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Finance and inequality: The case of India

James B Ang, *Nanyang Technological University*

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James B. Ang*

Although theory emphasizes the role of financial market frictions in explaining income inequality, there is little empirical research exploring how financial development and financial sector reforms influence the evolution of income inequality. This article examines how finance impacts income inequality in India using annual time series data for over half a century. The results indicate that while financial development helps reduce income inequality, financial liberalization seems to exacerbate it. The results are robust to the use of different measures for financial development and financial liberalization.

JEL Classification: G28, O16, O53

1. Introduction

Although the relationship between financial development and economic growth has been extensively studied in the literature (see, for example, King and Levine 1993; Demetriades and Hussein 1996; Arestis and Demetriades 1997; Levine, Loayza, and Beck 2000; Bell and Rousseau 2001; Ang and McKibbin 2007), little is known about how finance impacts income inequality. The importance of the finance-inequality relationship has recently been highlighted in an insightful survey article by Claessens and Perotti (2007). They indicate that while financial development can help reduce income inequality, financial liberalization captured by established interests may do the opposite.

The theoretical predictions of the effects of finance on income inequality are controversial. Rajan and Zingales (2003b) argue that improvements in the formal financial sector primarily benefit the rich. Greenwood and Jovanovic (1990) predict a nonlinear relationship between financial development and income inequality, where it is hypothesized that income inequality first increases with the degree of sophistication in the financial systems, then stabilizes and eventually declines. Others propose that the presence of financial market imperfections deters the poor from borrowing adequately to invest in human and physical capital, implying that financial development helps alleviate income inequality (Banerjee and Newman 1993; Galor and Zeira 1993; Aghion and Bolton 1997; Mookherjee and Ray 2003, 2006). Given that theories provide ambiguous predictions regarding the effects of finance on the distribution of income, it is useful to approach the issue at the empirical level. This could facilitate our understanding of the relationship between finance and inequality, and help us to assess the validity of each theoretical model.

Despite the important role of financial market frictions in the theories of poverty and income inequality, researchers so far have not adequately addressed whether financial

development, and in particular financial sector policies, affect income inequality (Demirgüç-Kunt and Levine 2007). In this connection, there are two novel studies that focus on examining the effect of financial development on income inequality. Using data for 83 countries over the period 1960–1995, Clarke, Xu, and Zou (2006) examine the effect of financial development on the level of the Gini coefficient—a measure of deviations from perfect income equality. Their results show that financial deepening is associated with lower income inequality. The finding of a non-linear effect of financial development is not robust. A more recent study by Beck, Demirgüç-Kunt, and Levine (2007) attempts to assess the impact of financial development on changes in income distribution and income for the poor. Their main findings indicate that financial development is associated with a lower growth rate of the Gini coefficient and a higher growth rate of income for the poor. While these two studies have established that financial development helps reduce income inequality, studies examining the direct impact of financial liberalization on income inequality are particularly scant (Demirgüç-Kunt and Levine 2007). The limited indirect empirical evidence, based on the survey by Arestis and Caner (2004), seems to suggest that financial liberalization has ambiguous effects on the poor and income distribution.

This article attempts to contribute to this rather under-researched area by considering an important case study—that of India for the period 1951–2004. Specifically, I analyze the distributional impact of financial development and financial liberalization on the Gini coefficient.[1] The article aims to complement the above studies, and enrich the literature by providing further evidence on how development of financial systems and implementation of financial sector policies affect the evolution of income inequality, drawing on the experience of one of the most rapidly growing developing economies that has undergone significant financial sector reforms. I focus on India rather than a larger set of countries given that the effects of financial development and financial liberalization may be heterogeneous across countries at different stages of economic development. Moreover, case studies are particularly useful in disentangling the complexity of the financial environment and economic history of each country. By analyzing case studies, the econometric findings of this project can be related to the prevailing institutional structure (Bell and Rousseau 2001), and therefore inform academic as well as policy debate.

The main contributions of this study include: (i) empirically testing the effect of financial development on income inequality by providing further evidence from a large and fast-growing developing country. Not only could this enhance our understanding of the finance-inequality relationship, but also fill the gap in the extant literature, which is dominated by cross-country analysis; (ii) contributing to the debate on the effectiveness of financial liberalization on the Indian economy—although various financial restructuring programs have been launched since the early 1990s, there is little empirical evidence informing policy makers of the effects of these reforms—and (iii) complementing the literature by assessing the impact of financial liberalization on income inequality. This policy factor has been somewhat neglected in the analysis of the finance-inequality nexus. The results show that income inequality decreases as the financial system deepens and broadens, consistent with the general findings in the literature.

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[1] Although financial crises may also have significant effects on income inequality, as demonstrated by Pritchett et al. (2000) in the case of Indonesia during the Asian financial crisis of 1997–1998, this issue is not addressed because the economy of India was largely unaffected by the 1997–1998 crisis.

However, liberalization of the financial systems appears to have a harmful effect on income distribution, a finding that tends to support the political economy argument where captured financial sector reforms benefit only small elites.

The remainder of the article is structured as follows. The next section describes the financial repression and liberalization experience of India. Section 3 discusses income inequality and the policies adopted to alleviate poverty. Section 4 briefly reviews the theoretical literature on the relationship between finance and inequality. The model and data are described in section 5. The estimation techniques employed in this study are explained in section 6. The results are presented and analyzed in section 7. Finally, section 8 summarizes the main findings and concludes.

2. Financial Sector Reforms in India

There was little financial repression imposed on the Indian financial system in the 1950s. However, the Reserve Bank of India gradually imposed more controls over the financial system by introducing interest rate controls in the 1960s. The statutory liquidity ratio was raised from 25% in 1966 to 38% in 1989. The cash reserve rate increased considerably from 3% to 15% during the same period. These high liquidity and reserve requirements enabled the Bank to purchase government securities at low cost. The extent of directed credit programs has also increased significantly after the nationalization of the 14 largest private banks in 1969. A number of priority lending rates were set at levels well below those that would prevail in the free market. This process culminated in the late 1980s when directed lending accounted for more than 40% of total lending. Revenue from financial repression was estimated to be 22.4% of total central government revenue during the period 1980–1985 (see Giovannini and De Melo 1993).

The major phase of financial liberalization was undertaken in 1991 as part of the broader economic reform in response to the balance-of-payments crisis of 1990. The objective was to restructure the entire orientation of India's financial development strategy from its position as a financially repressed system to one that was more open in order to provide a greater role for markets in price determination and resource allocation. Consequently, interest rates were gradually liberalized, and reserve and liquidity ratios were reduced significantly. The equity market was formally liberalized in 1992; although, the first country fund was set up earlier in 1986, allowing foreign investors to access the domestic equity market directly. There has also been a change in the capital account regime from a restricted one to a more open one. The regulatory framework was strengthened significantly in 1992. In addition, entry restrictions were relaxed in 1993, resulting in the establishment of more private and foreign banks. Regulations on portfolio and direct investment have since been eased. The exchange rate was unified in 1993–1994 and most restrictions on current account transactions were eliminated in 1994.

However, despite this liberalization, the Indian financial system has continued to operate within the context of repressionist policies through the provision of subsidized credit to certain priority sectors. The bank nationalization program in 1969 has enabled the Reserve Bank of India to effectively implement its credit allocation policy. Although the government divested part of its equity position in some public banks in the 1990s, the banking sector has remained

predominantly state-owned.[2] Liberalization of the directed credit programs is only limited to deregulation of priority lending rates while significant controls on the volume of directed lending remain in place. Furthermore, the Bank has tightened supervision and regulation in recent years to ensure that these priority sector requirements are met. With regard to capital controls, transactions related to capital outflows have remained heavily regulated in India. As such, it appears that repressionist measures coexist with a set of liberalization policies aimed at promoting free allocation of resources.

3. Macroeconomic Policy and Income Inequality in India

Indian governments have accorded great importance to poverty eradication and rural employment generation since independence in 1947, as reflected by the inclusion of poverty alleviation as a major goal in all the Five-Year Plans. In particular, a number of antipoverty programs have been implemented since the early 1960s, most notably the National Rural Employment Program and the Rural Landless Employment Guarantee Program, to expand employment opportunities in rural areas. Other strategies include, among others, land reforms, food subsidies, price controls, concessional loans, and rural housing schemes.

In terms of financial sector policies, the presence of significant directed credit programs has mandated minimum lending to priority sectors such as agriculture and small and medium-sized enterprises so that the poor are not excluded from formal credit. The share of directed credit in total lending grew by more than 10-fold from 2.5% to 25.9% during the period 1950–1990. The imposition of interest rate ceilings from the 1960s to 1980s also ensured that the poor were able to obtain financing at a reasonably low cost. Furthermore, as part of the effort to increase bank presence in rural areas, the Reserve Bank of India imposed a 1:4 branch license policy in 1977, which required banks to open four branches in rural areas without a bank presence for every new branch opened in locations that already had a bank presence. Burgess and Pande (2005) find that this social banking program has substantially reduced rural poverty. However, this policy ended with the onset of financial sector reforms in 1991.

The 1950s and 1960s saw a significant reduction in income inequality, as indicated by a downward trend in the Gini coefficient (see Figure 1).[3] However, despite this positive development, a significant number of people continued to live below the poverty line. Reduction in income inequality, however, slowed in the 1970s and 1980s. While the reasons for this change are not entirely clear, it was probably due to lackluster agricultural performance and higher inflation. Income inequality increased sharply following the 1990 balance-of-payments crisis. Since then, the strategy for alleviating poverty has been shifted to the acceleration of growth and the creations of jobs for the poor. Although the Indian economy has achieved remarkable growth since the reforms in the early 1990s, the reversed trend in the Gini

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[2] In a study that examines the influence of institutional quality on government ownership of banks, Andrianova, Demetriades, and Shortland (2008) report that India has the highest ratio of state-owned or state-controlled bank assets to total commercial bank assets in a sample of 83 countries.

[3] The Gini coefficient is the ratio of the area between the Lorenz curve (which plots share of population against income share received) to the area below the diagonal. The value ranges from 0 to 1, where 0 means perfect income equality and 1 implies perfect income inequality. I use the Gini data from Deininger and Squire (1996) and Dollar and Kraay (2002). These data are updated with more recent data points available from ADB (2007) and UNDP (2007).
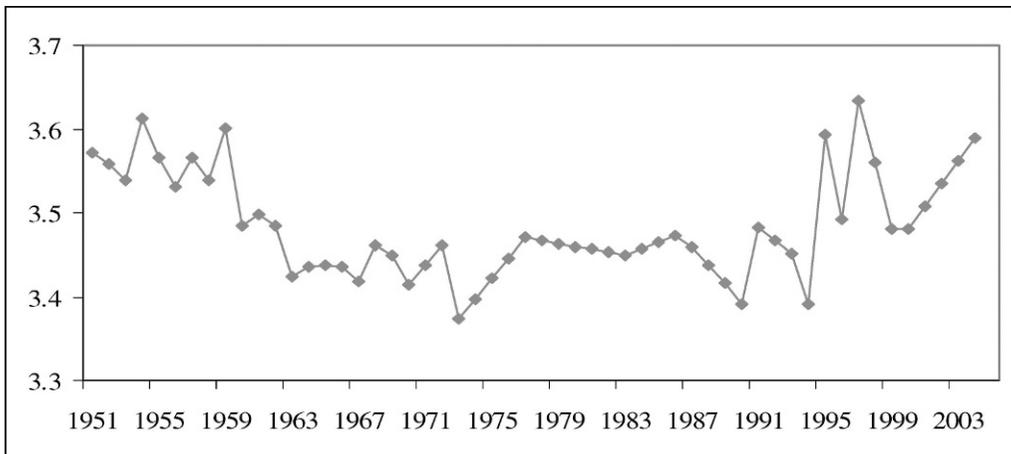
Figure 1. Evolution of the Gini Coefficient (on ln Scale)

coefficient suggests that these reforms have been accompanied by a significant rise in income disparity.

4. Conceptual Issues on Finance and Inequality

Developing countries are often characterized by the presence of credit constraints due to market imperfections such as asymmetric information and moral hazard problems. These credit constraints may intensify income inequality since the poor may not have equal access to credit due to the lack of collateral and established relationships with financial institutions. The relaxation of credit constraints achieved through improvements in the financial systems enables efficient allocation of resources and thereby reduces income inequality. In the models developed by Banerjee and Newman (1993), Galor and Zeira (1993), Aghion and Bolton (1997), and Mookherjee and Ray (2003, 2006), among others, only rich agents can borrow enough to invest in human capital and high-yield investment projects due to credit market imperfections. Their models imply that borrowing constraints triggered by market failures could result in greater income inequality, and consequently, financial development helps alleviate income inequality.

On the other hand, Rajan and Zingales (2003a) argue that in the presence of weak institutional environments, *de jure* political representation is dominated by *de facto* political influence. This allows established interests to influence access to finance, implying that higher financial development induced by captured direct controls is likely to hurt the poor. Rajan and Zingales (2003b) further argue that development of financial systems is more likely to benefit the rich and well connected since they have sufficient wealth for collateral (dubbed "the tyranny of collateral"). The rich may also be able to prevent small firms from accessing external finance and reduce the ability of the poor to improve their economic well-being. Thus, the poor are often excluded from finance and are therefore unable to invest sufficiently in human and physical capital.

However, financial development and income inequality can also be characterized by a hump-shaped relationship. In an influential article, Greenwood and Jovanovic (1990)

present a theoretical model that predicts a non-monotonic relationship between the two variables. They postulate that access to finance involves a fixed transaction cost that poor households cannot afford. Such a market imperfection therefore causes deterioration in their relative position in the distribution of income. However, as the economy becomes more developed, the transaction costs of using financial services decline, allowing the majority to access finance so that financial deepening narrows the income gap between the rich and the poor. Hence, it appears that the above theoretical models offer quite different perspectives about the relationship between financial development and income inequality.

How financial liberalization impacts income inequality is also theoretically ambiguous. Arestis and Caner (2004) propose that there are three main channels through which financial liberalization can influence poverty and income inequality. The first, known as the economic growth channel, posits that financial liberalization affects income inequality through increasing the rate of economic growth based on the financial liberalization thesis of McKinnon (1973) and Shaw (1973). However, this depends on the empirical links between financial liberalization and economic growth as well as economic growth and income distribution, which are not necessarily unambiguous. The second, the financial crisis channel, works through changes in macroeconomic volatility triggered by crises following financial liberalization. The poor are likely to be more vulnerable to these negative shocks. Finally, the last channel proposes that improved access to credit and financial services due to financial liberalization can have a profound effect on income distribution.

5. Model and Data

Model Specification

My empirical model postulates that income inequality ($Gini_t$) depends on per capita growth rate of real GDP (GRO_t),[4] inflation rate (INF_t), trade openness (TO_t), and a variable that captures the effect of finance, as given in Equation 1. The inflation rate is measured by the growth rate of the GDP deflator and trade openness is the share of exports plus imports in GDP. For the finance variable, my focus is on the level of financial development and financial liberalization; although, I also take into consideration their growth and non-linear effects. Besides, I also pay attention to stock market volatility and banking sector efficiency. The model will be estimated using annual data for India over the period 1951–2004. Except for the Gini coefficient, all data series are directly obtained or compiled from the Report on Currency and Finance of the Reserve Bank of India and National Accounts Statistics of the Central Statistical Organisation in India.

$$Gini_t = \beta_0 + \beta_1 GRO_t + \beta_2 INF_t + \beta_3 TO_t + \beta_4 Finance_t + \varepsilon_t \qquad (1)$$

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[4] I use the growth rate of per capita real GDP as a control variable rather than the level of per capita real GDP since the influence of finance on income inequality operates through growth (Demirgüç-Kunt and Levine 2007). Moreover, the use of a level income variable in the specification may lead to some econometric problems because per capita real GDP is highly correlated with the measures of financial development.
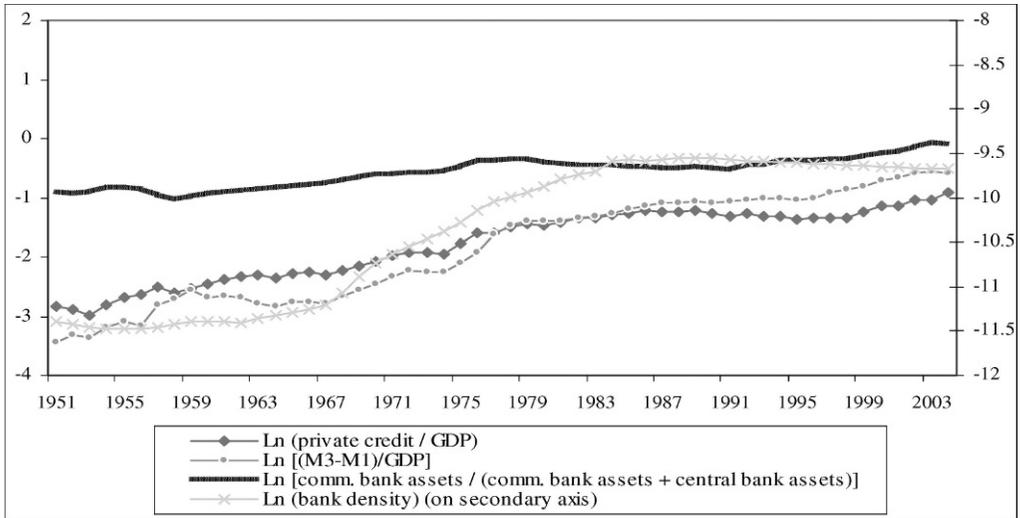
Figure 2. Time Series Plots of Financial Development Indicators

Measures of Financial Development and Financial Liberalization

Financial development is measured by several commonly used indicators in the literature: the ratio of claims on the private sector to GDP, the ratio of broad money M3 minus M1 to GDP, the share of commercial bank assets in the sum of commercial and central bank assets, and banking density, which is measured by the number of bank offices per population. Figure 2 shows the evolution of these variables. It is evident that all these financial development indicators exhibit an upward trend over time.

This study uses the financial liberalization measure advanced by Demetriades and Luintel (1996, 1997). Their approach considers nine indicators of financial repressionist policies. Six of them are interest rate controls, including a fixed lending dummy, a minimum lending rate, a maximum lending rate, a fixed deposit dummy, a minimum deposit rate, and a maximum deposit rate. These policy controls are translated into dummy variables that take the value of 1 if a control is present and that equal 0 otherwise. The remaining three policies are directed credit programs, the cash reserve ratio, and the statutory liquidity ratio. The extent of directed credit programs is measured by the share of directed credit lending in total lending.[5,6] The other two variables are direct measures expressed in percentages.

Since I want to summarize the financial sector policies to obtain an overall measure of financial liberalization, the method of principal component analysis seems to be a natural choice. It is a systematic and sophisticated way of examining the patterns of relationship among the variables, with the objective of summarizing the information content of several observed variables into a handful of representative principal components. The method involves

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[5] Ideally, one should use a *de jure* (rather than a *de facto*) measure reflecting the strength of directed credit policies designed to repress the financial system. Unfortunately, such information is not available on a consistent and reliable basis for India.

[6] Demetriades and Luintel (1996, 1997) set the measure to 0 when the directed credit programs are not implemented, and to 1, 2, and 3 when the programs cover up to 20%, 21–40%, and over 40%, respectively, of total bank lending. However, I use the share of directed credit in total credit in order to allow for more variation in the series, particularly in the 1950s and 1960s, when the ratio was always below 20%.

computing the linear combinations of the original variables so that the resulting principal components can capture a large proportion of the variance in the original variables. This can therefore serve the same purpose as the full set of original variables, but in a much more succinct manner. Given that the principal components are uncorrelated to each other and their conciseness, this approach sufficiently deals with the problems of multicollinearity and over-parameterization.

To provide a sensitivity check I also consider two alternative measures of financial liberalization. Firstly, the approach of Demetriades and Luintel (1996, 1997) is modified to allow for the policy changes that took place after the liberalization since their work covers only the period to 1991, prior to the reform programs. The modification involves taking into consideration privatization in the financial sector, entry barriers in the banking sector, government regulations on banking operations, equity market liberalization, and restrictions on international capital flows. I use dummy variables to represent policy changes in these dimensions.[7]

In constructing the third summary measure of financial liberalization, I follow the approach of Abiad and Mody (2005). In particular, six policy dimensions are considered as the inputs to construct the measure: (i) credit controls and reserve requirements; (ii) interest rate restraint; (iii) entry barriers in the banking sector; (iv) government regulations of operations; (v) privatization in the financial sector; and (vi) restrictions on international capital flows. Along each dimension, a score of 0, 1, 2, or 3 is assigned, indicating fully liberalized, partially liberalized, partially repressed, and fully repressed, respectively. The aggregation of these six components is used to obtain an overall measure of financial repression.[8] Similar to the second approach, this provides a more broad-based measure of financial sector reforms because it considers several other dimensions in addition to credit and interest controls. The inverse of these composite measures can be interpreted as the extent of financial liberalization (see, for example, Ang and McKibbin 2007; Ang 2008). All data series are directly obtained or compiled from the Annual Report and the Report on Currency and Finance of the Reserve Bank of India.

The resulting three composite financial liberalization indices displayed in Figures 3a and 3b coincide rather well with the actual policy changes that took place in India during the sample period, as discussed earlier. In Figure 3a, the two measures of financial liberalization show increasing disparity since the early 1970s given that the second measure captures more dimensions of financial sector reforms. It therefore necessarily reflects a greater degree of financial liberalization compared to the first measure that focuses exclusively on credit and interest controls. The financial liberalization series depicted in Figure 3b shows a rather different pattern of development, due largely to the use of a different coding procedure. On the whole, it is evident that the trend towards financial repression has been reversed since the early 1990s. The leveling-off observed in the series coincides with the increase in the extent of directed credit programs in recent years.

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[7] For the first and second measures of financial liberalization, I extract six principal components, which are able to account for 97% and 95% of the total variation in the policy variables, respectively. These components are then summarized into just one composite measure using eigenvalues as the weights. I have also tried using just one and all principal components. However, the results remain insensitive to the number of principal components extracted due to their high correlation structure.

[8] I have also explored using the principal component analysis. Correlation analysis shows that this simple arithmetic mean is significantly and highly correlated with the first principal component and weighted average of all six principal components, suggesting that the results would not vary significantly with the use of any of these measures.
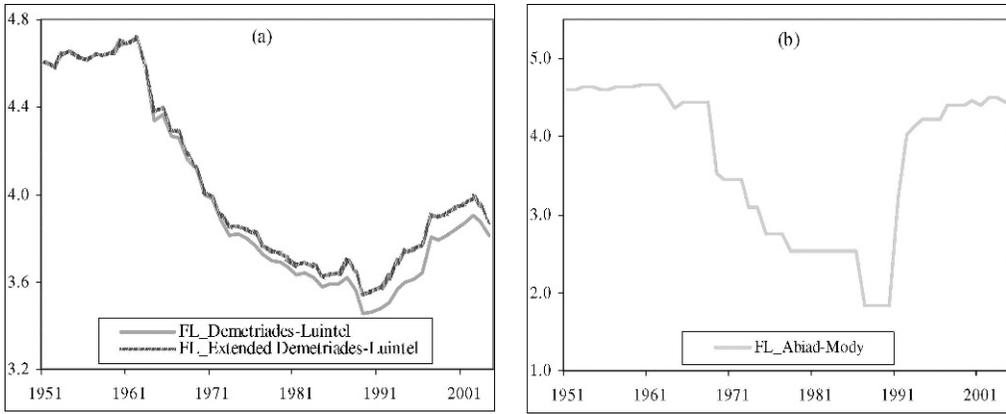
Figure 3. Financial Liberalization Composite Indices, 1951–2004 (in Natural Logarithms)

Correlations

Table 1 presents the correlations between indicators of financial development and financial liberalization. All four measures of financial development appear to be positively and strongly correlated with each other, and the coefficients range from 0.903 to 0.980. Indicators of financial liberalization show similar correlation patterns, ranging from a low of 0.708 to a high of 0.998. These two different aspects of finance appear to be negatively related, suggesting that they are likely to have different effects on income inequality.[9] However, it may be difficult to enter both variables in the same regression given the high correlations between them. All correlations are statistically significant at the 1% level.

6. Estimation Techniques

The dynamic adjustment of the Gini coefficient can be characterized by a conditional error-correction model (ECM), which can be used to test for the existence of a long-run relationship using the autoregressive distributed lag (ARDL) bounds test developed by Pesaran, Shin, and Smith (2001) and the ECM test of Banerjee, Dolado, and Mestre (1998). The former involves a standard *F*-test; whereas, the latter is a simple *t*-test. Accordingly, the underlying ECM can be formulated as follows:

$$\Delta Gini_t = a_0 + b_0 Gini_{t-1} + \sum_{j=1}^{k} b_j DET_{j,t-1} + \sum_{i=1}^{p} c_{0i} \Delta Gini_{t-i} + \sum_{i=0}^{p} \sum_{j=1}^{k} c_{ji} \Delta DET_{j,t-i} + \varepsilon_t \quad (2)$$

where p is the lag length and DET_t is a vector of k determinants of $Gini_t$. The above equation can be estimated by ordinary least squares (OLS) because Pesaran and Shin (1998) have shown that the OLS estimators of the short-run parameters are consistent, and the ARDL-based

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[9] This may not necessarily imply that one has to pay the costs associated with financial liberalization in order to deepen the financial system. A more in-depth analysis is required to draw such a policy conclusion. For instance, regressing financial development on financial liberalization and other conditioning variables such as per capita real GDP and real interest rate may shed some light on this issue. This additional analysis is not performed here because my focus is on the finance-inequality relationship.

Table 1. Correlations between Financial Development and Financial Liberalization

	PCY	M2Y	COM	BANK	FL-DL	FL-DL^E	FL-AB
PCY	1.000						
M2Y	0.980 (0.000)***	1.000					
COM	0.925 (0.000)***	0.909 (0.000)***	1.000				
BANK	0.971 (0.000)***	0.962 (0.000)***	0.903 (0.000)***	1.000			
FL-DL	−0.904 (0.000)***	−0.851 (0.000)***	−0.831 (0.000)***	−0.946 (0.000)***	1.000		
FL- DL^E	−0.890 (0.000)***	−0.828 (0.000)***	−0.817 (0.000)***	−0.932 (0.000)***	0.998 (0.000)***	1.000	
FL-AB	−0.511 (0.000)***	−0.402 (0.003)***	−0.382 (0.004)***	−0.567 (0.000)***	0.708 (0.000)***	0.743 (0.000)***	1.000

PCY = ln(private credit/GDP); $M2Y$ = ln[(M3 − M1)/GDP]; COM = ln[commercial bank assets/(central bank assets + commercial bank assets)]; $BANK$ = ln(number of bank offices per population); $FL-DL$ = ln(financial liberalization index − Demetriades and Luintel approach); $FL-DL^E$ = ln(financial liberalization index − extended Demetriades and Luintel approach); and $FL-AB$ = ln(financial liberalization index − Abiad and Mody approach). Figures in parentheses are p-values. *** indicates 1% level of significance.

estimators of the long-run coefficients are super-consistent in small sample sizes. Hence, valid inferences on the long-run parameters can be made using standard normal asymptotic theory. The main advantage of this approach is that it can be applied to the model regardless of whether the underlying variables are $I(0)$ or $I(1)$.

The testing procedure involves two stages. In the first stage, the existence of the long-run relationship between the variables is tested. Specifically, two separate statistics are employed to test for the existence of a long-run relationship in Equation 2: (i) an F-test for the joint significance of coefficients on lagged levels terms of the conditional ECM ($H_0 : b_0 = b_1 = \dots = b_k = 0$), and (ii) a t-test for the significance of the coefficient associated with $Gini_{t-1}$ ($H_0 : b_0 = 0$). The test for cointegration is provided by two asymptotic critical value bounds when the independent variables are either $I(0)$ or $I(1)$. The lower bound assumes all the independent variables are $I(0)$, and the upper bound assumes they are $I(1)$. If the test statistics exceed their respective upper critical values, the null is rejected, and it can be concluded that a long-run relationship exists. The second stage of the procedure is to derive the long-run estimates using the underlying ARDL model.

7. Empirical Results

Financial Development and Income Inequality

I begin the empirical analysis by assessing the integration properties of the underlying variables. Two standard unit root tests were used to assess the order of integration of the underlying variables—the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test. The results, which are not reported in order to conserve space but are available upon request, show that all variables appear to be $I(0)$ or $I(1)$, suggesting that there is no variable integrated at an order greater than one. This allows legitimate use of the ARDL bounds and ECM tests since these procedures require all underlying variables to be integrated at an order less than two. Next, to perform the cointegration tests, I estimate Equation 2 with only one lag in order to conserve the degrees of freedom, given the small sample used in this study (54 annual observations).[10] The results reported in panel I of Table 2 strongly suggest that a long-run relationship is present for each of the equations estimated.

However, the relationship between financial development and income inequality may be driven by reverse causality since lower income inequality may result in greater political pressure to create a more market-driven type of financial system in order to ensure efficient allocation of resources (Beck, Demirgüç-Kunt, and Levine 2007). Moreover, banks may also prefer to open branches in richer areas (Rajan 2006). To address the concern of endogeneity bias, I have attempted to use financial development as the dependent variable. However, no evidence of cointegration is found when the measures of financial development are used as the dependent variables. Hence, the results suggest that financial development can be interpreted as one of the

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[10] In estimating the Gini coefficient equation, my focus has been on the long run, that is, how the variables are related in the steady state. Results on the short-run dynamics are not reported. My specification with only one lag shows that the short-run effects of both financial development and financial liberalization are highly significant with signs consistent with their long-run counterparts. Allowing for two lags in the estimation does not vary the results in any significant way; although, the coefficients of two-period lagged changes on financial development and financial liberalization become statistically insignificant.

Table 2. Income Inequality and Financial Development (Dep. = Ln Gini Coefficient)

	(1)	(2)	(3)	(4)	(5)	(6)
I. *Cointegration tests*						
ARDL bounds test (Pesaran et al. 2001)	4.817**	4.549**	4.768**	4.218**	3.626*	4.659**
ECM *t*-test (Banerjee et al. 1998)	−4.522**	−4.341**	−4.371**	−4.087**	−3.954*	−4.491**
II. *ARDL estimate*						
Intercept	3.659 (0.000)***	3.743 (0.000)***	3.729 (0.000)***	3.388 (0.000)***	3.709 (0.000)***	3.673 (0.000)***
Per capita real GDP growth	−0.331 (0.094)*	−0.529 (0.082)*	−0.535 (0.063)*	−0.479 (0.105)	−0.771 (0.028)**	−0.412 (0.044)**
Ln Trade openness	0.142 (0.000)***	0.153 (0.000)***	0.143 (0.000)***	0.135 (0.000)***	0.061 (0.125)	0.149 (0.000)***
Inflation rate	−0.351 (0.008)***	−0.495 (0.009)***	−0.545 (0.002)***	−0.470 (0.011)**	−0.675 (0.001)***	−0.375 (0.007)***
Ln (Private credit / GDP)	−0.066 (0.000)***					
Ln [(M3 − M1)/GDP]		−0.037 (0.021)**				
Ln [Comm. bank assets/ (central bank assets + comm. bank assets)]			−0.123 (0.009)***			
Ln Banking density				−0.037 (0.000)***		
Ln (Stock market capitalization / GDP)					0.019 (0.195)	
Ln (Modern sector / GDP)						−0.267 (0.000)***
III. *Diagnostic checks*						
LM test for serial correlation	1.076 (0.301)	2.821 (0.093)*	1.843 (0.175)	1.772 (0.183)	3.043 (0.081)*	1.034 (0.309)
Ramsey's RESET test	0.327 (0.568)	0.079 (0.778)	0.185 (0.667)	0.001 (0.974)	0.001 (0.991)	0.252 (0.615)
Heteroskedasticity test	0.991 (0.319)	0.345 (0.557)	0.686 (0.407)	0.386 (0.534)	0.994 (0.319)	0.411 (0.521)

The optimal lag structure for the resulting ARDL model was chosen using SBC. The test statistics of the bounds tests are compared against the critical values reported in Pesaran et al. (2001). The estimation allows for an unrestricted intercept and no trend. The 10%, 5%, and 1% critical value bounds for the *F*-test are (2.45, 3.52), (2.86, 4.01), and (3.74, 5.06), respectively. The 10%, 5%, and 1% critical value bounds for the *t*-test are (−2.57, −3.66), (−2.86, −3.99), and (−3.43, −4.60), respectively. Numbers in parentheses indicate *p*-values. *, **, and *** indicate 10%, 5%, and 1% levels of significance, respectively.

long-run forcing variables explaining the evolution in the Gini coefficient where a reverse causation is absent.

In testing the effect of financial development on the Gini coefficient, I control for per capital GDP growth, trade openness, and inflation. These control variables have also been used by Beck, Demirgüç-Kunt, and Levine (2007). Panel II in Table 2 reports the long-run estimates derived using the underlying ARDL model. The negative sign and the significance of the coefficient for the growth rate of per capita real GDP suggest that income growth helps alleviate income inequality, a result consistent with the general literature on growth and inequality. In line with the results of Barro (2000), openness to trade enters positively and significantly in all equations except column 5.

The rate of inflation enters negatively and significantly in all regressions, suggesting that monetary instability does not seem to hurt income distribution. In principle, inflation may have an adverse effect on real agricultural wages and, hence, income inequality. However, it may also be associated with a decline in unemployment due to lower real wages and thus benefit the poor. The results are consistent with the cross-country findings of Cutler and Katz (1991) and Clarke, Xu, and Zou (2006), but stand in sharp contrast to those of Easterly and Fischer (2001) and Beck, Demirgüç-Kunt, and Levine (2007). However, as highlighted by Easterly and Fischer (2001), the way inflation affects the poor may well differ between economies due to the complication of the tax system, and therefore is an empirical issue.

Financial development appears to be associated with lower income inequality. The results are compatible with similar studies in this area, in particular Honohan (2004a), Clarke, Xu, and Zou (2006), and Beck, Demirgüç-Kunt, and Levine (2007). In column 1, an increase in the ratio of private credit to GDP has a significant and favorable effect on income inequality (long-run elasticity of -0.066), indicating that financial deepening has an equalizing effect. In columns 2 and 3, I use two alternative indicators of financial development, but this does not alter my main findings.

Column 4 shows the effects of banking density on income inequality. The use of banking density as an indicator of financial development has a major advantage—it captures the breadth of financial systems; whereas, other indicators reflect their depth. This is particularly important since the theories in finance and income inequality focus on the importance of broad access to finance (Demirgüç-Kunt and Levine 2007). The results indicate that bank branch expansion is associated with lower income inequality, a finding in line with the results of Burgess and Pande (2005) for the Indian experience. Thus, the social banking program launched by the Indian government during the period 1977–1990 appears to have significantly improved the access of the poor to the formal financial sector.

Studies have suggested that stock market activity may also predict growth (for example, Levine and Zervos 1998; Arestis, Demetriades, and Luintel 2001; Beck and Levine 2004). Given that the financial development measures I have considered so far are primarily bank-based in nature, I also take into account a market-based measure. The results in column 5 show that stock market development has no statistically significant impact on income inequality. However, the results must be interpreted with caution because the measure of stock market development is a rather noisy indicator of financial development. The series was backdated using the share price index for the period before 1976 due to data unavailability. I am unable to relate the findings to the literature because the impact of stock market development on the Gini coefficient has not been studied in the literature.

I also include a proxy for modern sector development in the estimation due to Clarke, Xu, and Zou (2006). This allows me to examine how the sectoral structure of the economy affects income inequality. The influence of the modern sector is measured by the share of the industrial and service sector's value added in total GDP. When the economy moves away from subsistence agriculture activities to advanced service-oriented activities, this may be reflected by credit facilities becoming more readily and cheaply available. Thus, in general, countries with more developed financial systems tend to have relatively larger service and industrial sectors, and therefore this measure may provide an indirect indicator of financial development. The results reported in the last column show that development in the non-farm sector has an equalizing effect, consistent with the findings of Datt and Ravallion (1998) for India.

Panel III reports some diagnostic statistics. I do not find any evidence of serial correlation, functional misspecification, and heteroskedasticity at the 5% level of significance. In sum, the results suggest that financial development helps in reducing the Gini coefficient through helping the poor to access finance by reducing financial market frictions. Thus, quite consistent with the vast literature showing a positive relationship between financial development and economic growth, the results reveal that financial development is effective in reducing income inequality in India.

Financial Liberalization and Income Inequality

Evolution of financial market frictions in the financial systems, which can have a significant impact on access to finance and thus income inequality, may be driven by financial sector policies. Therefore, I want to examine the extent to which financial sector policies matter to income inequality. This addresses the concern raised by Demirgüç-Kunt and Levine (2007) that there is surprisingly little research that investigates whether financial sector policies influence the evolution of the distribution of income. I first look at how each type of financial sector policy affects income inequality. This includes examining the three main components of domestic financial sector reforms—directed credit programs, reserve and liquidity requirements, and interest rate restraint (see McKinnon 1973; Shaw 1973).

As explained earlier, the extent of directed credit controls is measured by the share of direct lending in total lending. Reserve and liquidity requirements are the sum of the cash reserve and statutory liquidity ratios. The index for interest rate restraint is constructed using the method of principal component using the six interest control variables discussed in *Measures of Financial Development and Financial Liberalization*. The results reported in Table 3 show that the estimated elasticity of the Gini coefficient with respect to a steady-state increase in the extent of directed credit programs is -0.249, and for reserve and liquidity requirements and interest rate restraint, the elasticities are -0.229 and -0.035, respectively (see columns 1–3).

Taken together, the results in columns 1–3 appear to suggest that financial repressionist policies in India were pro-poor—as indeed they were designed to be—and thus financial liberalization aggravated income inequality. To confirm this, columns 4–6 examine how income inequality responds to the overall financial sector reforms in India using different measures of financial liberalization. The measure used in column 4 encompasses the three financial sector policies considered earlier, where they are summarized into just one single variable. I take the inverse so that this composite variable can be interpreted as financial liberalization.

Table 3. Income Inequality and Financial Sector Policies (Dep. = Ln Gini Coefficient)

	(1)	(2)	(3)	(4)	(5)	(6)
I. Cointegration tests						
ARDL bounds test (Pesaran et al. 2001)	4.024**	3.908*	3.857*	4.661**	4.660**	3.715*
ECM *t*-test (Banerjee et al. 1998)	−4.033**	−4.193**	−3.746*	−4.467**	−4.467**	−4.011**
II. ARDL estimate						
Intercept	3.797 (0.000)***	3.803 (0.000)***	3.709 (0.000)***	3.759 (0.000)***	3.751 (0.000)***	3.621 (0.000)***
Per capita real GDP growth	−0.527 (0.081)*	−0.512 (0.098)*	−0.276 (0.171)	−0.294 (0.148)	−0.305 (0.134)	−0.574 (0.072)*
Ln Trade openness	0.123 (0.000)***	0.106 (0.000)***	0.083 (0.000)***	0.109 (0.000)***	0.105 (0.000)***	0.081 (0.001)***
Inflation rate	−0.502 (0.008)***	−0.465 (0.020)**	−0.353 (0.009)***	−0.338 (0.015)**	−0.348 (0.012)**	−0.556 (0.004)***
Directed credit programs	−0.249 (0.000)***					
Reserve and liquidity requirements		−0.229 (0.028)**				
Interest rate restraint			−0.035 (0.000)***			
Ln Financial liberalization index (Demetriades-Luintel)				0.074 (0.000)***		
Ln Financial liberalization index (Extended Demetriades-Luintel)					0.077 (0.000)***	
Ln Financial liberalization index (Abiad-Mody)						0.019 (0.041)**
III. Diagnostic checks						
LM test for serial correlation	2.125 (0.145)	1.077 (0.299)	1.578 (0.209)	1.538 (0.215)	2.248 (0.134)	2.092 (0.148)
Ramsey's RESET test	0.041 (0.841)	0.256 (0.613)	0.264 (0.607)	0.051 (0.821)	0.289 (0.591)	0.036 (0.851)
Heteroskedasticity test	0.756 (0.384)	0.506 (0.477)	1.875 (0.171)	1.848 (0.174)	2.871 (0.091)*	1.371 (0.242)

See previous table.

The results reported in column 4 show that the measure of financial liberalization is significantly and positively associated with income inequality, with a long-run elasticity of 0.074. To provide some sensitivity checks, I also consider two other broader indicators of financial liberalization (see details in *Measures of Financial Development and Financial Liberalization*). Financial liberalization continues to enter positively and significantly even when I use different measures in columns 5 and 6. The estimates are found to be 0.077 and 0.019, respectively. Thus, the results unanimously show that financial liberalization appears to have a harmful effect on the distribution of income in India, confirming the earlier findings in columns 1–3. In all cases, I continue to find evidence of cointegration (panel I). There is also little evidence of econometric problems (panel III).

Similar to the effect of financial development, changes in the distribution of income may also affect the political economy in shaping financial sector policies so that variations in the Gini coefficient may influence the composite indices of financial liberalization and bias the results. I address this concern by also treating the measures of financial liberalization as the dependent variables but no evidence of cointegration is found (results not reported). This provides some support for entering financial liberalization "exogenously" in the specification.

The Joint Effects of Financial Development and Financial Liberalization

The evidence presented thus far suggests that while financial development has an equalizing effect on income distribution, financial liberalization tends to work in the opposite direction. The results are obtained by entering these two finance variables separately in the regressions. Nevertheless, given that financial development and financial liberalization are two distinct aspects of finance emphasized in this article, it would be interesting to see if the results remain robust to the inclusion of these two variables in the same specification.[11]

However, this may present some estimation difficulties since these two variables are strongly correlated (see Table 1). To mitigate the problems of multicollinearity, I have chosen the third financial liberalization measure, which is based on the approach of Abiad and Mody (2005), given that it is least correlated with all other measures of financial depth. It would also be interesting to see how financial breadth (proxied by banking density) influences income inequality. Its inclusion with financial depth variables, however, can cause severe collinearity problems given their high correlations. I have therefore considered the average value of banking density and financial depth as an overall measure of financial development.

As can be seen from Table 4, this set of results is econometrically less robust compared to the case where the finance variables are entered individually in the regressions. This is probably due to the strong correlations between the finance variables, although attention has been paid to mitigate any problems associated with multicollinearity.[12] In only half of the cases, financial development is found to be significantly associated with lower income inequality. While financial liberalization has the sign consistent with the previous findings, it is only significant in one out of six cases. The evidence of cointegration is also considerably weaker. Nevertheless, a general picture emerges from these analyses—financial development and liberalization appear

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[11] I am grateful to a referee for recommending this approach.
[12] I have also considered using the lagged values of financial liberalization. However, this does not improve the results considerably.

Table 4. Income Inequality, Financial Development and Financial Liberalization

	(1)	(2)	(3)	(4)	(5)	(6)
I. Cointegration tests						
ARDL bounds test (Pesaran et al. 2001)	3.373*	2.937	3.274	3.429*	2.817	2.925
ECM t-test (Banerjee et al. 1998)	−4.262**	−3.984*	−3.981*	−4.399**	−3.833	−3.780
II. ARDL estimate						
Intercept	3.656 (0.000)***	3.682 (0.000)***	3.601 (0.000)***	3.929 (0.000)***	3.909 (0.000)***	4.029 (0.000)***
Per capita real GDP growth	−0.329 (0.099)*	−0.503 (0.093)*	−0.298 (0.136)	−0.281 (0.171)	−0.491 (0.099)*	−0.307 (0.144)
Ln Trade openness	0.141 (0.000)***	0.129 (0.004)***	0.089 (0.004)***	0.143 (0.000)***	0.131 (0.004)***	0.128 (0.000)***
Inflation rate	−0.352 (0.009)***	−0.479 (0.011)**	−0.524 (0.000)***	−0.362 (0.008)***	−0.473 (0.011)**	−0.398 (0.004)***
Ln (Private credit / GDP)	−0.065 (0.004)***					
Ln [(M3 − M1) / GDP]		−0.025 (0.233)				
Ln [Comm. bank assets / (central bank assets + comm. bank assets)]			−0.041 (0.433)			
$\text{Ln}\left[\frac{1}{2}\left(\frac{\text{private credit}}{\text{GDP}} + \text{BD}\right)\right]$				−0.025 (0.011)**		
$\text{Ln}\left[\frac{1}{2}\left(\frac{\text{M3} - \text{M1}}{\text{GDP}} + \text{BD}\right)\right]$					−0.028 (0.215)	
$\text{Ln}\left[\frac{1}{2}\left(\frac{\text{ComBA}}{\text{ComBA} + \text{CenBA}} + \text{BD}\right)\right]$						−0.053 (0.041)**
Ln Financial liberalization index (Abiad−Mody)	0.001 (0.932)	0.009 (0.419)	0.019 (0.040)**	0.005 (0.554)	0.007 (0.551)	0.003 (0.801)
III. Diagnostic checks						
LM test for serial correlation	0.077 (0.781)	0.147 (0.701)	1.088 (0.297)	0.201 (0.609)	0.026 (0.872)	1.138 (0.286)
Ramsey's RESET test	6.409 (0.011)**	5.871 (0.015)**	4.076 (0.044)**	6.756 (0.009)***	6.407 (0.011)**	6.709 (0.011)**
Heteroskedasticity test	1.534 (0.215)	3.876 (0.049)**	0.751 (0.386)	1.385 (0.239)	2.972 (0.085)*	1.971 (0.161)

The dependent variable is Ln Gini coefficient. "BD" is banking density. "Com BA" is commercial bank assets, and "CenBA" refers to central bank assets. The regressions involve six variables and therefore a different set of critical values applies. The relevant 10%, 5%, and 1% critical value bounds for the F-test are (2.26, 3.35), (2.62, 3.79), and (3.41, 4.68), respectively. The 10%, 5%, and 1% critical value bounds for the t-test are (−2.57, −3.86), (−2.86, −4.19), and (−3.43, −4.79), respectively.

to have different effects on income inequality—a result consistent with the findings reported in Tables 2 and 3 earlier.

Although in principle financial sector reforms may reduce market frictions and thereby alleviate income inequality, the results seem to suggest that liberalization of the domestic and international financial system has led to an increase in income inequality in India, providing some support to the arguments of Claessens and Perotti (2007). How could these results be interpreted within the specific context of India?

In India, directed credit has been extended to the agricultural sector and small and medium enterprises over the last few decades. These programs have significantly benefited farmers and small traders, allowing the poor direct access to financial services. Therefore, reducing the extent of these programs as part of the financial sector reforms is likely to hurt the poor. Similarly, the deregulation of interest rates may increase the costs of borrowing to the poor since this involves higher transaction costs relative to the size of the loan. The resulting higher borrowing costs, along with the reduction of direct lending, can have an undesirable effect on income inequality since these policies deter the poor from adequately accessing finance.[13]

Financial liberalization in India did not necessarily lead to a relaxation of credit constraints to poor individuals that result in lower inequality. Before the liberalization, banks were required to open a certain number of branches in rural areas, and this policy was an important factor behind the savings rate increases of the 1970s and 1980s in India. However, this requirement was relaxed in 1991 following the launch of financial reforms. Thus, foreign and private banks would necessarily have a bias in providing consumer credit to richer areas, and access to finance by the poor would fall as banks withdrew branches from rural areas.

As Aghion, Bacchetta, and Banerjee (2004) have shown, unrestricted financial liberalization may induce instability. While financial repression may not be desirable, the evidence presented in this article does provide some support to the argument that some form of financial restraint may help in alleviating income inequality in developing countries. However, as noted by Demetriades and Luintel (2001) and Honohan and Stiglitz (2001), financial restraints are more likely to work well in environments with strong regulatory capacity, pinpointing the importance of strengthening the institutional framework.

For instance, Beck, Levine, and Levkov (2008) find that bank branch deregulation reduces the Gini coefficient of income inequality in the United States, a result that contradicts the findings for India. This highlights the fact that the effect of financial deregulation on income inequality may depend on the quality of institutions. As Rajan and Zingales (2003b) propose, the process of financial liberalization is likely to be harmful for countries with a weak institutional environment. Although the legal system in India was originally based on the British model that emphasizes protection of property rights, India ended up with a much less effective institutional framework since the legal system was modified in a way that benefited the small number of Europeans that settled in and ran the economy (Mishkin 2006).

In sum, financial sector reforms may lead to well-connected elites capturing most of the gains from new opportunities (Rajan and Zingales 2003a, b; Claessens and Perotti 2007).

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[13] Although many farmers in developing countries obtain credit through microfinance, this issue is not formally addressed in this article due to the lack of reliable time series data. Moreover, the microfinance finance penetration rate, defined as borrowing clients as a percentage of population, stands at only 1.1% for India. This ratio is relatively lower than many other developing countries such as Bangladesh, Indonesia, and Thailand, where microfinance claims 13.1%, 6.7%, and 6.5% of the population as clients, respectively (see Honohan 2004b).

Therefore, the presence of these established interests may deepen rather than broaden access to finance, resulting in higher income inequality. For example, Das and Mohapatra (2003) have shown that stock market liberalization in emerging markets has mainly benefited high income individuals at the expense of others. Furthermore, the presence of weak institutional environments in many liberalizing markets has allowed insiders to expropriate the interests of minority shareholders (Claessens et al. 2002; Claessens 2006). Unlike central and eastern Europe, where the extent of captured reform and rent seeking is limited (Roland 2002), in India financial liberalization has primarily benefited the well-connected rich, leaving the poor to fall further behind due to unequal access to finance.

Recent opinion polls conducted by the National Election Study (NES) in 2004 complement the findings. This election analysis shows that more than two-thirds of the respondents believe that the benefits of the reforms have primarily been reaped by a small number of affluent individuals (Suri 2004). In this connection, Varshney (2007) also argues that elite-oriented reforms have continued whereas more pro-poor reforms have been delayed in India. Similarly, Jha (2004) suggests that reforms allow the rich to move financial resources more easily in their favor, and this leads to greater income disparity. There is further evidence suggesting that finance in India is subject to political capture. For instance, using data for the period 1992–1999, Cole (2009) finds that agriculture lending by government-owned banks increases significantly in election years and the surge is most prominent in the highly contested districts. Given that these banks often prefer lending to firms with connections to business groups or politicians (Gormley and Gopalan 2008), the results suggest that these loans are subject to substantial capture in the post-reform period. Using individual tax return data, Banerjee and Piketty (2005) show that the top 0.1% of income tax payers have gained disproportionately in the 1990s, suggesting that the ultra-rich have benefited significantly from the reforms.

An important component of financial liberalization is the easing of priority sector loans. Although the actual share of directed loans in total lending remains high in recent years, bank compliance with these targets reduced sharply after financial liberalization following a change in the priority sector definition to include many other activities. As a result, most banks have avoided lending to small farmers and small entrepreneurs who are deemed less creditworthy, thereby depriving the relatively poor of institutional lending for investing in their businesses. This has negatively affected income distribution since a majority of the Indian population is dependent on the agriculture sector. Alongside this development, Pal and Ghosh (2007) note that there has been anecdotal evidence suggesting that a number of large Indian industrial incumbents are in fact responsible for a significant share of the non-performing loans in recent years. However, strong connections with political elites prevent any legal actions against these default firms.

The Effects of Financial Growth, Non-Linearity, Efficiency, and Volatility on Income Inequality

Next, I analyze the results further by examining the growth and non-linear effects of financial development and financial liberalization. Since the earlier results reveal that the relationship between income inequality and finance is not sensitive to the measures of financial development and financial liberalization, I use only the ratio of private credit to GDP and the

approach of Demetriades and Luintel (1996, 1997), respectively, in performing these additional tests for brevity. The results in the first two columns in Table 5 show that while the growth rate of financial development is found to be statistically significant at the conventional levels, the growth rate of financial liberalization is not.

In addition, I do not find any evidence of a non-linear effect of finance, a finding consistent with Beck, Demirgüç-Kunt, and Levine (2007). When the linear and squared terms for financial development are added to the base model, these two terms become jointly insignificant, suggesting that a threshold effect of financial development is not present in the relationship (column 3). Similarly, I do not find any significant non-linear effect of financial liberalization. The coefficient of squared financial liberalization is insignificant; although, its linear term is weakly significant at the 10% level (column 4).

In order to shed additional light, I test the effects of banking efficiency and volatility in the share market on the degree of economic opportunity. Demirgüç-Kunt and Levine (2007) propose that financial innovation can affect the level and evolution of financial market frictions, and therefore has an impact on income inequality. On the other hand, although in principle macroeconomic volatility may affect economic growth (see Ramey and Ramey 1995), empirical research has not yet established whether financial volatility has an impact on income distribution.

The interest rate spread is measured by the difference between the average lending rates and average deposit rates.[14] I use the rolling standard deviation of growth rate of the ratio of share price index to GDP deflator with a five year rolling window as the measure of share price volatility. The results in column 5 show that efficiency in the banking system is effective in reducing income gaps. However, volatility in the stock market, measured by variations in relative share prices, has no statistically significant impact on income inequality (see column 6).

8. Summary and Conclusions

Since theories provide different predictions about the impact of finance on income inequality, more empirical analysis is necessary to shed light on their relationship. In this article, I examined the determinants of the Gini coefficient in an autoregressive distributed lag framework, paying particular attention to testing the effects of financial development and financial sector reforms. Employing the ECM cointegration test and the ARDL bounds technique, the empirical evidence showed a significant steady-state relationship between the Gini coefficient and its determinants. After documenting these basic cointegration results, the long-run estimates were derived using the underlying ARDL model.

The evidence suggests that underdevelopment of financial systems hurts the poor more than the rich, resulting in higher income inequality. Both the level and growth effects of financial development are found to be significant. The results therefore highlight the importance of developing financial systems in order to alleviate income inequality. However, both domestic and international financial sector reforms do not seem to reduce unequal access to finance, but rather tend to aggravate income inequality in India. My results are not sensitive

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[14] Honohan (2004a) proposes that the interest rate spread is a better measure that reflects the efficiency of the financial system, compared to other rudimentary measures of financial development commonly used in the literature. This measure has also been used by Rousseau (1998) as a measure of technical progress in the banking sector.

Table 5. Income Inequality, Financial Growth, Nonlinearity, Efficiency, and Volatility

	(1)	(2)	(3)	(4)	(5)	(6)
I. Cointegration tests						
ARDL bounds test (Pesaran et al. 2001)	3.432	3.762*	3.975**	3.459*	4.698**	3.969*
ECM *t*-test (Banerjee et al. 1998)	−3.869*	−3.903*	−4.438**	−4.154*	−4.272***	−4.112**
II. ARDL estimate						
Intercept	3.815 (0.000)***	3.701 (0.000)***	3.781 (0.000)***	3.753 (0.000)***	3.765 (0.000)***	3.640 (0.000)***
Per capita real GDP growth	−1.281 (0.007)***	−0.651 (0.089)*	−0.344 (0.096)*	−0.291 (0.170)	−0.601 (0.052)*	−0.793 (0.041)**
Ln Trade openness	0.116 (0.000)***	0.089 (0.006)***	0.121 (0.000)***	0.109 (0.000)***	0.112 (0.000)***	0.084 (0.018)**
Inflation rate	−1.051 (0.002)***	−0.562 (0.023)**	−0.319 (0.037)**	−0.266 (0.103)	−0.529 (0.006)***	−0.633 (0.016)**
Growth rate of private credit / GDP	−0.485 (0.034)**					
Growth rate of financial liberalization index		0.188 (0.329)				
Ln (Private credit / GDP)			0.118 (0.488)			
Squared Ln (Private credit / GDP)			0.047 (0.277)			
Ln Financial liberalization index				0.086 (0.096)*		
Squared Ln (Financial liberalization index)				0.015 (0.753)		
Interest spread					−0.694 (0.000)***	
Ln Share price volatility						0.020 (0.337)
III. Diagnostic checks						
LM test for serial correlation	2.901 (0.089)*	4.252 (0.039)**	0.789 (0.374)	1.189 (0.275)	2.778 (0.096)*	4.775 (0.029)**
Ramsey's RESET test	0.002 (0.961)	0.239 (0.625)	0.016 (0.898)	0.040 (0.841)	0.549 (0.459)	0.067 (0.795)
Heteroskedasticity test	1.452 (0.228)	0.789 (0.374)	1.287 (0.257)	2.335 (0.127)	1.578 (0.209)	1.175 (0.278)

The dependent variable is Ln Gini coefficient. *, **, and *** indicate 10%, 5%, and 1% levels of significance, respectively.

to the measures of financial development and financial liberalization. In addition, increased banking density and banking efficiency are found to have a favorable effect on income inequality in India. Finally, there is no evidence to support the presence of a non-linear effect in the finance-inequality relationship, providing no support to the Greenwood and Jovanovic (1990) hypothesis.

Although the finding that financial liberalization is leaving the poor behind seems plausible in the context of India, the results do not necessarily suggest that repressing the financial system is an effective device for reducing inequality. One of the main objectives for priority sector lending is to expand financial inclusion. While the evidence suggests that this policy may have succeeded in ameliorating income inequality to some extent, directed lending is generally associated with misallocation of resources, which is costly for the financial system. Moreover, in recent years, the definition of priority sectors has been modified to include more sectors. To the extent that the poor tend to have higher default rates, banks have increasingly preferred to provide lending to established entrepreneurs who are deemed more creditworthy.

For a large developing country with a prevalence of widespread poverty and a high concentration of poor in the rural sector, any structural adjustment program that requires efficient allocation of financial resources and price corrections is likely to harm a vast majority of the poor who have been supported by subsidies of various kinds in the past. Hence, the immediate undesirable effects on income distribution associated with financial reforms are inevitable. However, it remains to be seen how financial reforms may impact the poor in the longer term. Probably some of these adverse consequences are only transitory, and it will take a longer period of adjustment for the benefits of reforms to trickle down to the poor. This suggests that the relationship between financial liberalization and income distribution may indeed be a non-linear one; although, currently available data do not support such a conjecture. Thus, the results are not necessarily contrary to the Washington consensus.

Achieving greater depth and breadth in the financial system is only one element of an effective strategy to reach a more equitable income distribution in India. It is also important to strengthen the regulatory framework and improve financial supervision. Reforms that work in favor of politically connected interests may undermine financial access. Thus, future policy design should focus on expanding financial inclusion with a view to broadening and improving access to finance for the poor.

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