Finance and Inequality: Evidence from Brazil

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Abstract

We examine in this paper the impact that financial development had on earnings inequality in Brazil in the 1980s and 1990s. The empirical evidence presented—based initially on time series, and then on panel time series and panel data and analysis—shows that broader access to financial and credit markets had a significant and robust effect in reducing inequality during the period. We suggest that this is not only because the poor can invest the acquired credit in either short or long-term productive activities, but also because those with access to financial markets can insulate themselves against recurrent poor macroeconomic performance, which is exemplified by high rates of inflation. The main practical implication of the results is that a seemingly non-distortionary policy, such as more widespread finance, alleviates the high inequality (and therefore improves welfare) present in Brazil without distorting economic efficiency. (JEL: D31, E44, O11, O54).

Keywords: Financial development and markets, credit, inequality, Brazil.

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1 Introduction and Motivation

Brazil is a major developing country that has been known for its perennial high earnings-income inequality and also for presenting poor macroeconomic performance, particularly in the 1980s and first half of the 1990s. The high inequality is exemplified by a Gini coefficient of 63.60 in 1989, and the poor macroeconomic performance by high and volatile rates of inflation\(^1\).

The importance of finance in such an economic environment is twofold: firstly, access to credit markets benefits the poor and the middle classes via the investment in productive activities channel. Loosely speaking, with more access to credit they can invest in, e.g. short-term activities such as self-employment (also sometimes related to the underground economy in developing countries), and also in long-term projects such as education. They can then increase-improve their social mobility and economic prospects, and hence break the cycle of persistent inequality. However—as well argued by Loury (1981), Galor and Zeira (1993), and Banerjee and Newman (1993)—the basic assumption is that the poorer lack initial wealth, and because of that moral hazard, and all its implications, arises. Therefore, financial and credit markets are imperfectly accessed by those at the bottom-middle of the earnings-income distribution. The main common theoretical prediction is that these imperfections determine the occupational outcomes of an economy, with the poorer becoming wage earners and the rich becoming entrepreneurs. This social immobility, of those at the bottom-middle with respect to those at the top of the distribution, consequently widens the distribution of earnings-income.

On a different—but related, strand—Greenwood and Jovanovic (1990) develop a model that predicts a Kuznets curve [Kuznets (1955)], i.e. an economy in its initial stages of financial development would present increasing inequality and only in a second or even third stage of development would inequality actually decrease. Furthermore, Aghion and Bolton (1997) argue that more access to credit is not a sufficient condition to reduce inequality for the trickle-down mechanism occurs only at very high rates of capital accumulation. Because of that, they advocate [as Loury (1981), via public training, and Banerjee and Newman (1993), via a one-off transfer, had done

\(^1\)It is worth mentioning that other developing countries that presented similar poor economic conditions, with high inequality and high rates of inflation were, e.g. Bolivia, Colombia, Guatemala, Indonesia, Mexico, Peru and Tanzania. See Bulíř (2001).
before] some redistribution, which would improve efficiency and welfare in the early stages of development. Finally, Piketty (1997) argues that imperfectly accessed credit markets lead to high interest rates and low credit market intermediation. With that asymmetrically imperfect access to credit the economic mobility of the poorer is reduced, when compared to the rich, and inequality increases.

Secondly, in countries which presented not only high and volatile rates of inflation for such a long time but also bursts of hyperinflation—access to financial markets and more than fully indexed assets offer to those at the top of the distribution daily (or overnight) indexed protection of their earnings-income against high inflation—and also financial assets with higher real returns. Lucas and Stokey (1987), Sturzenegger (1992), Erosa and Ventura (2002), and Cysne et al. (2004), develop theoretical models that are strictly linked to this question. In an economy with cash-in-advance constraints [or different shopping-time allocations as is the case in Cysne et al. (2004)], higher rates of inflation and indeed hyperinflation act as a tax on goods that require cash to be purchased, therefore leading people to reallocate their consumption of cash goods for consumption of goods requiring credit. However, in Brazil and other developing countries, the poorer are credit-goods (financial and credit markets) constrained, having to hold cash, and hence being taxed much more by high inflation (via the inflation-tax channel) than those at the top of the distribution. With that, inequality naturally widens.

Hence, finance in Brazil, and most certainly in other developing countries too, is important because it provides the poorer with the much needed credit to be invested in all sorts of productive activities, and also because it might offer to those with access to financial markets protection against chronic poor

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2 For a more thorough review of some of these theoretical studies, see Aghion and Bolton (1992), or Aghion, Caroli, et al. (1999).
3 Alternatively, dollarisation was widely used in some Latin American countries, e.g. Argentina, Uruguay and Peru, as an instrument of protection against high inflation. However, in Brazil dollarisation did not play such a role against galloping inflation. See Singh (2006).
4 In brief, the stylised facts presented above indicate that bank credit in Latin America and the Caribbean is scarce, costly, and volatile", Inter-American Development Bank (2005).
macroeconomic performance\textsuperscript{6}. Therefore, access to credit and indexation is theoretically relevant since they might play an important role on a better allocation of resources, and also on inequality and welfare.

Previous empirical studies include, e.g. Beck, Demirguc-Kunt, et al. (2004). They use a cross-section of countries, with the legal origins as instruments, and find that finance alleviates inequality. Moreover, Li, Squire, et al. (1998), Dollar and Kraay (2002), and Clark, Xu, et al. (2003), use panels of countries instead (each with different panel estimators), and their results confirm the theoretical prediction that more access to financial and credit markets help either to reduce inequality or to improve the incomes of the poor\textsuperscript{7}. Somehow more distantly related, Bonfiglioli (2006) finds some evidence, using cross-sections and panels of countries between 1976-2000, that stock market development can have a progressive impact on inequality\textsuperscript{8}.

Having said that, we use data covering the period between 1985-1999 to examine the impact that the financial and credit markets had on earnings inequality in Brazil. The time span of the data is particularly interesting because it covers two very distinct periods of the Brazilian economy. First, the high inflation period (1985-1994) with rates of inflation of up to 82.18 percent \textit{per month}, and then a period with more stable macroeconomic conditions (1995-1999) when inflation was on average at 9.27 percent for the period\textsuperscript{9}. Moreover, and as a matter of transparency in terms of data availability, 1985 is when the data on monetary aggregates used to construct the measures of financial development utilised actually become available.

The empirical evidence we present shows that finance had a significant effect in reducing inequality at the time. Furthermore, the results are robust for different measures of inequality and financial development, different estimators and different time periods. The main policy implication emerging from these results is that more widespread financial markets and credit has the advantage of being a non-distortionary (e.g. fiscal) and somewhat less

\textsuperscript{6}An interruption in credit supply can lead to a disruption in investment and economic growth and prosperity*, Inter-American Development Bank (2005).

\textsuperscript{7}It has to be said though, that the evidence presented by Dollar and Kraay (2002), and Clarke, Xu, et al. (2003), of the impact of finance on inequality, is not entirely satisfactory in terms of statistical significance.

\textsuperscript{8}Incidentally, Honohan (2004) reports that in a cross section of countries finance helps to reduce poverty rates.

\textsuperscript{9}It is worth mentioning though, that the annual rate of inflation in 1995 was still at 21.98 percent, 9.11 percent in 1996 and 8.43 percent in 1999.
intrusive redistributive policy that alleviates inequality, and therefore improves welfare in general without negatively affecting economic efficiency\textsuperscript{10}.

What distinguishes this paper from the previous empirical studies is that firstly, as suggested by Besley and Burgess (2003), we carry out a much needed national and subnational study on the subject. This can somehow be regarded as a step forward from the previous international cross-sectional $N \to \infty$ and panel $N \succ T$ studies for the reliability of the national and subnational data in better pinpointing the effects of finance on inequality at a more disaggregated level. Moreover, we use not only the available national time series $T \to \infty$ variation in the data but also construct and explore the variation of a subnational panel time series $T \succ N$ data set that covers six major regions of Brazil to better explore the regional variation in the data. Secondly, we use the usual measures of financial development, and also extra measures that we believe capture more appropriately and realistically the Brazilian economic reality at the time. Furthermore, we take into consideration the importance of having access to financial markets for the additional insulation provided in times of poor macroeconomic performance.

The remainder of this paper has the following structure: the next Section describes the data set, presents the descriptive statistics and correlations amongst the main variables, and shows how finance and inequality behaved and interacted over the period. Section 3 explains the empirical strategy utilised, and presents and discusses the main results obtained. Finally, Section 4 concludes the paper; it summarises the main findings, discusses the significance of the results and also their limitations, and examines the policy implications and advantages of having more access to financial and credit markets on inequality.

2 The Data

2.1 Description of the Data

The data set comes from the Brazilian Institute of Geography and Statistics (IBGE), which is the Brazilian Census Bureau, the Brazilian Central Bank (BACEN) and the Institute of Applied Economic Research (IPEA) files. The

\textsuperscript{10} Aghion and Bolton (1997) argue that a redistributive policy would increase efficiency because the rich’s marginal productivity of investment is relatively low when compared to the poor’s. This is obviously debatable.
IBGE is the most important institution for data collection and is the body that covers the Brazilian territory most thoroughly. The IPEA is an agency of the Brazilian government that, among other things, compiles primary and provides secondary data coming from the IBGE and BACEN themselves.

Firstly, the data on earnings come from the Monthly Employment Survey (PME) files compiled by the IBGE, which is a monthly rotative survey that follows ILO recommendations for international comparability, and that covers six major regions over time and approximately 38,500 households drawn from a probabilistic sample. The six regions covered are, from north to south: Pernambuco (PE), Bahia (BA), Minas Gerais (MG), Rio de Janeiro (RJ), São Paulo (SP) and Rio Grande do Sul (RS). On aggregate these regions represent roughly 59.70 percent of the total Brazilian population (as in 1996).

That said, the concept of before tax earnings adopted by the PME includes wages, monetary bonuses and fringe benefits earned by those at work, profits made by those who are self employed and employers, and the monetary value of goods for those earning in kind. Therefore, this concept is, in fact, broader and less restrictive than what usually is understood by more conservative definitions of earnings, although not as broad as the usual definition of income.

Furthermore, in a country which presented high rates of inflation for such a long period of time the way the data is deflated is rather important. The earnings data are deflated by the IBGE’s National Index of Consumer Prices (INPC). The INPC covers a basket of goods that families earning between one and eight times the monthly minimum wage, and whose head is employed and living in one of the regions, usually purchase. This information comes from the IBGE’s Family Budget Survey, and Products and Services Specification Survey.

One important prior adjustment is the use of a converter to express all data in Real (R$) mainly because Brazil had many monetary reforms with several different currencies being implemented during the period—as an instrument to combat high inflation—especially between 1986 and 1994. Some adjustments in the INPC itself are also implemented. These include a correction of 22.25 percent for the inflation incurred in June 1994, a month before the full implementation of the R$. The reason is that the INPC calculated inflation using the price variations of a virtual, but not fully
implemented R$, which was lower than the price variation incurred by the still existent and widely used Cruzeiro (CR$)\textsuperscript{11}. Another adjustment is the need to centre the INPC as if it was measuring inflation starting on the first day of each month, which is the date that most people get their paycheques. Finally, taking into consideration that the information on earnings reported in the questionnaires of the PME is related to the first day of a particular reference month $t$ and to avoid a severe measurement error, because of that earnings are corrected by the deflator of month $t + 1$ to allow the inflation incurred in $t$ to be accounted for\textsuperscript{12}.

We can then use the information on individual earnings from people between fifteen and sixty five years of age to obtain the Gini coefficient ($\textit{GINI}$), the Coefficient of Variation ($\textit{CV}$) and the respective shares of the quintiles ($Q_i$) of the earnings distribution by region and for Brazil. These measures of inequality are used for having attractive properties. The Gini coefficient and the Coefficient of Variation are both simultaneously consistent with the Anonymity, Population, Relative Income and Dalton principles, and are therefore Lorenz consistent. Furthermore, according to the Relative Income principle the shares are sufficient to measure inequality\textsuperscript{13}. Definitions 1, 2 and 3 illustrate the Gini coefficient, the Coefficient of Variation and the quintile shares of the earnings distribution respectively.

\[
\text{GINI} = \frac{1}{2n^2 \text{Earnings}} \sum_{i=1}^{n} \sum_{j=1}^{n} |\text{Earnings}_i - \text{Earnings}_j|,
\]

\[
\text{CV} = \frac{1}{\text{Earnings}} \left[ \frac{1}{n} \sum_{i=1}^{n} (\text{Earnings}_i - \overline{\text{Earnings}})^2 \right]^{1/2}, \text{and (2)}
\]

\[
Q_i = \frac{\text{Earnings}_Q}{\text{Earnings}},
\]

where \textit{Earnings} is the total earnings of the distribution, \textit{Earnings}_{ij} the earnings of individuals $i$ and $j$, \textit{Earnings} is the sample mean earnings, \textit{Earnings}_Q the shares of a particular quintile group, and $n$ the sample

\textsuperscript{11}For more about the implementation of the Real Plan (1994-99) and its underpinnings, see Agénor and Montiel (1999).

\textsuperscript{12}See Corseuil and Foguel (2002) for more details on how to best deflate earnings and income data from Brazil.

\textsuperscript{13}For more on inequality measures and their properties, see Sen and Foster (1997) or Ray (1999).
size.

Secondly, the data used to construct the measures of financial development come from the BACEN and IBGE files. The national monetary aggregates, m2, m3, credit to the private sector (credit) and personal credit (personal) are originally from the BACEN’s Monthly Bulletin. The first annualised monetary aggregate, m2, is defined as money in circulation in the economy, and current account and savings deposits in the financial sector. The second monetary aggregate, m3, is defined as m2 plus other deposits that do not present the same sort of high liquidity that the ones contained in m2 do, but that present higher returns. Credit to the private sector and personal credit are defined as credit provided by private and public institutions to the private sector (firms and individuals), and individuals only respectively. It is important to include the participation of the public financial institutions in the mentioned monetary aggregates because in Brazil they do provide the general public with the usual commercial financial services. Credit provided by public financial institutions that finance economic development is excluded, though. These monetary aggregates are deflated by the IBGE’s INPC.

The data on the regional Financial Domestic Product (FDP)—which accounts for the gross domestic product of the financial sector in each region covered, and the regional and national Gross Domestic Products (GDPs)—are from the IBGE’s National Accounts System. All these macroeconomic aggregates are calculated at market prices by the IBGE and deflated by the GDP implicit prices deflator.

We are then able to calculate the ratios \( m2/GDP, m3/GDP, credit/GDP \) and \( personal/GDP \), by region and for Brazil, to obtain \( M2, M3, CREDIT \) and \( PERSONAL \). To get these measures at national level we simply use the aforementioned national monetary aggregates over the national GDP. To construct the regional measures-proxies of financial development we have to take into account the fact that the information on monetary aggregates is national in scope. We therefore use the available national monetary aggregates over the regional GDPs, but multiplied by the percentage participation of each region in the total FDP to construct the regional measures of financial development utilised. The reason for doing so is that otherwise the most developed regions of the South would not appear as financially developed as they actually are. The weight used re-captures the importance of the most
financially developed regions and hence provides a more accurate picture of the regional variation of financial development in Brazil, e.g. São Paulo, Rio de Janeiro and Rio Grande do Sul regain their places as the most financially developed regions with the weighting. Definitions 4 and 5 illustrate the regional ($FD_{it}$) and national ($FD_t$) measures of financial development respectively.

$$FD_{it} = \left(\frac{\text{mon.aggregates}_t}{\text{GDP}_it}\right)FDP_{it},$$  \hspace{1cm} (4)

where $FDP_{it} = FDP_i/FDP_t$, and

$$FD_t = \frac{\text{mon.aggregates}_t}{\text{GDP}_t}.$$  \hspace{1cm} (5)

Furthermore, the reason for using $M3$ in addition to the usual $M2$ is because of the financial repression problem existent in Brazil, and other developing countries, in the 1980s and first half of the 1990s. Although the rates of inflation were notoriously high—the government kept the nominal interest rates on basic deposits and savings artificially low—and consequently generated negative real interest rates and a low $m2/GDP$ ratio\textsuperscript{14}. Hence, it can be argued that $M3$—for including financial assets with more indexation attached and also higher rates returns—would not be as severely affected by financial repression and inflation as $M2$. Moreover, the importance of the somewhat narrower $PERSONAL$ is because, unlike from the usual $CREDIT$, it captures the financial resources being allocated only to individuals, who might well lack the initial wealth and collateral usually available to private firms. Hence, these two extra measures, in their own ways, are believed to give a broader ($M3$) and more accurate ($PERSONAL$) view of the importance of financial development on inequality.

Thirdly, regarding the first macroeconomic control variable used, the rates of inflation ($INFL$), we use the variation on the IBGE’s regional Consumer Price Indexes (IPCs) and the INPC. These IPCs cover ten regions—including the six regions covered here—which are then aggregated and weighted by the resident population in each region, to form the INPC itself\textsuperscript{15}.

Fourthly, we also use the national and subnational unemployment rates ($UNEMP$) as an extra control variable. This information is compiled by

\textsuperscript{14}For more on the problem of financial repression in developing countries, see Agénor and Montiel (1999) or Easterly (2002).

\textsuperscript{15}For more on these price indexes, see Corseuil and Foguel (2002).
the IBGE using information from the PME, and it is defined as people who are unemployed and currently looking for employment over the labour force who are at least fifteen years old.

Having said that, Table One below presents the descriptive statistics of the time-series variation in the national data, and also the correlations between the measures of inequality and financial development during the period. It is worth mentioning the high means of the Gini and Coefficient of Variation of the earnings distribution, and also that the poorest forty percent (Q12) appropriated on average just 18.51 percent of the national earnings. The above illustrates the high inequality in Brazil. With regards to the measures of financial development, it is important to mention at this point that the measure PERSONAL presents by far the smallest ratio of all. Inflation was on average at 13.76 percent during the period, however it presents rates of virtually zero percent up to an astounding 82.18 percent per month, which shows its extreme volatility.

About the selected correlations on the second half of the Table, first the measures of financial development present positive correlations among themselves, as expected. More significantly, it is important to highlight the negative correlation between the Gini and all measures of financial development. Particularly eye-catching is the negative correlation between PERSONAL and the Gini. No less important is the positive correlation between Q12 and the very same measures of financial development. Furthermore, PERSONAL presents a significant positive correlation with Q12. All correlations are statistically significant at five percent level.

\[^16\text{The correlations between the Coefficient of Variation of the earnings distribution to all measures of financial development present the same intuitive results as the ones reported in Table One. Available upon request.}\]
Table One: Descriptive Statistics and the Correlation Matrix, Brazil 1985–1999.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
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<tr>
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<td>1.63</td>
<td>51</td>
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<tr>
<td>CV</td>
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<td>1.61</td>
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<td>1.27</td>
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<tr>
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<td>180</td>
<td>18.51</td>
<td>.93</td>
<td>15.78</td>
<td>21.12</td>
</tr>
<tr>
<td>M2</td>
<td>180</td>
<td>133.77</td>
<td>50.42</td>
<td>53.60</td>
<td>285.59</td>
</tr>
<tr>
<td>M3</td>
<td>180</td>
<td>199.37</td>
<td>69.73</td>
<td>79.16</td>
<td>376.38</td>
</tr>
<tr>
<td>CREDIT</td>
<td>180</td>
<td>193.12</td>
<td>35.06</td>
<td>113.26</td>
<td>283.64</td>
</tr>
<tr>
<td>PERSONAL</td>
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<td>15.61</td>
<td>9.55</td>
<td>3.17</td>
<td>32.69</td>
</tr>
<tr>
<td>INFL</td>
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<td>13.76</td>
<td>15.16</td>
<td>-49</td>
<td>82.18</td>
</tr>
<tr>
<td>UNEMP</td>
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<td>5.32</td>
<td>2.54</td>
<td>9.77</td>
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<table>
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<th>M2</th>
<th>M3</th>
<th>CREDIT</th>
<th>PERSONAL</th>
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</tr>
<tr>
<td>Q12</td>
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<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>-.42*</td>
<td>.37*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>-.37*</td>
<td>.32*</td>
<td>.97*</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>CREDIT</td>
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<td>.19*</td>
<td>.61*</td>
<td>.69*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PERSONAL</td>
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<td>.32*</td>
<td>.76*</td>
<td>.76*</td>
<td>.67*</td>
<td>1</td>
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</tbody>
</table>

Source: IBGE, BACEN, IPEA and author's own calculations. * significant at 5 percent level.

2.2 Behaviour of the Data

Earnings and income inequality in Brazil have historically been among the highest in the world\textsuperscript{17}. In Figure 1 below we put—using the time-series variation of the national data—the Gini Coefficient and the earnings share of the poorest forty percent of the distribution (Q12) together. We can see, e.g. how both inequality measures behaved during the hyperinflationary bursts of 1989-1990 and in 1994, and after the stabilisation of 1995. The Gini saw a considerable increase, with the shares of the two lowest quintiles of the distribution shrinking during both hyperinflationary peaks and their immediate aftermath. For instance, the Gini reached its maximum figure (58.20) in January 1989 and Q12 its lowest (15.78 percent of the national

\textsuperscript{17}According to the World Bank’s World Development Indicators (2005), only Botswana, the Central African Republic, Lesotho, Namibia and Paraguay presented a distribution more unequal than Brazil in recent times.
earnings) in July 1990. It is worth mentioning though, that after the implementation of the Real Plan in 1994, which has kept inflation reasonably under control at least until the end of 1999, the Gini has been much more stable and somehow lower than in previous periods. Similarly, the shares of the two lowest quintiles of the distribution have shown a modest, but steady gain from 1995-1996 onwards.

![Graph](image)

Figure 1: Earnings Inequality, Brazil 1985-1999. Source: PME, IBGE and author’s own calculations. The measures of inequality are the Gini coefficient \((GINI)\) and the shares of the forty percent poorest \((Q12)\) of the earnings distribution.

With respect to the measures of financial development, in the first half of Figure 2 we put together \(M2\) and \(M3\). Both measures, which are believed to be more related to access to indexation—for being related to access to some assets which would be indexed overnightly during the hyperinflationary periods—presented sharp falls in 1989-1990 and a more modest decrease in 1994. For example, they both reached their lowest figures in February 1991. However, after the stabilisation of 1994-1995 they have consistently increased in importance. It is worth saying that both measures reached their pre- 1989-1990 figures only in 1997-1998, which illustrates how badly
the instability of the period affected the financial markets\textsuperscript{18}. Additionally, in the second half of the Figure we graph the two other measures that are obviously more related to access to credit, \textit{CREDIT} and \textit{PERSONAL}. Similarly to how the previous two measures behaved, they both reached rock bottom during and right after the hyperinflation of 1989-1990 (March 1991), before consistently growing in size during the second half of the 1990s.

Figure 2: Financial Development, Brazil 1985-1999. Source: BACEN, IBGE, IPEA and author’s own calculations. The measures of financial development are \textit{M} \textsubscript{2}, \textit{M} \textsubscript{3}, private credit (\textit{CREDIT}) and personal credit (\textit{PERSONAL}).

Furthermore, to enhance the above statistical and visual evidence coming from the time-series variation in the national data, we plot some univariate OLS regression lines of the impact of finance on inequality. It can be seen that—and somehow confirming the previous evidence—the clear negative relationship between all variables of financial development and the Gini. The variable \textit{PERSONAL} presents the largest estimates, with \textit{M} \textsubscript{2} and

\textsuperscript{18}It is believed that the process of remonetisation that naturally took place after the stabilisation also contributed to the increase in the size of \textit{M} \textsubscript{2} and \textit{M} \textsubscript{3}. See Agénor and Montiel (1999).
Credit also faring well against the Gini, which highlights the importance of access to credit (Personal and Credit), and also to indexation (M2) on inequality. Figure 3 reports the results\(^{19}\).

Figure 3: Regression Lines, Inequality and Financial Development, Brazil 1985-1999. Source: BACEN, IBGE, IPEA and author’s own calculations. The measure of inequality is the Gini coefficient (GINI), and the measures of financial development are M2, M3, private credit (CREDIT) and personal credit (PERSONAL). All estimates are statistically significant at 5 percent level.

\(^{19}\)Moreover, we run regressions using the GLS estimator and also VARs, and the results confirm the ones being reported. Available upon request.
Hence, what can be said about the above preliminary descriptive-statistical and visual evidence is that finance and inequality moved in opposing directions in Brazil at the time. This highlights the importance of more widespread finance in reducing inequality, and therefore improving welfare in such an unequal country. This is illustrated not only by the statistical correlations, but also by the regression lines provided.

Also important to stress is that, particularly during and right after the hyperinflation of 1989-1990, there was a significant reduction in importance of all measures of financial development\(^{20}\). This indicates that, because of the macroeconomic volatility and uncertainty existent at the time—only those better-endowed at the middle-top of the earnings distribution managed to keep themselves in the financial and credit markets, and hence insulated against the poor macroeconomic performance (via the indexation provided by \(M2\) and \(M3\)—and with enough credit to be invested in productive activities (via the credit provided by \(CREDIT\) and \(PERSONAL\)). Coincidentally enough, inequality increased considerably during the same period.

Moreover, the importance of having a stable macroeconomic environment that actually encourages the growth of financial and credit markets that consequently reduces inequality and improves welfare is also touched upon. All measures of financial development significantly increased in size from 1995-1996 onwards and inequality modestly, but steadily, decreased during the same period of macroeconomic stability.

3 Empirical Strategy and Results

3.1 Strategy

When utilising the subnational panel time series \(T \gg N\) data, we firstly take the centred twelve-point moving averages to deal with any seasonality and to smooth the irregular component in the series. We then check all series for non-stationarity using the Im, Pesaran and Shin [IPS (2003)] test

\(^{20}\)It is important to mention that, in addition to all macroeconomic instability of the period, in March 1990 the ill-fated Collor Plan, the stabilisation plan named after the then newly elected president and which literally confiscated a huge proportion of all financial assets, was implemented. It is therefore believed that this Plan helped to reduce the size of the measures of financial development at the time. See Kiguel and Liviatan (1992) for more on this plan.
for unit roots. The advantage of this test over other competing alternatives is that it considers the existence of heterogeneous parameters, and serial correlation in the data\textsuperscript{21}. The IPS (2003) consists of an Augmented Dickey-Fuller (ADF) regression for each region of each variable, which are then averaged. Equations 6 and 7 illustrate the regional ADF equations of a particular variable $y$ and the IPS test, respectively.

\[
\Delta y_{it} = \alpha_i + \beta_i y_{it-1} + \sum \gamma_{ij} \Delta y_{i,t-j} + u_{it},
\]

and

\[
IPS = \sqrt{\frac{N(t - E(t))}{\text{var}(\bar{t})}},
\]

where $\alpha_i$ and $\beta_i$ represent the heterogeneous intercepts and slopes, $N$ is the number of regions ($N = 6$), and $E$ and $\text{var}$ are the mean and the variance of the average $\bar{t}$, which are then plugged into the IPS test. The $E$ 1.504 and $\text{var}$.683 information is taken from IPS (2003).

Secondly, we estimate equations using the Pooled Ordinary Least Squares (POLS), and then the one-way Fixed Effects (FE) estimators. The POLS estimator—with its assumption of homogeneous intercepts and slopes—gives equal weight to the between and within variance in the data, and if the explanatory variables are exogenous it provides unbiased estimates of the expected values of the coefficients. On the other hand, the FE (or Within Groups) estimator—with heterogeneous intercepts and homogeneous slopes—estimates only the within variance in the data. The FE estimator is OLS on deviations from group means, e.g. $M2_{it} - \overline{M2}_i$, where $\overline{M2}_i = \frac{1}{T} \sum_{t=1}^{T} M2_{it}$. It also takes into consideration the more realistic case that the explanatory variables $x$ might be correlated with the unobserved individual effects. Moreover, when $T \to \infty$ and $N$ small, which is the case here, the FE estimator provides unbiased and consistent estimates of the expected values of the coefficients in dynamic models. More intuitively, the Nickell bias is severely reduced as $T \to \infty$\textsuperscript{22}.

\textsuperscript{21}A popular alternative is the test by Levin, Lee and Chu (2002), however this test ignores the possibility of heterogeneity in panels and is therefore somewhat restrictive.

\textsuperscript{22}Furthermore, the reason for not using a GMM-type estimator here is because under $T \succ N$ we would incur in overfitting. See Smith and Fuertes (2004), Alvarez and Arellano (2003), or Pesaran and Smith (1995).
Thirdly, we understand that the regional financial development measures—proxies in our panel time series data, as originally set—present a measurement error for the absence of regional information on monetary aggregates that, although corrected and minimised by the factor $FDP_{it}$—can cause a statistical endogeneity $E(FinancialDevelopment_{it} u_{it}) \neq 0$ problem. Hence, we utilise the First Differences with Instrumental Variables (FDIV) estimator, Anderson and Hsiao (1981, 1982), which is consistent when $N$ or $T \to \infty$, and deals—not only with the possible statistical endogeneity caused by the measurement error—but also with the possibility of reverse economic causality. This sort of estimator—which removes the unobserved individual effect, is based on the assumption of sequential exogeneity $E(FD_{it-1} \Delta u_{it}) = 0$ or $E(\Delta FD_{it-1} \Delta u_{it}) = 0$—i.e. the first lag or the lagged first difference of the endogenous explanatory variable are valid identifying instruments by default\textsuperscript{23}. Therefore, since we estimate dynamic models, we choose to use the second lag $FD_{it-2}$ of the proxy of financial development being estimated, as our identifying instruments\textsuperscript{24}. The estimates provided by this FDIV estimator are asymptotically consistent and efficient.

Furthermore, the regression-based Hausman test is used to test for endogeneity in all equations. This test for endogeneity consists of regressing the endogenous explanatory variable against the instruments, and then plugging these saved residuals as an extra regressor in the original equation. Not rejecting the null $H_0 : \text{residuals} = 0$ suggests no endogeneity.

Hence, and for the sake of clarity, equations 8 and 9 illustrate the dynamic equations estimated by the benchmark POLS, and by the FDIV estimators respectively.

\begin{align*}
GINI_{it} &= \alpha + \beta FD_{it-1} + \gamma INFL_{it-1} + \delta UNEMP_{it} + u_{it}, \quad (8) \\
\Delta GINI_{it} &= \beta \Delta FD_{it-1} + \gamma \Delta INFL_{it-1} + \delta \Delta UNEMP_{it} + \Delta u_{it}, \quad (9)
\end{align*}

where $\alpha$ is the homogeneous intercept of the POLS estimator, $GINI_{it}$ is the

\textsuperscript{23}See Wooldridge (2002), Chamberlain (1992), or Anderson and Hsiao (1981 and 1982).
\textsuperscript{24}The first lags and the lagged first differences of the endogenous explanatory variable are obviously linearly equivalent instruments. When we utilise the lagged second differences of the endogenous explanatory variable as instruments, the results reported below are not altered.
measure of inequality being utilised, $FD_{it}$ is the particular measure of financial development being estimated, $INFL_{it}$ the inflation rates, $UNEMP_{it}$ the unemployment rates, and $u_{it}$ the residuals.

Moreover, as mentioned in Section 2 above—because the data available cover two very distinct periods of the recent Brazilian economic history, when estimating the subnational panel time series we split the sample to better examine the impact of not only financial development—but also inflation rates on inequality during these periods. The initial intuition suggests that during the low-inflation period (1995-1999), not only inflation would be progressive on inequality through the debtor and creditor channel (as in developed countries), but also financial development would present larger progressive effects on inequality than during the high-inflation period (1985-1994). This is because during the period of stable macroeconomic performance access to financial and credit markets would expand, therefore reducing inequality through more investment in all sorts of short and long-run activities.

### 3.2 Results

Initially, in Table Two we report the IPS statistics for non-stationarity in the regional series of all variables used for estimation below, and they all suggest that we can accept the alternative that at least one region of each variable is, in fact, stationary\(^{25}\).

\(^{25}\)Additionally, it is worth mentioning that a spurious regression under $T > N$ is less of a problem. This is because the pooled estimators are averaging over the regions, and therefore the noise is attenuated and the estimates consistent. See Phillips and Moon (1999), or Phillips and Moon (2000) for a less technical treatment.
Table Two: Panel Unit Root Tests, Regions 1985-1999.

<table>
<thead>
<tr>
<th>Variables</th>
<th>IPS Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>GINI</td>
<td>-2.72</td>
</tr>
<tr>
<td>M2</td>
<td>-2.62</td>
</tr>
<tr>
<td>M3</td>
<td>-2.72</td>
</tr>
<tr>
<td>CREDIT</td>
<td>-2.69</td>
</tr>
<tr>
<td>PERSONAL</td>
<td>-2.27</td>
</tr>
<tr>
<td>INFL</td>
<td>-3.81</td>
</tr>
<tr>
<td>UNEMP</td>
<td>-2.00</td>
</tr>
</tbody>
</table>

The mean $E$ and variance $\text{var}$ of the average $\bar{t}$ are, respectively: -1.504 and .683.

Source: Im, Pesaran and Shin (2003) and author’s own calculations.

Given that all variables are stationary, and that therefore no cointegration analysis can be pursued nor further data transformations needed, we report in Table Three the main results obtained by using the data covering the volatile period of 1985-1994. We firstly estimate dynamic equations using the POLS estimator and the Gini coefficient of the earnings distribution as the measure of inequality, and secondly we employ the FE estimator to do the analysis.

All lagged financial development measures present progressive effects on inequality (hence, a lower $\text{GINI}$), and all estimates are statistically significant. The first macroeconomic control variable estimated, the rates of inflation, presents regressive and significant effects on inequality, as expected during this period of high inflation and imperfect access to the indexation provided by financial institutions. The other control variable, the unemployment rates, is regressive, which validates the prediction that the poor present lower turnover costs, and therefore loose their jobs and earnings first when a recession occurs.

The FE estimator delivers a similar story regarding the impact of finance on inequality, i.e. all measures present progressive and significant effects on the Gini. Unemployment remains significant and regressive on inequality, however the other control, inflation, does not present significant estimates this time. The Likelihood Ratio (LR) test indicates the presence of fixed effects in all equations, which reinforces the use of the FE estimator to estimate these dynamic equations.

<table>
<thead>
<tr>
<th></th>
<th>POLS (GINI)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M2_{t-1}</td>
<td>-1.291 (-6.19)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M3_{t-1}</td>
<td>.704 (-5.21)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CREDIT_{t-1}</td>
<td>-1.126 (-8.12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PERSONAL_{t-1}</td>
<td>-7.803 (-4.46)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INFL_{t-1}</td>
<td>.052 (4.60)</td>
<td>.052 (4.61)</td>
<td>.046 (4.19)</td>
<td>.034 (2.71)</td>
</tr>
<tr>
<td></td>
<td>UNEMP</td>
<td>.240 (2.49)</td>
<td>.271 (2.76)</td>
<td>.227 (2.49)</td>
<td>.402 (4.45)</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>53.86 (83.76)</td>
<td>53.45 (82.06)</td>
<td>54.55 (88.02)</td>
<td>52.88 (87.31)</td>
</tr>
<tr>
<td></td>
<td>LR test</td>
<td>194.05</td>
<td>199.70</td>
<td>169.32</td>
<td>199.95</td>
</tr>
<tr>
<td></td>
<td>F test</td>
<td>38.07</td>
<td>33.90</td>
<td>48.31</td>
<td>31.24</td>
</tr>
<tr>
<td></td>
<td>R^2</td>
<td>.15</td>
<td>.13</td>
<td>.18</td>
<td>.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>FE (GINI)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M2_{t-1}</td>
<td>-1.585 (-7.37)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M3_{t-1}</td>
<td>-.987 (-7.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CREDIT_{t-1}</td>
<td>-1.052 (-7.43)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PERSONAL_{t-1}</td>
<td>-14.817 (-6.60)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INFL_{t-1}</td>
<td>-.323 (-1.03)</td>
<td>-.325 (-1.04)</td>
<td>-.253 (-.81)</td>
<td>-.419 (-1.33)</td>
</tr>
<tr>
<td></td>
<td>UNEMP</td>
<td>.862 (7.94)</td>
<td>.881 (8.10)</td>
<td>.866 (8.00)</td>
<td>.930 (8.65)</td>
</tr>
<tr>
<td></td>
<td>F test</td>
<td>2.87</td>
<td>2.81</td>
<td>2.88</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>R^2</td>
<td>.37</td>
<td>.36</td>
<td>.37</td>
<td>.36</td>
</tr>
</tbody>
</table>

T-ratios in parentheses, number of observations: N_T=636. Source: author’s own calculations.

Table Four shows the main results covering the period of relative stable macroeconomic performance (1995-1999). Corroborating with the results presented above, all measures of financial development significantly helped to reduce inequality during the period. However, the first macroeconomic control, inflation, does not present a clear cut picture, with most estimates provided by the FE estimator being significant and progressive—as one would expect during a low-inflation period—but the ones provided by the POLS not being entirely convincing in this respect. All in all, the progressive estimates of inflation on inequality are to be taken with care in this case. The other control variable, unemployment, confirms its regressiveness on inequality. The LR test confirms the existence of fixed effects.
in all equations, which validates the FE estimator as the most appropriate estimator to be employed here.

Table Four: Dynamic Estimates of Finance on Inequality, Regions 1995-1999.

<table>
<thead>
<tr>
<th></th>
<th>POLS (GINI)</th>
<th>FE (GINI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2t-1</td>
<td>-2.078 (-19.82)</td>
<td>-2.060 (-17.66)</td>
</tr>
<tr>
<td>M3t-1</td>
<td>-1.481 (-20.37)</td>
<td>-1.440 (-17.37)</td>
</tr>
<tr>
<td>CREDITt-1</td>
<td>-1.938 (-20.18)</td>
<td>-1.821 (-18.14)</td>
</tr>
<tr>
<td>PERSONALt-1</td>
<td>-14.114 (-19.16)</td>
<td>-14.185 (-17.57)</td>
</tr>
<tr>
<td>INFLt-1</td>
<td>-.402 (-2.08)</td>
<td>-1.312 (-2.18)</td>
</tr>
<tr>
<td>UNEMP</td>
<td>.452 (8.69)</td>
<td>.537 (8.40)</td>
</tr>
<tr>
<td>Constant</td>
<td>53.79 (125.58)</td>
<td>53.77 (127.94)</td>
</tr>
<tr>
<td>LR test</td>
<td>58.81</td>
<td>55.28</td>
</tr>
<tr>
<td>F test</td>
<td>141.63</td>
<td>149.31</td>
</tr>
<tr>
<td>R²</td>
<td>.60</td>
<td>.67</td>
</tr>
</tbody>
</table>

T-ratios in parentheses, number of observations: NT=280. Source: author’s own calculations.

Hence, according to the evidence above—PERSONAL and M2 are the measures presenting the largest estimates, which reinforces both channels by which finance plays a progressive role on inequality—i.e. productive investment and indexation respectively. Needless to say that the other two measures fare well too against inequality. Moreover, the estimates of finance covering the more stable period are larger than their counterparts covering the 1985-1994 period, which indicates that a stable macroeconomic environment is rather important for the provision of more widespread finance in the
economy with all its attached benefits on inequality\textsuperscript{26}.

When we take into consideration the measurement error and the reverse causality issues, the FDIV estimator delivers a similar picture. Most financial development measures present significant and progressive effects on the Gini coefficient, and inflation confirms its regressiveness during the period of poor macroeconomic performance. The estimates reported in the second half of the Table—covering the stable period—confirm that finance has the ability of reducing the Gini, with inflation being regressive. This regressiveness of inflation might well be because, although Brazil presented a much more stable macroeconomic environment in the second half of the 1990s—the inflation rates for the period were, on average, still at 9.27 percent—which might have proved regressively enough for those at the bottom of the distribution. In anyway, as mentioned before, the estimates of inflation for this period are to be taken with caution for incorporating a period of transition from high rates of inflation to a more stable environment.

Furthermore—in the first-stage regressions the identifying instruments are statistically significant, and the Hausman test for endogeneity suggests that we can actually not reject the null of no endogeneity, which indicates that the measurement error mentioned before is less of a problem here—since it is not inducing finance to be endogenous.

\textsuperscript{26}Singh (2006), Singh and Cerisola (2006) and Santiso (2006) highlight the importance of the much improved macroeconomic performance in Latin America recently to produce better economic outcomes. Furthermore, Carvalho and Chamon (2006) argue that after the reforms of the 1990s the Brazilian income has grown, in fact, by much more than the official figures suggest, which reinforces the importance of macroeconomic stability on welfare gains.
Table Five: Estimates of Finance on Inequality, Regions 1985-1999.

<table>
<thead>
<tr>
<th>FDIV (GINI), 1985-1994</th>
<th>M2&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>-7.32 (-4.83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-4.87 (-4.48)</td>
<td></td>
</tr>
<tr>
<td>CREDIT&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-10.31 (-.85)</td>
<td></td>
</tr>
<tr>
<td>PERSONAL&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-8.98 (-3.66)</td>
<td></td>
</tr>
<tr>
<td>INF&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>.0489 (2.76)</td>
<td></td>
</tr>
<tr>
<td>UNEMP&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-.8006 (-1.95)</td>
<td></td>
</tr>
<tr>
<td>Hausman test</td>
<td>-.19 -.11 -.10 -1.81</td>
<td></td>
</tr>
<tr>
<td>NT</td>
<td>636 636 636 636</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FDIV (GINI), 1995-1999</th>
<th>M2&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>-1.23 (-5.66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-1.10 (-5.63)</td>
<td></td>
</tr>
<tr>
<td>CREDIT&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-1.30 (-2.66)</td>
<td></td>
</tr>
<tr>
<td>PERSONAL&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>.6366 (.42)</td>
<td></td>
</tr>
<tr>
<td>INF&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>.2327 (2.29)</td>
<td></td>
</tr>
<tr>
<td>UNEMP&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>.1759 (2.63)</td>
<td></td>
</tr>
<tr>
<td>Hausman test</td>
<td>.17 -.76 -1.30 -1.75</td>
<td></td>
</tr>
<tr>
<td>NT</td>
<td>280 280 280 280</td>
<td></td>
</tr>
</tbody>
</table>

T-ratios in parentheses. The identifying instruments are the second lag of the measure of financial development being estimated. Source: author’s own calculations.

Given the evidence presented above, we can confidently say that finance is proved important under more stable or even unstable macroeconomic conditions through the investment in productive activities channel (CREDIT and PERSONAL), and through the access to indexation channel (M2 and M3).

The estimates of PERSONAL (the narrowest of the measures) are the largest ones in almost all equations presented and the estimates of CREDIT fare very well too, which highlights the potential of these particular measures in reducing inequality and improving welfare and economic efficiency in Brazil.²⁷

Furthermore, the estimates of those measures more related to access to simple but indexed financial assets, i.e. M2 and M3, present the right signs, incidentally, Khandker (2005) advocates that the microfinance experiment in Bangladesh helped to reduce extreme village poverty, and Burgess and Pande (2004) suggest that the Indian rural branch expansion program helped to reduce rural poverty.

²⁷

indicating the importance of some sort of indexed earnings protection against the high inflation existent in periods of poor macroeconomic performance.

All in all, the results are statistically and economically significant, and robust for a wide range of inequality and financial development measures, estimators and time periods, which—not only confirms the time-series evidence presented in Section 2—but also reinforces the importance of these findings for policy purposes.

4 Concluding Remarks

In this paper we examined the importance of financial development—i.e. broader access to financial and credit markets in alleviating earnings inequality—and therefore improving economic welfare as a whole in Brazil during the 1980s and 1990s.

The wide range of results presented in Sections 2 and 3 confirms the theoretical prediction that more access to credit markets has a positive impact in reducing inequality through the channel of short and long-run investment in productive activities, particularly, but not only, in periods of stable macroeconomic performance. Moreover, finance proved to be important also via the access to indexation channel, that is access to financial markets actually provided insulation against the poor macroeconomic performance, in the role of high rates of inflation, recurrently existent in Brazil during the 1980s and first half of the 1990s.

Furthermore, we stress the importance of a stable macroeconomic environment—since after the stabilisation of 1994-1995 not only inequality saw a decrease, but also, and more significantly, finance saw a considerable increase—so that a more inclusive financial sector can be developed, with all its attached benefits to, in this case, inequality.

The significance of these results is principally because: firstly, we undertake a needed national and subnational study on the subject, which pinpoints more accurately, when compared to international cross-section and panel studies, the impact of finance on inequality in a major developing and very unequal country like Brazil. Secondly, in addition to the usual measures of financial development we utilise alternative ones (M3 and PERSONAL) that we believe capture more realistically the Brazilian economic reality at the time. Furthermore, the results are statistically and economically signif-
significant, and robust for different data sets (time series and panel time series), different measures of inequality (Gini coefficient, Coefficient of Variation and quintile shares) and financial development ($M_2$, $M_3$, PRIVATE and PERSONAL), different specifications and estimators (OLS, POLS, FE and FDIV), and different time periods (1985-1999, 1985-1994 and 1995-1999). Last, but not the least, this sort of national and subnational study may be extended to other developing countries, so that our knowledge on the subject can be well extended and better policies recommended.

The main limitation at this point concerns the data available, though. The information on monetary aggregates used to construct the measures of financial development is still only provided at national level. Although we explore the regional variation of the data, correcting and minimising the possible measurement error present, we understand that the provision of regional information on the monetary aggregates would certainly bring more flexibility than we have at the moment in terms of empirical modelling. On the other hand, this temporal limitation can not act as an impediment to carry out such studies. We do manage to minimise the error caused by the lack of regional information on monetary aggregates and construct exogenous regional measures-proxies of financial development that, not only confirm the initial time-series and then panel time series evidence, but also deliver significant and robust results. Moreover, at the moment there is no data on financial assets at an individual level in Brazil, which would disaggregate this sort of information even further. Certainly the availability of these sorts of data would allow us to investigate not only the direct access to credit by the poor, but also how well or badly they are actually repaying their debts.

The main practical implication arising from the evidence is that the policy of making financial and credit markets more widely available has the advantage of being a non-distortionary redistributive fiscal policy—for they generate negative incentives to invest, and therefore lower employment that affects mostly the poor and their earnings—that reduces the persistent inequality present in Brazil, and that therefore improves the welfare of the poorer without affecting economic efficiency. To corroborate with that, PERSONAL, although the smallest in size, presented the largest estimates among all measures in all equations. This highlights the importance of credit being allocated on a more individual level and how efficiently it helps
to reduce inequality and to improve welfare, not to mention to improve the allocation of resources.

Given the nature of some of the results regarding the impact of inflation rates on inequality between 1995 and 1999, a study—with an extended data set—on how lower rates of inflation are actually affecting inequality would be in order. More related to what has been done here, a natural extension of this paper would be an investigation of the impact (negative presumably) of inflation on finance itself—i.e. how the poor macroeconomic performance of the 1980s and first half of the 1990s directly affected the provision of credit, and access to financial markets—and with that indirectly affecting inequality and also other macroeconomic variables such as economic growth.

References


