential regulation and (or) supervision can lead to financial/economic crisis. This frequently experienced scenario widens income inequality/poverty via several channels, such as unemployment[5] and decreasing real income levels. Interactions among financial liberalization, deregulation, and inequality have also drawn attention in the literature. Jeanneney and Kpodar (2008) argue that the beneficial impact of financial development on poverty reduction is reduced or perhaps even eliminated by financial instability. In particular, the authors express their view that financial development is accompanied by crises that are likely to undermine the potential benefits of financial development, in particular for the least well off. Claessens and Perotti (2007) underline that financial liberalization may, in practice, increase fragility and inequality, and lead to a political backlash against reforms. By econometrically evaluating causal impact of bank regulations on income distribution, Beck et al. (2010) suggest that branch regulation in the U.S. restricted competition, protected local banking monopolies, and impeded the economic opportunities of the relatively poor.

Empirical studies also provide evidence on whether the linkage between financial development and income inequality is non-linear. For example, Greenwood and Jovanovic (1990) predict a non-linear effect of financial development on inequality, in which income inequality first increases and then decreases as higher levels of economic development are reached and larger segments of society can access the growing financial markets. Consequently, Greenwood and Jovanovic's (1990) model predicts an inverted U-shaped relationship between financial development and income inequality. However, Clarke et al. (2003) find no evidence of this inverted U-shaped relationship. Moreover, Liang (2006) finds a negative and linear relationship between finance and inequality in urban China, but no strong support for the inverted U-shaped hypothesis. More recently, Park and Shin (2015) examine the relationship between financial development and income inequality.

[5] Although it is out of the context of our research, it is important to note that unemployment is an important determinant of inequality and poverty.

Their results suggest that financial development contributes to reducing inequality up to a point, but as financial development proceeds further, it contributes to greater inequality.

As regards the growth impact of inequality, in the 1950s and 1960s, economists such as Nicholas Kaldor and Simon Kuznets argued that there is a trade-off between reducing inequality and promoting growth (Forbes, 2000). However, whether inequality retards or promotes growth is a long-standing theoretical and empirical issue (Bandyopadhyay and Basu, 1999). One point of view is that inequality may in fact be beneficial in some respects. Thus, inequality is often regarded as a necessary evil, which has to be tolerated to allow growth. In this view, inequality allows the wealthy to earn a greater rate of return on assets, encouraging rapid wealth accumulation, allowing a degree of redistribution, which can benefit everyone. By analysing the linkage at the aggregate level for selected 18 developing countries in the Asia region, Majeed (2010) suggests positive and significant relationship between growth and inequality. Using data for 12 Latin American countries between 1970 and 1994, de Janvry and Sadoulet (2000) find that income growth reduces urban/rural poverty, but not inequality. Moreover, income growth is more effective in reducing urban poverty if the levels of inequality/poverty are lower, and the levels of secondary education are higher. A contrasting view is that inequality actually slows growth. This is because increased inequality causes greater conflict over distributional issues, thereby encouraging greater government intervention into the economy, and higher taxes. This lowers the rate of return on private assets, restricting capital accumulation and slowing growth (see Clarke, 1992, among others).

3. Data description

We use measures of bank development, stock market development, income inequality, and poverty as well as the set of conditioning information. This section describes the variables and principal components, and provides a summary statistics for all variables used in the analysis.

3.1. The sample

The sample consists of emerging countries only, in contrast to that of Dollar and Kraay (2002) and Beck, Demirguc-Kunt, and Levine (2007), which analysed both developed and developing countries. Our reasons for focusing solely on emerging countries are threefold. Firstly, these countries may have different determinants of inequality/poverty compared to developed countries, due to structural differences in fundamental economic and political institutions. Second, by focusing on a specific group of countries, it is possible to reduce sample heterogeneity. Finally, for developed countries, our financial sector development indicators may not be able to fully capture the level of financial development, since their financial systems are more diversified and more mature.

We use a sample 45 countries for the period 1987–2011. The analysis period provides significant knowledge on the process of financial market developments in emerging countries since the 1990s. However, in contrast to developed countries, time series data on inequality and poverty in many emerging countries are very limited, since these countries only started recording such data in the late 90s. Thus, data was available for only 45 emerging countries for banking sector analyses, and 38 countries for stock market analyses.[6] Therefore, we determine the countries for the panel based on the availability of bank and stock market development data and inequality and poverty indicators. Data are averaged over six 4-year periods[7] rather than considered annually or quarterly in order to smooth out short-term fluctuations in growth rates. We require that a country should have data for at least four non-overlapping time points to be included in any estimated systems. We prefer averaging data over a period since our key econometric model, the system GMM estimator, requires fewer time points and larger cross-sectionals. For the averaging period, however, it has been observed that empirical literature uses three, four, or five year averages. Since our variables become stationary, we prefer four-year averages in order to maximize the number of time points.[8]

[6] See Table A.1 in the Appendix for the list of these countries along with their main variables.

[7] We have six periods. The first period represents the data averaged between 1987 and 1991 (only for the first period we use 5 year averages), the second period represents the data averaged between 1992 and 1995, the third period represents the data averaged between 1996 and 1999, and so on.

[8] Averaging data over a period solves missing data problem and becomes popular in dynamic growth model (Khadraoui and Smida, 2012).

3.2. Measures of bank and stock market developments

The selection of key variables to measure financial development is one of the major problems in the empirical literature of the FGIP nexus.[9] To measure financial development level, the literature has mostly used the ratio of private credits to GDP (see Ang and McKibbin, 2007; Kappel, 2010; Demirguc-Kunt et al., 2013, among others). The ratio of private credit to GDP has been shown as a good proxy for the extent to which private sector agents have access to financial intermediation. Private credits to GDP might be a good indicator of financial development in less developed countries, where traditional borrowing and lending activities are the key business in financial intermediation because stock markets are either underdeveloped or non-existent. In emerging economies, however, financial intermediation is relatively sophisticated and has more dimensions. Therefore, to capture a more complete picture, we use both bank-based and market-based financial proxies to measure financial development in emerging countries. However, researchers do not have direct measures of the degree to which a financial system, as a whole, performs its key functions. Due to the lack of sufficient data across countries, and the differences among economies, a comprehensive index or principal component better represents "what is broadly meant by financial development" (Creane et al., 2003; Ang and McKibbin, 2007). In this respect, by following Ang and McKibbin (2007), principal component analysis (PCA) is utilized in this paper to construct satisfactory and reliable indicators of bank and stock market developments.

To measure bank development, we choose five indicators that are most widely used by the related literature. We use logarithm of liquid liabilities to GDP (*liquid*), logarithm of private credit by deposit money banks and other financial institutions to GDP (*private*), logarithm of bank deposits to GDP (*deposit*), logarithm of bank private credit to GDP (*bprivate*), and logarithm of deposit money bank assets to GDP (*basset*). Furthermore, we use logarithm of stock market capitalization to GDP (*mktcap*), logarithm of stock market total value traded to GDP (*traded*) and logarithm of stock market turnover ratio (*turnover*) as proxies for stock market development.[10] However, these series are highly correlated. The correlation matrix presented in Table A.3 in the Appendix confirms the interrelations between the indicators, and suggests that the financial development indicators may contain common information, which may lead to multi-collinearity and over-parameterization problems. This multi-collinearity problem is a further justification for the construction of new aggregate measures. When all eight financial development indicators are included in regressions, we generally obtain inconsistent results, possibly because of the high correlation between financial development indicators. At this point, PCA solves the problems of multi-collinearity.[11] It should be noted that PCA does not search for causal relations; instead, it searches for interdependence between indicators, without defining the direction of the causal relation. Moreover, compared to the factor analysis, PCA is a more appropriate technique for data reduction when the intention is to obtain synthetic variables (see Hair et al., 1998).

We develop three aggregate measures: i) bank development (*bank-aggregate*) by using five indicators of bank development, ii) stock market development (*market-aggregate*) by using three indicators of stock market development, and iii) the overall financial development (*finance-aggregate*) by using both bank and stock market development indicators. Each aggregate measure employs principal component analysis, which deals with the problems of over-parameterization and multi-collinearity. Theoretically, these new aggregate measures are able to capture most of the information from the original dataset.

The results of the extraction of PCA for bank development and stock market development indicators are presented in Tables A.4 and A.5 in the Appendix, respectively. The financial development indicator for the banking sector corresponds to the first principal component, the only one with an eigenvalue greater than 1, and which explains about 93.2% of the total variance. The remaining principal components are not considered since their marginal contributions are relatively small.[12] The synthetic variable, in other words,

[9] There is no directly measurable or reliable data available to measure the extent and efficiency of financial intermediation although the existing measures have been improved over the last years (Ang and McKibbin, 2007). In this context, Levine (2003) mentions the problem of choosing a proxy for measuring financial development and the differences among economies in terms of the availability of financial intermediation.

[10] The sources and short definitions of all variables used in the analyses are provided in Table A.2 in the Appendix.

[11] Principal component analysis has been used to reduce a large set of correlated variables into a smaller set of uncorrelated variables. See Stock and Watson (2002a,b).

[12] For instance, while the second principal component explains 4.4% of the variation, the third principal component explains 1.3% of the variation, and the last two components together explain only 1.1% of the variation.

the measure of bank development (*bank-aggregate*), is computed as a linear combination of the five widely used measures of bank development with weights given by the first eigenvector. In the case of stock market development, we extract again the first principal component, which is able to capture 76.6% of the information from the original dataset, while the last two components explain 23.3% of the total variance. In addition, the first principal component is the only one with an eigenvalue greater than 1. The first component is computed as a linear combination of the three standard measures of stock market development with weights given by the first eigenvector, and it is named as *market-aggregate*.

3.3. Measures of income inequality and poverty

We use measures of income inequality and poverty, which have been typically used in the literature. As indicator of income inequality, we use the Gini coefficient. The Gini coefficient measures deviations from perfect income equality. This is based on the Lorenz curve, a standard indicator of the distribution of income within a community. The Gini coefficient is expressed as a percentage, and ranges from 0 (perfect equality) to 1 (perfect inequality), that is, higher values imply greater income inequality. We use the growth rate for each country's Gini coefficients in a four-year span (*Growth of Gini*) as a dependent variable. Specifically, we take the logarithmic difference between the Gini coefficients of the current and previous periods. To measure poverty, we first use the average per capita income of the least wealthy quintile, which measures the average income of the lowest 20% of the population. To calculate the average income, we multiply the income share of the lowest 20% quintile, which is provided by the World Bank's Database, by the average per capita GDP and divide all by 0.2. Then, we take logarithmic growth of the average per capita income of the poorest quintile as explained above. We use the *growth of the average* per capita *income of the poorest quintile* as a dependent variable in our regressions. A second poverty indicator is the percentage of the population living below US$2.00 a day at 2005 international prices, namely that headcount ratio. These data are based on primary household survey data obtained from government statistical agencies and World Bank country departments. First, the data are averaged over four-year periods, as in all inequality and financial development variables. Then, we take the logarithmic difference of the current (four-year span) period headcount ratio and the previous period headcount ratio to calculate the third dependent variable, namely that *Growth of Headcount*.

3.4. Summary statistics

Table 1 provides summary statistics for the eight financial development indicators, three dependent variables and six control variables. There are considerable variations in financial development indicators across countries. Private credit ranges from 1.26% of GDP in Ukraine (in 1992–1995) to 150% of GDP in Thailand (in 1996–1999). Liquid liabilities to GDP ratio ranges from 4% in El Salvador (in 1992–1995) to 161% in China (in 2008–2011), while stock market turnover ratio ranges from 0.34% in Uganda (in 2008–2011) to 397% in Pakistan (in 2000–2003).

The dependent variables also show a large variation. For example, the Gini coefficient ranges from 19.49% in the Slovak Republic (in 1992–1995) to 61.36% in Brazil (in 1987–1991). In addition, poverty headcount ratio (at 2$ per day) has its minimum value of 0 in several countries (for instance, Kyrgyz Republic and Slovak Republic, in 1987–1991) while it takes a maximum value of 89 in Pakistan (in 1987–1991).

4. Econometric methodology

We use dynamic panel GMM techniques to address the problems of potential endogeneity, and unobserved country-specific effects in the data. We run the following equation, which is the basic regression specification from the growth literature,[13] to investigate the relationship between financial development, income inequality and poverty.

$$y_{i,t} - y_{i,t-1} = (\alpha - 1) y_{i,t-1} + \beta_1 FD_{i,t} + \gamma X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

[13] See Beck et al. (2007), Rioja and Valev (2004), and Beck and Levine (2004), among others.

Table 1
Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Gini index	249	40.34	9.97	19.49	61.36
Poverty headcount ratio (at 2$ a day, PPP)	250	22.16	23.51	0	88.67
Average per capita income of the poorest quintile	242	1133.7	1313.6	47.51	7067.75
Bank private credit to GDP	249	34.1	26.77	1.26	150.17
Deposit money bank assets to GDP	251	41.57	28.98	2.83	157.84
Liquid liabilities (M3) to GDP	242	42.48	28.62	4.03	160.91
Private credit by deposit money banks and other financial inst. to GDP	249	35.23	27.14	1.26	150.17
Bank deposits to GDP	251	33.64	22.89	2.64	116.61
Stock market capitalization to GDP	200	27.03	32.77	0.19	221.82
Stock market total value traded to GDP	197	11.91	21.75	0.002	141.21
Stock market turnover ratio	198	40.85	55.77	0.81	396.66
GDP per capita (constant 2005 US$)	267	3663.4	3217.62	191.7	19,446.5
General government final consumption to GDP	267	14.48	4.75	3.99	29.89
Inflation, annual GDP deflator	267	77.6	412.79	−4.71	5740.22
School enrolment rate, secondary gross	250	73	23.02	9.8	107.71
Trade to GDP	267	80	40.24	14.49	204.33

Note: All variables (except GDP per capita) are in percentage form and averaged over a four-year period. Definitions of variables are the same as in Table A.2 in the Appendix. Obs, Std. Dev., Min, and Max denote observation, standard deviation, minimum, and maximum, respectively.

where $y_{i,t}$ represents, alternatively, the logarithm of the Gini coefficient, logarithm of the average income of the poorest quintile and logarithm of the headcount ratio for country i in period t, where each period represents the four year-averaged time points. Hence, $y_{i,t}-y_{i,t-1}$ is the growth rate of the Gini coefficient or the growth rate of the average income of the poorest quintile or the growth rate of the headcount ratio. The first explanatory variable is the lagged value of the dependent variable, $y_{i,t-1}$, which introduces a dynamic specification and allows us to measure the persistency in income inequality and poverty measures. $FD_{i,t}$ represents the level of financial development at period t. The hypothesis to be tested is whether β_1 is positive/negative and significantly different from zero. $X_{i,t}$ represents the set of control variables such as secondary school enrolment rate, trade as a ratio of GDP, inflation rate, government consumption share in GDP, real per capita GDP, and real per capita GDP growth. Finally, η_i captures unobserved country-specific effects and $\varepsilon_{i,t}$ is the error term.

This study employs the system GMM approach, an augmented version of GMM outlined in Arellano and Bover (1995) and fully developed in Blundell and Bond (1998), who more precisely articulated the necessary assumptions for the augmented estimator, and tested it with Monte Carlo simulations. The system GMM estimator provides consistent and efficient estimates, overcomes the endogeneity problem, and is a better fit for panel studies, having fewer time points and greater numbers of individuals. In the system GMM, the original equations in levels can be added to the system, and the additional moment conditions could increase efficiency, while lagged levels are often poor instruments for first differences. In other words, predetermined and endogenous variables in levels are instrumented with suitable lags of their own first differences; the predetermined and endogenous variables in first-differences are instrumented with suitable lags of their own levels; strictly exogenous regressors, as well as any other instruments, enter the instrument matrix in the conventional instrumental variables fashion, which requires one column per instrument.

To have valid instruments, we use the standard Hansen test of over-identification, where the null hypothesis is that the instrumental variables are not correlated with the residual, and the serial correlation test, where the null hypothesis is that there is no second-order serial correlation in the error terms. The Arellano–Bond test for autocorrelation has a null hypothesis that there is no autocorrelation. The tests for AR (1) process in first differences rejects the null hypothesis since $\Delta\varepsilon_{i,t}=\varepsilon_{i,t}-\varepsilon_{i,t-1}$ and $\Delta\varepsilon_{i,t-1}=\varepsilon_{i,t-1}-\varepsilon_{i,t-2}$, that is, both have $\varepsilon_{i,t-1}$. However, the test for AR(2) in first differences is more important because it detects autocorrelation in levels. Moreover, the number of instruments should be less than or equal to the number of groups to have valid instruments.

To assess the strength of the linkage between financial development and income inequality/poverty, we control for other potential determinants of inequality/poverty in regressions. We use standard control variables that are widely used in the literature (for a survey, see Christiaensen, Demery, and Paternostra, 2003).

These variables are also introduced into the model as a test of robustness. We first control for the lagged level of inequality and poverty indicators, which allows us to test persistency in poverty, as in Beck et al. (2007), although this is a more data-demanding specification. We use logarithm of the secondary school enrolment rate (*education*) to control for human capital accumulation. We also use logarithm of the ratio of trade to GDP (*trade*) to capture the degree of openness of an economy. We add inflation rate (*inflation*) as a control variable since, Ravallion and Datt (1999), Easterly and Fischer (2001), and Dollar and Kraay (2002) all find evidence that this is a significant determinant of poverty. Moreover, we use logarithm of the ratio of government consumption to GDP (*government*) to measure macroeconomic stability (see Beck et al., 2000). In order to test the impact of economic growth on inequality/poverty, we use the growth rate of the real per capita GDP (*growth*), as in Dollar and Kraay (2002), and Beck et al. (2007). A large body of the FG literature predicts that effective financial systems can promote economic growth and reduce poverty by ameliorating information and transaction costs (Bencivenga et al., 1995; King and Levine, 1993a; Beck and Levine, 2004). Therefore, it is crucial to control whether financial development affects those on low-incomes by its effect on GDP per capita. Hence, we also control for real per capita GDP (*gdpc*) to establish whether there is a disproportionate effect of financial development on the income of the lowest-paid quintile.

5. Empirical results

This study adopts the basic regression specification from the growth literature, which is also the typical representation for dynamic panel estimation. Our specifications include the convergence effect (log of the lagged level of dependent variable), the secondary school enrolment rate, the trade to GDP ratio, the government consumption to GDP ratio, the GDP deflator, real per capita GDP, real per capita GDP square, and real per capita GDP growth, where each control variable is introduced one by one. Stata 12 is used as the econometrics package. For the purpose of completeness, the models employ both the OLS and system GMM estimators. The OLS estimates represent the biased modelling approach with some theoretical inconsistencies, and so the system GMM results are the primary source of our discussion. All regressions include time dummies, which we find to be jointly insignificant in almost every regression, to account for time-specific effects. In order to save space, the coefficients of the time dummies are not reported in the tables. In all runs, we assume that control variables are exogenous[14] and financial development indicators are endogenous in the sense of being correlated with shocks to GDP per capita in both the current and previous periods. In all regressions, the left hand side variable is the growth of the inequality or poverty measures, which are defined as the change in the log of (i) Gini coefficient, (ii) the average income of the poorest quintile, and (iii) headcount ratio.

We estimate eight specifications with four OLS estimates and four system GMM estimates, by testing the impacts of new control variable(s) in each forward step. In this respect, columns 1 and 5 of each table represent our baseline equations for the OLS and system GMM, respectively. The lagged levels of the Gini coefficient, headcount ratio, and average income of the poorest quintile are introduced to the related specifications in order to measure the persistency in inequality and poverty. In column 6 of each table, the control variables secondary school enrolment rate, trade openness, inflation rate, and government consumption are added. In column 7 of each table, we control for the effect of GDP per capita growth to identify whether there exists a significant relationship between GDP per capita growth and any of inequality and poverty measures. Our specifications also include real per capita GDP and real per capita GDP square variables to test the non-linear relationship between inequality/poverty measures and GDP per capita (column 8 of each table).

We first test the inverted U-shaped relationship between financial development and income inequality. We regress the logarithm of the Gini coefficient on the logarithm of the *bank-aggregate*, which is obtained through PCA, and its square. The result for the panel sample is shown in Fig. A.1 in the Appendix. The figure suggests a negative, and possibly constant, relationship between the Gini coefficient and *bank-aggregate*. We rerun the same regression for *market-aggregate*, as an indicator of stock market development, and we find similar results. Then, we regress the logarithm of the Gini coefficient on the logarithm of real GDP per capita, and its square to test the existence of the inverted U-shaped relationship between economic development and income inequality, as proposed by Kuznets (1955). We plot the logarithm of the Gini coefficient and

[14] Dollar and Kraay (2002) and Easterly and Fischer (2001) find that the income of the poorest quintile is significantly affected by inflation. However, when we treat inflation as an exogenous or an endogenous variable, the results do not change dramatically.

its fitted value against the logarithm of real GDP per capita and its square. Fig. A.2 in the Appendix shows the results for the panel sample. The figure suggests the existence of an inverted U-shaped relationship between the Gini coefficient and real GDP per capita. Hence, we control for logarithm of the real GDP per capita and its square in our regressions, but not for square of financial development indicators, since our data show no evidence of the inverted U-shaped relationship between the financial development indicators and the Gini coefficient.

5.1. Bank development and income inequality/poverty

5.1.1. Income inequality

Table 2 presents the outcomes of the regression models on *bank-aggregate*, as the proxy of financial development, and growth of the Gini coefficient, as the proxy of income inequality indicator. Policymakers may theoretically expect a negative linkage between the Gini coefficient and bank development, as the development in banking sector may decline income inequality, represented by declining Gini coefficient towards perfect equality. However, while the OLS results do not suggest a significant relationship, the system GMM results reveal a positive and statistically significant relationship between our variable of interest, *bank-aggregate*, and growth of the Gini coefficient with 10%, 1%, and 1% significance levels as shown in columns 5, 6 and 7 of Table 2, respectively. That is, the direct effect of bank development on income inequality is positive, implying countries with higher levels of bank development experienced higher levels of income inequality in terms of

Table 2
Bank-aggregate and income inequality (dependent variable: growth of the Gini coefficient).

Variable	1	2	3	4	5	6	7	8
	OLS	OLS	OLS	OLS	GMM	GMM	GMM	GMM
Constant	−0.071	−0.079	−0.084	−1.560	−0.051	−0.3832	−0.318	1.847
	(0.028)**	(0.070)	(0.072)	(0.600)**	(0.224)	(0.543)	(0.525)	(6.134)
Log of lagged Gini	−0.174	−0.123	−0.134	−0.159	0.030	−0.222	−0.156	−0.099
	(0.032)***	(0.031)***	(0.033)***	(0.037)***	(0.231)***	(0.389)*	(0.376)**	(0.399)**
Bank-aggregate	−0.001	0.006	0.007	0.003	0.056	0.059	0.0617	
	(0.003)	(0.003)	(0.004)	(0.003)	(0.032)*	(0.018)***	(0.019)***	(0.032)
Secondary enrolment		−0.018	−0.020	−0.082		−0.078	−0.0778	−0.1169
		(0.015)	(0.016)	(0.029)***		(0.046)*	(0.045)*	(0.164)
Trade openness		−0.008	−0.011	−0.012		−0.071	−0.0705	−0.0560
		(0.016)	(0.0167)	(0.015)		(0.036)*	(0.038)*	(0.037)
Inflation rate		0.116	0.083	0.110		0.211	0.2618	0.2546
		(0.040)***	(0.046)*	(0.040)***		(0.091)**	(0.118)**	(0.094)***
Consumption		0.002	−0.003	0.026		−0.026	−0.0106	−0.0560
		(0.024)	(0.024)	(0.023)		(0.105)	(0.106)	(0.228)
GDP growth			−0.137				0.1182	
			(0.058)**				(0.171)	
GDP				0.354				−0.6428
				(0.144)**				(1.779)
GDP square				−0.021				0.0469
				(0.009)**				(0.117)
Observations	181	169	168	168	181	169	168	168
R-squared	0.84	0.851	0.856	0.861				
F-statistic	156.07	205.26	176.76	190.08				
Number of groups					44	43	43	43
Number of instruments					13	17	17	17
Hansen test p-value					0.358	0.195	0.31	0.231
AR(2)					0.504	0.63	0.637	0.775

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average growth of the Gini coefficient for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

the growth of the Gini coefficient in emerging countries. This suggests that in emerging countries, access to banking services for the poor is limited compared to the access for the rest of the population. This finding contradicts that of Beck et al. (2007), who found a negative effect of bank development on the growth of the Gini coefficient by using a private credit to GDP ratio as an indicator of financial development. The reason could lie in the sample composition and the selection of the bank development indicator. Our sample consists of emerging economies, while theirs comprises both developing and developed economies, the latter having bigger and more diverse financial systems. Moreover, we employ PCA to five indicators of bank development, rather than private credits to GDP ratio.

The positive relationship between bank development and growth of the Gini coefficient is robust to a number of sensitivity tests. In each column of Table 2, we control for the one-period lagged value of the Gini coefficient, which enters significantly and negatively in the regressions, suggesting that countries with high level of inequality at the previous period tend to experience faster reduction in the Gini coefficient in the current period. In column 6 of Table 2, we control for secondary school enrolment rate, trade openness, inflation rate, and government consumption. The regression in column 6 of Table 2 shows that while secondary school enrolment rate and trade openness have negative effects on the growth of the Gini coefficient, *bank-aggregate* is still positively associated with the growth of the Gini coefficient. We also find that high levels of inflation lead to greater income inequality. In addition, when we take into account the effect of growth of GDP per capita on growth of the Gini coefficient, the coefficient of *bank-aggregate* improves in magnitude and significance compared to the baseline equation in column 5 of Table 2. Nevertheless, the positive effect of bank development on growth of the Gini coefficient tends to be insignificant when we control for real per capita GDP and its square. In the last column of Table 2, we add log of real GDP per capita and its square to test the inverted U-shaped relationship between economic development and income inequality and found statistically insignificant relation, indicating the non-existence of an inverted U-shape relation.

5.1.2. Poverty

Table 3 sets out the results for the regression models on *bank-aggregate* and *growth of the average income of the poorest quintile*, as the first proxy of poverty indicator. The results show that bank development fails to benefit those on low-incomes in emerging countries. We find that the effect of bank development on the growth of the average income of the poorest quintile is negative. That is, the direct effect of bank development on poverty reduction is negative, implying countries with higher levels of bank development experienced higher levels of poverty in terms of the average income of the poorest quintile in emerging countries. When we control for secondary school enrolment rate, trade openness, inflation rate and government consumption, *bank-aggregate* enters negatively and statistically significantly at the 10% level, while only inflation rate enters significantly (at the 1% level) among the other control variables, as shown in column 6 of Table 3. The negative sign of the inflation rate indicates the importance of macroeconomic stability for poverty reduction in emerging countries. In addition, the coefficient of *bank-aggregate* becomes insignificant when we control for the real per capita GDP growth, as shown in column 7 of Table 3. Furthermore, real per capita GDP growth has no effect on the growth of the average income of the poorest quintile since its coefficient is not significant. On the other hand, when we control for the real per capita GDP and its square, the coefficient of *bank-aggregate* again improves in magnitude and significance compared to the equations in columns 5 and 6 of Table 3. However, there is no evidence of non-linearity between our dependent variable and real per capita GDP.

The bank development and poverty linkage was also analysed through growth of the headcount ratio, the percentage of the population living below US$2.00 a day, as the second proxy of poverty indicator. Table 4 suggests mixed but statistically insignificant results. There is a negative but insignificant linkage between *bank-aggregate* and growth of the headcount ratio, according to the results of the system GMM equations in columns 6, 7 and 8 of Table 4. When we control for possible determinants of poverty, the significance of the estimated coefficient does not change. However, the results show that secondary school enrolment rate and government consumption have negative and significant impacts on the growth of the headcount ratio as shown in columns 6 and 7 of Table 4. The negative sign of the secondary school enrolment rate justifies the need for the human capital investment in order to reduce poverty in emerging countries. Moreover, in column 8, we test the effect of real per capita GDP and its square on the growth of the headcount ratio. Although real per capita GDP and its square enter significantly, this does not improve the explanatory power of *bank-*

Table 3
Bank-aggregate and poverty (dependent variable: growth of the average income of the poorest quintile).

Variable	1	2	3	4	5	6	7	8
	OLS	OLS	OLS	OLS	GMM	GMM	GMM	GMM
Constant	0.525	0.450	0.399	3.861	−0.040	−0.201	−0.001	−17.624
	(0.155)***	(0.269)*	(0.235)*	(1.349)***	(0.890)	(1.120)	(1.86)	(19.057)
Log of lagged income	−0.055	−0.060	−0.066	−0.217	−0.003	0.062	0.080	−0.338
	(0.022)***	(0.028)***	(0.026)***	(0.047)***	(0.137)***	(0.150)***	(0.157)***	(0.492)
Bank-aggregate	0.011	−0.002	−0.013	0.005	−0.083	−0.120	−0.125	−0.138
	(0.012)	(0.008)	(0.006)**	(0.007)	(0.054)	(0.067)*	(0.104)	(0.067)**
School enrolment		0.074	0.096	0.139		−0.283	−0.349	−0.420
		(0.055)	(0.047)**	(0.067)**		(0.434)	(0.571)	(0.462)
Trade openness		0.032	0.055	0.033		0.194	0.169	0.091
		(0.050)	(0.038)	(0.050)		(0.146)	(0.300)	(0.161)
Inflation rate		−0.307	−0.028	−0.181		−0.541	−0.597	−0.390
		(0.079)***	(0.048)	(0.066)***		(0.174)***	(0.342)*	(0.348)
Consumption		−0.034	−0.015	−0.065		0.071	0.240	0.500
		(0.056)	(0.038)	(0.068)		(0.167)	(0.724)	(0.575)
GDP growth			1.111				−0.082	
			(0.108)***				(0.893)	
GDP				−0.820				4.932
				(0.328)**				(5.308)
GDP square				0.064				−0.288
				(0.020)***				(0.341)
Observations	176	164	164	164	176	164	164	164
R-squared	0.947	0.925	0.969	0.958				
F-statistic	375.78	463.57	892.78	859.58				
Number of groups					44	43	43	43
Number of instruments					13	16	15	17
Hansen test p-value					0.56	0.701	0.465	0.757
AR(2)					0.069	0.246	0.417	0.375

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average growth of the average income of the poorest quintile for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

aggregate. Observation on the negative but insignificant relationship between *bank-aggregate* and growth of the headcount ratio in Table 4 is parallel to the results presented in Table 3. Both results in Tables 3 and 4 emphasize that development in the banking sector has had no significant effect on poverty levels in emerging countries.

There are several plausible explanations on the negative poverty reduction impact of bank development in selected emerging countries during the observation period. This outcome may imply that less democratized access to credit markets may result in distortions on poverty reductions and income equality in emerging countries. The pull and push factors on this result are broadly discussed in the literature. As for pull factors, institutional/legal obstacles for the poor may result to limited/weak access to the banking services. As for push factors, the concentrated political and economic power of elites and higher income groups may result in their easier access to credit. It can be argued that existing political settings and their relations to the elites may result in a limited number of powerful groups having implicit/explicit access to the financial intermediation mechanisms. This picture may imply that distribution channels of credit allocations would be captured by elites or powerful groups via either politics/state institutions or their long-term relations in the market. On the other hand, this outcome may imply weaknesses in collateral use by the poor population in emerging countries. In this respect, a lack of sufficient collateral use, arising from unequal wealth distribution and problems in existing laws and market practices may also play a role in restricting the poor's access to finance. Cultural problems, stage of the capitalistic development and less effective government policies may also reduce their access to banking services.

Table 4
Bank-aggregate and poverty (dependent variable: Growth of Headcount ratio).

Variable	1	2	3	4	5	6	7	8
	OLS	OLS	OLS	OLS	GMM	GMM	GMM	GMM
Constant	0.231	−1.185	−1.000	−10.036	2.566	−5.923	−4.852	−70.939
	(0.148)	(0.698)*	(0.719)	(4.412)**	(2.203)	(1.634)***	(1.782)***	(43.539)
Log of lagged headcount	−0.162	−0.220	−0.213	−0.456	0.609	−0.875	−0.749	−0.965
	(0.055)***	(0.066)***	(0.068)***	(0.094)***	(0.711)**	(0.174)	(0.211)	(0.169)
Bank-aggregate	−0.049	−0.007	0.013	−0.004	0.200	−0.105	−0.132	−0.215
	(0.027)*	(0.027)	(0.031)	(0.019)	(0.326)	(0.170)	(0.104)	(0.241)
School enrolment		−0.365	−0.372	−0.216		−1.440	−1.184	−2.083
		(0.166)**	(0.148)**	(0.185)		(0.451)***	(0.489)**	(2.170)
Trade openness		−0.063	−0.110	−0.164		−0.191	−0.142	−0.329
		(0.133)	(0.132)	(0.155)		(0.370)	(0.308)	(0.372)
Inflation rate		0.606	0.188	0.320		0.260	−0.216	−0.366
		(0.528)	(0.638)	(0.365)		(0.513)	(0.487)	(0.439)
Consumption		−0.373	−0.396	−0.530		−1.448	−1.265	0.070
		(0.273)	(0.269)	(0.280)*		(0.671)**	(0.632)*	(0.828)
GDP growth			−1.892				−1.792	
			(0.796)**				(1.130)	
GDP				2.562				18.514
				(1.275)*				(10.535)*
GDP square				−0.204				−1.245
				(0.088)**				(0.630)*
Observations	182	170	169	169	182	170	169	169
R-squared	0.796	0.799	0.813	0.835				
F-statistic	126.79	104.02	115.87	185.32				
Number of groups					44	43	43	43
Number of instruments					11	19	23	24
Hansen test p-value					0.782	0.149	0.047	0.582
AR(2)					0.538	0.392	0.673	0.641

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average Growth of Headcount ratio for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

5.2. Stock market development and income inequality/poverty

Stock market development has received much attention in emerging countries in the last 20–25 years, given the fact that the financial structure of these countries is mostly bank-based. Hence, as mentioned in Section 3.2, in this context, it may be appropriate considering the effect of stock markets in the measurement of financial development. In this respect, we also analyse the relationships between stock market development and income inequality/poverty indicators, using a sample of 38 emerging countries for the period of 1987–2011. The results of the regressions are reported in Tables 5, 6, and 7. To represent the development in stock markets, we use the first principal component, which is obtained through PCA as explained in Section 3.2, namely *market-aggregate*. We run the same regressions with the aggregate measure of stock market development. We also utilize the same control variables as indicated previously.

5.2.1. Income inequality

Table 5 reports the regression between *market-aggregate* and our inequality measure, growth of the Gini coefficient as the dependent variable. The regression results of the OLS and system GMM suggest that there are mixed but statistically insignificant relations between stock market development and growth of the Gini coefficient. In this respect, while the system GMM specifications of 5 and 7 of Table 5 imply positive but insignificant results, the system GMM equations of 6 and 8 of Table 5 imply negative but insignificant linkage between stock market development and income inequality. As regards the other explanatory variables,

Table 5
Market-aggregate and income inequality (dependent variable: growth of the Gini coefficient).

Variable	1	2	3	4	5	6	7	8
	OLS	OLS	OLS	OLS	GMM	GMM	GMM	GMM
Constant	−0.083	−0.011	−0.008	−1.020	0.243	−0.418	−0.239	−15.675
	(0.040)**	(0.045)	(0.046)	(0.777)	(0.358)	(0.409)	(0.205)	(10.765)
Log of lagged Gini	−0.126	−0.097	−0.097	−0.118	0.320	−0.446	−0.190	−0.615
	(0.037)***	(0.025)***	(0.027)***	(0.032)***	(0.405)***	(0.340)	(0.147)***	(0.433)
Market-aggregate	−0.003	−0.001	−0.001	0.0001	0.064	−0.061	0.014	−0.055
	(0.003)	(0.004)	(0.003)	(0.004)	(0.053)	(0.057)	(0.025)	(0.058)
Secondary enrolment		−0.051	−0.051	−0.090		−0.152	0.151	−0.516
		(0.049)	(0.049)	(0.054)		(0.157)	(0.122)	(0.290)*
Trade openness		−0.011	−0.012	−0.018		−0.032	−0.026	−0.084
		(0.015)	(0.016)	(0.016)		(0.051)	(0.028)	(0.056)
Inflation rate		0.136	0.132	0.132		−0.059	−0.666	−0.132
		(0.124)	(0.127)	(0.125)		(0.234)	(0.321)**	(0.297)
Consumption		0.042	0.042	0.037		0.019	−0.064	0.087
		(0.026)	(0.026)	(0.030)		(0.101)	(0.065)	(0.194)
GDP growth			−0.019				−0.207	
			(0.063)				(0.154)	
GDP				0.220				3.689
				(0.181)				(2.705)
GDP square				−0.012				−0.222
				(0.010)				(0.169)
Observations	149	139	138	138	149	139	138	138
R-squared	0.879	0.885	0.885	0.888				
F-statistic	362.7	331.4	313.5	400.6	4.39	12.29	25.65	4.25
Number of groups					38	37	37	37
Number of instruments					13	17	23	17
Hansen test p-value					0.827	0.325	0.931	0.922
AR(2)					0.311	0.451	0.416	0.95

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average growth of the Gini coefficient for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at 10%, 5% and 1% levels, respectively.

the secondary school enrolment rate and the inflation rate have negative signs, and enter significantly in columns 7 and 8 of Table 5.

5.2.2. Poverty

Table 6 presents the results for the regression models on *market-aggregate* and growth of the average income of the poorest quintile, as the first proxy of poverty indicator. It is suggested in Table 6 that stock market development may have positive impact on the average income of the poorest quintile. This relationship is statistically significant in system GMM results of columns 6 and 8 of Table 6, with respectively 10% and 1% significance levels. When we control for secondary school enrolment rate, trade openness, inflation rate, and government consumption (column 6 of Table 6), *market-aggregate* enters positively and significantly at 10% level. Furthermore, when we add real per capita GDP and its square in addition to the other control variables, *market-aggregate* enters positively and significantly at the 1% level (column 8 of Table 6). As regards other explanatory variables, the secondary school enrolment rate and trade openness enter positively and significantly in columns 6 and 7, respectively. When we control for real per capita GDP growth, we see that the coefficient of *market-aggregate* becomes insignificant as shown in column 7 of Table 6. Therefore, in the context of the results of Table 6, it is possible to argue that stock market development may have positive impacts on poverty reduction, which is measured by the average income of the poorest quintile, in emerging countries; moreover, this result appears to be supported by some control variables (such as secondary school enrolment rate, trade openness, GDP per capita growth, and government consumption).

Table 6
Market-aggregate and poverty (dependent variable: growth of the average income of the poorest quintile).

Variable	1	2	3	4	5	6	7	8
	OLS	OLS	OLS	OLS	GMM	GMM	GMM	GMM
Constant	0.441	0.553	0.411	3.971	0.509	0.940	1.060	1.359
	(0.138)***	(0.260)**	(0.171)	(1.874)**	(1.014)	(2.839)	(0.774)	(4.985)
Log of lagged income	−0.038	−0.072	−0.069	−0.218	−0.048	−0.184	−0.134	−0.460
	(0.018)***	(0.025)***	(0.017)***	(0.037)***	(0.147)***	(0.308)**	(0.090)***	(0.153)***
Market-aggregate	0.012	0.014	−0.004	0.026	0.027	0.277	0.017	0.073
	(0.008)	(0.010)	(0.007)	(0.008)***	(0.028)	(0.148)*	(0.023)	(0.022)***
Secondary enrolment		0.116	0.095	0.161		0.965	0.212	0.237
		(0.081)	(0.060)	(0.106)		(0.493)*	(0.153)	(0.216)
Trade openness		0.092	0.078	0.094		0.115	0.094	0.099
		(0.041)**	(0.031)**	(0.039)**		(0.196)	(0.040)**	(0.079)
Inflation rate		−0.004	0.122	0.172		−1.230	0.174	0.470
		(0.092)	(0.063)*	(0.072)**		(1.321)	(0.114)	(0.172)***
Consumption		−0.034	−0.027	−0.045		−0.372	0.001	0.041
		(0.070)	(0.040)	(0.085)		(0.450)	(0.085)	(0.154)
GDP growth			0.941				0.741	
			(0.108)***				(0.197)***	
GDP				−0.800				0.106
				(0.438)*				(1.243)
GDP square				0.060				0.017
				(0.027)**				(0.075)
Observations	147	137	137	137	147	137	137	137
R-squared	0.962	0.963	0.977	0.968				
F-statistic	566.8	405.1	941.9	721.2	82.76	19.43	509.19	130.95
Number of groups					38	37	37	37
Number of instruments					15	18	23	34
Hansen test p-value					0.454	0.817	0.652	0.879
AR(2)					0.076	0.691	0.325	0.283

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average growth of the average income of the poorest quintile for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at 10%, 5% and 1% levels, respectively.

The relationship between stock market development and poverty relationship was also analysed using growth of the headcount ratio, as the second poverty indicator. The system GMM results of columns 5, 6, 7 and 8 of Table 7 imply a possible negative, but statistically insignificant relation between stock market development and growth of the headcount ratio. This result is collectively parallel to findings in the system GMM results in columns 6 and 8 of Table 5, implying negative but insignificant linkage between stock market development and inequality. Moreover, none of the control variables, except log of lagged headcount, enters significantly in the regressions. The log of lagged headcount ratio is the only statistically significant control variable among those presented in Table 7.

The estimated coefficients of *market-aggregate* are mostly statistically insignificant according to the results of Tables 5, 6, and 7. We find statistically significant coefficients only for the regressions between *market-aggregate* and growth of the average income of the poorest quintile (see, columns 6 and 8 of Table 6), suggesting that stock market development could contribute to the income of the poorest quintile. The evidence may also imply that improvements in size/liquidity of stock markets do not necessarily reduce headcount ratio in emerging countries, since the estimated coefficient of *market-aggregate* is statistically insignificant (see Table 7). The results suggest a statistically weak linkage between stock market development and inequality/poverty reduction, despite the emphasis on the former after the 1980s in emerging countries. There may be several explanations for the finding. First, it is possible that stock markets tend to benefit large and mature firms, due to the high costs of issuing equity. Hence, small firms or financially constrained

Table 7
Market-aggregate and poverty (dependent variable: Growth of Headcount ratio).

Variable	1	2	3	4	5	6	7	8
	OLS	OLS	OLS	OLS	GMM	GMM	GMM	GMM
Constant	−0.217	−0.951	−1.137	−5.803	−1.605	7.431	1.671	−2.212
	(0.156)	(0.709)	(0.643)*	(6.716)	(0.649)**	(7.944)	(3.757)	(56.012)
Log of lagged headcount	−0.062	−0.152	−0.144	−0.282	−0.384	0.722	0.185	−0.563
	(0.031)***	(0.055)***	(0.056)***	(0.119)***	(0.216)***	(0.839)**	(0.429)***	(0.366)
Market-aggregate	−0.065	−0.048	−0.017	−0.038	−0.095	−0.547	−0.048	−0.282
	(0.041)	(0.044)	(0.040)	(0.045)	(0.191)	(1.041)	(0.254)	(0.209)
Secondary enrolment		−0.281	−0.222	−0.187		1.298	0.429	1.914
		(0.243)	(0.191)	(0.123)		(2.701)	(1.235)	(1.531)
Trade openness		−0.203	−0.181	−0.210		−0.026	−0.123	−0.038
		(0.119)*	(0.117)	(0.145)		(0.446)	(0.249)	(0.388)
Inflation rate		0.295	−0.040	0.179		−2.201	0.626	−2.723
		(0.248)	(0.305)	(0.195)		(5.312)	(0.693)	(3.879)
Consumption		−0.382	−0.366	−0.494		1.961	0.398	−0.131
		(0.303)	(0.286)	(0.295)		(2.618)	(0.876)	(1.095)
GDP growth			−1.791				0.923	
			(0.642)***				(2.986)	
GDP				1.272				3.212
				(1.816)				(15.171)
GDP square				−0.101				−0.362
				(0.123)				(0.988)
Observations	148	138	137	137	148	138	137	137
R-squared	0.855	0.852	0.864	0.861				
F-statistic	304.9	217.8	139.3	214.2	14.4	7.58	81.63	11.74
Number of groups					38	37	37	37
Number of instruments					13	14	17	23
Hansen test p-value					0.482	0.751	0.787	0.32
AR(2)					0.683	0.487	0.609	0.712

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average Growth of Headcount ratio for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

entrepreneurs need to rely on personal wealth or internal resources for investment. This restricted access to stock markets eventually has negative impacts on income inequality and poverty reduction. Second, our results related to *market-aggregate* appear to support Lin's (2009) argument that emerging countries' primary need is for banks rather than more sophisticated financial institutions like stock markets. Finally, probably because stock markets are less developed in emerging countries and hence have not yet reached the minimum levels of size and activity required to provide opportunities/benefits for all market participants, positive contributions of stock market to poverty reduction may be somehow limited.

5.3. Banks, stock markets and inequality/poverty

We also examine the simultaneous effect of bank and stock market development (namely overall development in the financial sector) on income inequality and poverty. As proxies for overall financial development, we use liquid liabilities, private credit by deposit money banks and other financial institutions, bank deposits, bank private credit, deposit money bank assets, stock market capitalization, stock market total value traded, and stock market turnover.[15] We combine eight conventional measures (five indicators of bank development and three indicators of stock market development, which are used

[15] The descriptions of the variables are the same as shown in Table A.2 in Appendix.

in the previous sections) of financial development to construct a composite indicator using principal component analysis as described in Section 3.2.

According to the results of PCA of these eight indicators, the first principal component explains about 70% of the variation in the original data, while the second principal component explains 18% of the standardized variance.[16] Therefore, the first principal component is chosen to represent the overall financial development in the sample of 45 emerging economies. Theoretically, this new variable, *finance-aggregate*, is able to capture most of the information from the original dataset. Eq. (1) is estimated through the OLS and system GMM procedures. We present the system GMM results only, since it is our preferred estimator. As dependent variables, we use growth of the Gini coefficient, Growth of Headcount ratio, and growth of the average income of the poorest quintile, as described previously.

Table 8 presents the results for the one-step system GMM estimates. Columns 1 & 2, 3 & 4, and 5 & 6 report the results for the Gini coefficient, average income of the poorest quintile, and headcount ratio, respectively. As can be seen in Table 8, we find no evidence of significant relationship between the overall financial development variable, measured by *finance-aggregate*, and our inequality and poverty measures. The first two columns of Table 8 show that *finance-aggregate* is positively but insignificantly associated with the growth of the Gini coefficient. Moreover, the lagged value of the Gini coefficient and other control variables enter insignificantly. The fourth column of Table 8 shows that despite a positive relationship between *finance-aggregate* and growth of the average income of the poorest quintile, this relationship is statistically insignificant. Among the explanatory variables, only secondary school enrolment rate is statistically significant (at the 10% level), and positively associated with growth of the average income of the poorest quintile. In the last column of Table 8, we examine the effect of overall financial development on Growth of Headcount ratio. The result predicts a negative but statistically insignificant relationship between *finance-aggregate* and Growth of Headcount ratio. The results in Table 8, therefore, indicate that overall financial development generally exerts a positive but statistically insignificant effect on income inequality and poverty reduction.

When we examine the simultaneous effect of bank and stock market development, the results change dramatically, compared to their separate effects, which are presented through Tables 2 to 7. In Table 2, we find strong evidence for an inequality-increasing effect of bank development on growth of the Gini coefficient. However, we find no evidence of a significant relationship between overall financial development, measured by *finance-aggregate*, and the growth of the Gini coefficient, as shown in the first two columns of Table 8. In addition, while Table 6 suggests that stock market development may have a positive and significant, though statistically weak, impact on the growth of the average income of the poorest quintile, the third and fourth columns of Table 8 suggest a statistically insignificant relationship between overall financial development and growth of the average income of the poorest quintile. Thus, considering the simultaneous effects of banks and stock markets alone may not fully capture the relationship between financial development, income inequality and poverty reduction. Moreover, omitting the impact of either banks or stock markets may also result in difficulties in assessing the exact impact of financial development (see Beck and Levine, 2004). Using a combined variable, *finance-aggregate* implies two important points. First, from a methodological perspective, the results prove the need for investigating both simultaneous and separate effects of banks and stock market development on inequality/poverty. Second, the outcome suggests that interactions between stock markets/banks and poverty/inequality may have different channels based on sector specific interactions with fund allocation, risk sharing, and mobilization of savings, etc.

In addition to the robustness tests that we performed using various control variables in the regressions through Tables 2–8, we also analyse the relationship between banks, stock markets and inequality/poverty measures using both yearly and 5-year averaged data for the 1987–2011 period, instead using 4-year averaged data. We estimate all the regressions for three dependent variables, which are growth of the Gini coefficient, growth of the average income of the poorest quintile, and growth of the headcount ratio. However, the sign and significance level of the estimated coefficients did not change dramatically. The results of the regression analyses with yearly and 5-year averaged data suggest that financial development does not have a statistically significant impact on income inequality and poverty reduction in emerging countries for the given period.

[16] The results of the PCA are not presented in order to save space, but available upon request.

Table 8
Finance-aggregate, income inequality and poverty (estimation method: the one-step system GMM).

Variable	Growth of Gini	Growth of Gini	Growth of average income	Growth of average income	Growth of Headcount	Growth of Headcount
Log of lagged value	0.561	0.343	−0.048	−0.461	0.391	−0.233
	(0.446)***	(0.831)	(0.217)***	(0.391)	(0.540)**	(0.210)***
Finance-aggregate	0.006	0.02	−0.023	0.042	0.077	−0.15
	(0.018)	(0.014)	(0.035)	(0.085)	(0.268)	(0.117)
Secondary enrolment		−0.031		0.669		−0.441
		(0.050)		(0.389)*		(0.438)
Trade openness		−0.023		0.054		−0.022
		(0.036)		(0.121)		(0.245)
Inflation rate		0.333		0.304		−0.321
		(0.296)		(0.576)		(0.447)
Consumption		0.119		0.133		−0.465
		(0.165)		(0.364)		(0.606)
Observations	152	142	150	140	153	143
Number of groups	41	40	41	40	41	40
Number of instruments	13	17	13	16	11	19
Hansen test p-value	0.79	0.41	0.291	0.429	0.611	0.294
AR(2)	0.358	0.344	0.078	0.245	0.479	0.486

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average of (i) growth of the Gini coefficient, (ii) growth of the average income of the poorest quintile, and (iii) Growth of Headcount index for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

5.4. Banks, stock markets, and economic growth

Theory and evidence show that an effective financial system promotes subsequent economic growth. To test this hypothesis in the emerging markets context, we examine the effect of overall financial development, including banks and stock markets, on economic growth using a sample of 45 countries. We do not examine the separate impacts of banks and stock markets on growth, since the FG nexus is not our target area of interest. We use the same indicators of financial development as described previously. We use *finance-aggregate*, which is the first principal component obtained through PCA process employed in Section 5.3, to measure the overall financial development.

The results presented in Table 9 suggest that financial development promotes subsequent economic growth in a sample of 45 emerging economies during the period of 1987–2011. Column 1 of Table 9 represents the results for the baseline regression, while regression in column 2 controls for other determinant of economic growth. The estimated coefficient of *finance-aggregate* is 0.031 and statistically significant at 1% level, as shown in column 2 of Table 9. Among the control variables, only the secondary school enrolment rate enters significantly with a negative impact on economic growth. Moreover, the lagged value of real per capita GDP is negatively and significantly correlated with economic growth, consistent with findings of previous studies (see, for example, Barro, 1991; Bekaert et al., 2005).

In line with majority of the evidence provided by the FG literature, our empirical results based on the system GMM estimates show that well-functioning financial systems may support economic growth in emerging countries. As a consequence, we believe that financial development can improve the investment opportunities and diversify the risks for large and mature firms, and thus enhance overall growth and employment opportunities for the poor. Hence, in the long-run, financial development may indirectly lead to poverty reduction by stimulating economic growth, since we find evidence of its positive contribution to growth and growth is good for the poor. This finding is confirmed by our results, though not strongly, presented in column 7 of Table 6, which suggest a positive and significant relationship between real per capita GDP growth and growth of the average income of the poorest quintile.

Table 9
Finance-aggregate and economic growth (estimation method: the one-step system GMM).

Variable	GMM	GMM
Lagged GDP	−0.053 (0.040)***	−0.24 (0.151)***
Finance-aggregate	0.029 (0.008)***	0.056 (0.017)***
Secondary enrolment		0.397 (0.233)*
Trade openness		−0.004 (0.057)
Inflation rate		−0.056 (0.070)
Consumption		0.036 (0.128)
Observations	177	153
Number of groups	41	35
Number of instruments	33	22
Hansen test p-value	0.313	0.32
AR(2)	0.007	0.076

Note: The table presents the results for the estimated coefficients and their robust standard errors in parenthesis. The dependent variable is the four-year (non-overlapping) average of the real per capita GDP growth for each country, which yields six observations per country. Four-year averages for all of the independent variables are computed over the same period. Definitions of variables are the same as in Table A.2 in the Appendix. The following are also reported: specification statistics including R-squared, F-statistics, number of groups, number of instruments, Hansen p-value test of over-identification test, and AR(2) test of the error terms. Time dummies for six time points are included in the model. *, **, and *** denote statistically significant coefficient at the 10%, 5% and 1% levels, respectively.

6. Concluding remarks

The question of whether deeper financial markets lead not only to more economic growth, but also to reduced inequality/poverty has been continually examined throughout the FGIP nexus over the last two decades. Although a large body of literature has shown that financial sector development is correlated with subsequent economic growth, theory provides conflicting predictions about the impact of finance on income inequality and poverty reduction. This study tests the hypothesis of whether bank and stock market development would reduce income inequality and poverty, in the context of newly emerging FIP nexus. We use data from 45 emerging countries for the period of 1987–2011. Using several financial development indicators to take the various dimensions of the financial sector into account, we develop three aggregate measures, one each for bank development (*bank-aggregate*), stock market development (*market-aggregate*), and the overall financial development (*finance-aggregate*) in order to investigate whether development of financial sector creates better conditions for the poor.

Four main points emerge from the study. First, with regard the regressions between bank development and inequality/poverty, we find that bank development, measured by *bank-aggregate*, has a positive and statistically significant effect on the growth of the Gini coefficient, while the effect is negative for growth of the average income of the poorest quintile, and insignificant for the Growth of Headcount ratio. Second, the results of the regressions between stock market development indicator, *market-aggregate*, and inequality/poverty measures suggest a positive and statistically significant effect of stock market development on growth of the average income of the poorest quintile, and insignificant effects on growth of the Gini coefficient and Growth of Headcount ratio. The results underline that stock market development may increase the average income of the poorest quintile in emerging countries. Some support for this result is provided by certain specific indicators, such as the secondary school enrolment rate, trade openness, GDP per capita growth, and government consumption. Moreover, the size of the effect of bank development on inequality and poverty is clearly larger than for the stock market, indicating the greater importance of the role of banks for income inequality and poverty reduction in emerging

countries. This finding is consistent with the fact that the financial structure of emerging countries is mostly bank-based, despite the amount of attention to stock market development in the last 20–25 years. Third, regarding the effect on inequality and poverty of overall financial development, measured by *finance-aggregate*, the results indicate that it generally exerts positive but statistically insignificant effect, suggesting that considering only the simultaneous effects of banks and stock markets may not fully capture the effect of financial development on income inequality and poverty. These conflicting results justify the need for investigating both simultaneous and separate effects of bank and stock market developments. Fourth, with regard the other explanatory variables, the results suggest that countries with higher inflation rates are likely to have more difficulties in reducing income inequality, indicating the importance of macroeconomic stability for poverty reduction in emerging countries. The regression results also suggest that the secondary school enrolment rate and government consumption also have negative and statistically significant impacts on the Growth of Headcount ratio. Moreover, the results show no evidence of the inverted U-shaped relationship between the Gini coefficient and financial development indicators, while the existence of an inverted U-shaped relationship between the Gini coefficient and per capita GDP is observed.

The results indicate that financial development in banks and stock markets failed to reach the poorest segments of society in emerging countries, despite the positive but statistically weak impact of stock markets on poverty indicators. Although financial systems have developed over the last two decades, especially in terms of size and liquidity, the poor could not benefit from these improvements. Less democratized access to credit markets, institutional obstacles, concentrated political or economic power of higher income groups, government policies, and the lack of sufficient collateral use can be shown as the main reasons for the limited access to finance of the poor in emerging countries. It is also important to note that a large proportion of the poor live in rural areas, which are often beyond the reach of financial services, especially banking services. That could be another reason for the lack of democratized access to financial services. The results may also suggest that the poor do not have sufficient access to financial services, or they have access to some activities, but not to poverty reduction. Furthermore, it is widely accepted that broadening the access to finance for microenterprises, SMEs, and vulnerable groups is particularly important for poverty reduction. Some Latin American countries such as Brazil and Argentina have succeeded in reducing poverty via enhancing microfinance institutions. To benefit effectively from such institutions and credit programmes, those should be well designed and accompanied by other services such as assistance in accessing markets and provision of capacity building. In addition, the critical importance of the effective regulatory and supervisory mechanisms for managing the possible risks that financial sector development could bring should be taken seriously by the policymakers. The investigation of the effects of such factors on income inequality and poverty reduction is left for the future research.

Overall, observations on relations between bank/stock market development and inequality/poverty have significant policy implications. One of the most important implications, regarding negative or weak inequality/poverty reduction impact of bank/stock market development in selected emerging countries, is that the challenge of income inequality and poverty reduction may require global policy response, due to their potential global threat. In this context, redistributive social and economic policies and institutional improvements in law and finance would be more a effective/direct approach to poverty reduction, in addition to minimizing financial market imperfections/constraints and lack of finance.

Our analysis has centred on financial size and liquidity variables due to the data availability across countries and time: however, access and use of financial services may be more relevant to poverty reduction. Hence, we leave to future research to explore the impacts of other aspects of financial development on income inequality and poverty reduction. Similarly, we want to know whether microfinance institutions reach the extremely poor to the same extent as the moderately poor; whether new credit goes mostly to households or firms; what are its uses; whether the mechanisms through which financial development affects income inequality and poverty are country-, case-, or time-specific; etc. It would also be valuable to investigate the relationship between financial development and poverty measures across income levels in order to explore whether the relationships differ across income levels. Hopefully, future datasets would allow us to investigate the dynamics of these and other aspects of financial development.

Appendix A

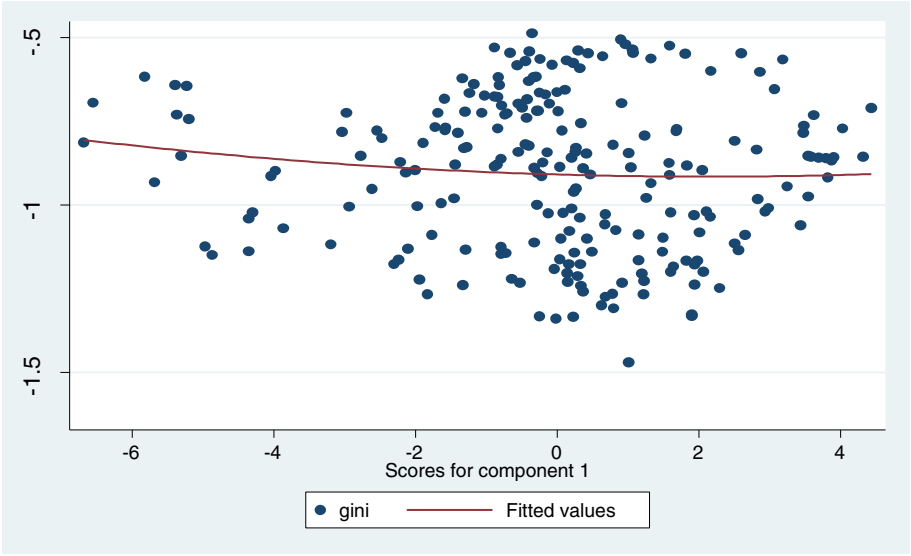

Fig. A.1. Log Gini and banking development index in a panel of 45 countries.
Note: The fitted line is from a regression of log of the Gini coefficient on the first principal component and its square. The first principal component is obtained by applying principal component analysis to the log values of our financial development indicators. All data are averaged over six 4-year periods between 1987 and 2011.

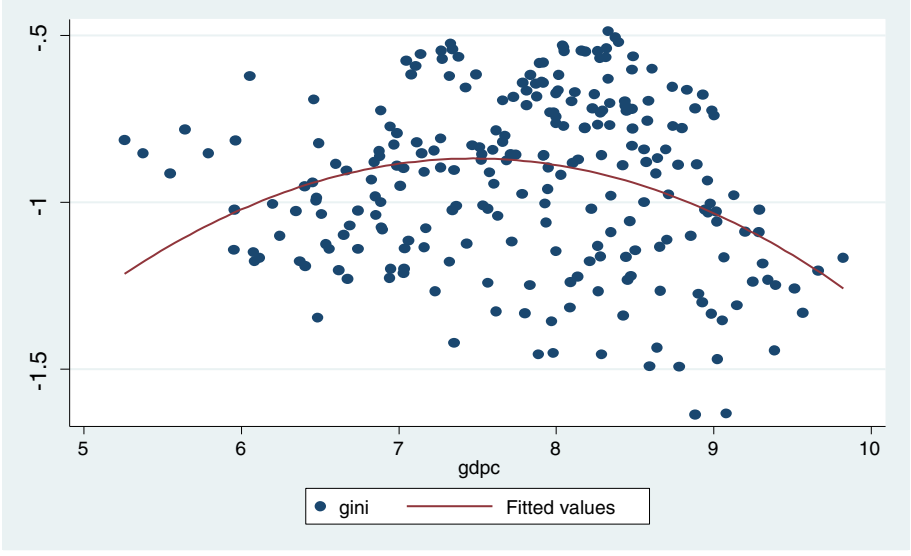

Fig. A.2. Log Gini and log real GDP per capita in a panel of 45 countries.
Note: The fitted line is from a regression of log of the Gini coefficient on the log of real GDP per capita and its square. All data are averaged over six 4-year periods between 1987 and 2011.

Table A.1
Main variables by country.

Country	GDP per capita	Gini coefficient	Headcount ratio	Average income of the poorest quintile	Private credit	Market capitalization
Argentina	4191.766	48.61	7.83	798.48	15.67	24.89
Brazil	4541.577	58.88	21.01	530.40	35.17	32.46
Bulgaria	3199.96	28.45	2.14	1276.72	33.47	11.96
China	1289.561	38.05	63.79	354.89	94.41	41.48
Colombia	3221.849	56.6	23.35	427.46	28.52	21.73
Costa Rica	4113.213	47.64	10.82	795.05	23.77	8.91
Cote d'Ivoire	1004.446	40.65	42.32	323.93	21.32	13.93
Croatia	9177.23	28.91	0.14	3798.76	44.77	27.7
Dominica	3207.409	50.1	13.56	728.47	28.31	
Ecuador	2841.811	53.11	21.63	482.97	23.61	7.92
Egypt	1118.592	31.56	21.44	518.64	41.38	31.42
El Salvador	2435.234	50.49	20.74	413.11	4.13	17.1
Estonia	8279.566	34.74	1.91	2454.06	50.08	24.29
Georgia	1545.319	40.49	32.46	363.26	14.01	5.47
Honduras	1289.232	56.39	42.75	167.23	34.8	7.47
Hungary	9161.635	26.89	0.3	4321.40	36.7	19.2
India	609.4635	32.5	77.47	282.07	30.26	42.33
Indonesia	1141.252	31.97	65.82	510.22	31.76	22.8
Iran	2347.621	42.25	9.42	610.16	29.55	13.55
Jordan	2130.865	37.38	6.61	837.77	71.49	100.02
Kazakhstan	3122.078	32.35	11.47	1379.55	23.01	19.27
Kyrgyzstan	500.2003	36.43	32.55	188.99	5.96	1.46
Latvia	5530.69	32.86	1.55	2032.81	33.81	7.36
Lithuania	6426.539	32.06	2.94	2173.96	22.94	15.62
Malaysia	4664.931	46.08	8.13	1097.07	106.67	151.15
Mauritania	683.6619	42.01	54.32	195.11	25.98	
Mexico	7327.676	49.34	11.45	1683.74	19.39	26.73
Moldova	931.6679	35.41	31.21	310.13	18.06	3.04
Pakistan	615.9417	31.57	72.82	280.94	23.47	17.74
Panama	4240.666	56.08	20.69	500.76	68.01	23.79
Paraguay	1530.87	53.75	17.52	240.13	22.3	3.04
Peru	2680.203	50.55	20.53	542.51	16.97	29.45
Philippines	1104.655	43.89	47.99	313.03	31.36	46.88
Poland	6959.33	32.42	1.41	2895.97	25.12	17.81
Romania	4162.894	29.38	7.32	1884.54	20.42	9.76
Russia	4862.351	39.32	3.79	1486.10	21.2	35.86
Slovakia	10,013.61	25.82	0.32	5540.40	42.03	5.66
Slovenia	15,382.98	28.72	0.06	6420.11	45.42	18.83
Sri Lanka	1051.022	37.12	37.78	430.15	22.99	15.62
Thailand	2269.568	42.69	17.61	720.04	105.35	53.42
Tunisia	2712.184	40.04	12.91	850.90	60.42	11.65
Turkey	6127.208	41.25	6.81	1870.27	19.35	19.49
Uganda	273.3343	42.84	80.48	82.01	5.74	8.33
Ukraine	1,839.854	28.84	3.75	817.99	23.81	17.05
Uruguay	5041.278	44.88	2.78	1241.03	28.97	0.67

Note: All variables are averaged over the 1987–2011 period. Definitions of variables are the same as in Table A.2 in the Appendix.

Table A.2
Description of the data sample and sources.

Name	Code	Goal	Description	Employed in (Selected)	Source
Dependent variable					
Gini coefficient		Impact of financial development on the poor	Measures deviations from perfect income equality. We use the logarithmic difference between the current period's Gini coefficient and the previous period's Gini coefficient as a dependent variable.	Dollar and Kraay (2002), Clarke, Xu, and Zou (2006), and Beck et al. (2007),	PovStats

Table A.2 *(continued)*

Name	Code	Goal	Description	Employed in (Selected)	Source
Headcount ratio			The percentage of the population living below $2.00 a day at 2005 international prices. We use logarithmic growth of the headcount ratio as a dependent variable.	Beck et al. (2007) and Kappel (2010)	PovStats
Average income of the poorest quintile			The average per capita income of the lowest 20% quintile. We use logarithmic growth of the average per capita income of the poorest quintile as a dependent variable.	Dollar and Kraay (2002) and Jeanneney and Kpodar (2008)	PovStats
Financial development variables					
Bank private credit to GDP	*bprivate*	Measure of bank development	The financial resources provided to the private sector by domestic banks as a share of GDP.	Ang and McKibbin (2007), Kappel (2010) and Demirguc-Kunt et al. (2013)	IFS 2013
Liquid liabilities to GDP	*liquid*		Ratio of liquid liabilities (M3) to GDP.	King and Levine (1993a,b,c), and Rousseau and Wachtel (2002)	IFS 2013
Bank deposits to GDP	*deposit*		The total value of demand, time and saving deposits at domestic deposit money banks as a share of GDP.	Barajas et al. (2013)	IFS 2013
Private credit to GDP	*private*		Private credit by deposit money banks and other financial institutions to GDP.	Clarke, Xu, and Zou (2006), and Kappel (2010)	IFS 2013
Deposit money bank assets to GDP	*basset*		Total assets held by deposit money banks as a share of GDP.	Clarke, Xu, and Zou (2006)	IFS 2013
Stock market capitalization to GDP	*mktcap*	Measure of stock market development	The value of listed shares on a country's stock exchange as a percentage of GDP.	Levine and Zervos (1998) and Kappel (2010)	IFS 2013
Stock market total value traded to GDP	*traded*		The value of total shares traded on the stock market as a percentage of GDP.	Levine and Zervos (1998)and Kappel (2010)	IFS 2013
Stock market turnover ratio	*turnover*		The ratio of the value of total shares traded to average real market capitalization.	King and Levine (1993a,b,c) and Levine and Zervos (1998)	IFS 2013
Control variables					
Real GDP per capita	*gdpc*	To control for other potential determinants of inequality and poverty measures	Real GDP per capita at constant prices of 2005 US$.	Dollar and Kraay (2002), Beck and Levine (2004) and Clarke, Xu, and Zou (2006)	WDI 2013
Real GDP per capita growth	*growth*		Logarithmic growth rate of the real GDP per capita.	Beck and Levine (2004) and Dollar and Kraay (2002)	OC
Education	*education*		Gross enrollment rate is the ratio of total enrollment in secondary school, regardless of age, to the population of the age group.	Dollar and Kraay (2002) Beck and Levine (2004) and Kappel (2010)	WDI 2013
Trade openness	*trade*		Sum of exports/imports of goods and services as a share of GDP.	Beck and Levine (2004)	WDI 2013
Inflation rate	*inflation*		Inflation is measured by the annual growth rate of the GDP implicit deflator.	Beck and Levine (2004) Clarke, Xu, and Zou (2006) and Kappel (2010)	WDI 2013

(*continued on next page*)

Table A.2 *(continued)*

Name	Code	Goal	Description	Employed in (Selected)	Source
Government consumption	*government*		General government final consumption expenditure includes all government current expenditures for purchases of goods and services, as a share of GDP.	Beck and Levine (2004), and Kappel (2010)	WDI 2013

Note: WDI: World Development Indicators; IFS: International Financial Statistics and OC: Own Calculations.

Table A.3
Correlations between financial development variables.

Variable	*private*	*liquid*	*deposit*	*bprivate*	*basset*	*mktcap*	*traded*	*turnover*
private	1							
liquid	0.883	1						
deposit	0.871	0.944	1					
bprivate	0.994	0.878	0.863	1				
basset	0.937	0.907	0.902	0.94	1			
mktcap	0.547	0.542	0.572	0.542	0.569	1		
traded	0.462	0.549	0.527	0.465	0.538	0.791	1	
turnover	0.149	0.293	0.232	0.143	0.255	0.261	0.7767	1

Note: Definitions of variables are the same as in Table A.2 in the Appendix.

Table A.4
Principal component analysis for bank development.

	PCA 1	PCA 2	PCA 3	PCA 4	PCA 5
Eigenvalues	4.658	0.221	0.064	0.050	0.004
% of variance	0.931	0.044	0.013	0.010	0.001
Cumulative %	0.931	0.976	0.989	0.999	1

	Eigenvectors				
Variable	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5
private	0.449	−0.475	0.289	0.059	−0.695
liquid	0.444	0.471	0.225	−0.727	−0.003
deposit	0.441	0.556	0.171	0.682	0.034
bprivate	0.449	−0.490	0.211	0.019	0.715
basset	0.451	−0.045	−0.889	−0.028	−0.050

Note: Definitions of variables are the same as in Table A.2 in the Appendix.

Table A.5
Principal component analysis for stock market development.

	PCA 1	PCA 2	PCA 3
Eigenvalues	2.300	0.683	0.015
% of variance	0.766	0.228	0.005
Cumulative %	0.767	0.995	1.000

	Eigenvectors		
Variable	Vector 1	Vector 2	Vector 3
mktcap	0.536	−0.699	0.471
traded	0.656	−0.005	−0.754
turnover	0.530	0.714	0.456

Note: Definitions of variables are the same as in Table A.2 in the Appendix.

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