



# Inflation and financial development: Evidence from Brazil<sup>☆</sup>

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## ABSTRACT

We examine the impact of inflation on financial development in Brazil, and the data available permit us to cover the period between 1985 and 2004. The results—based initially on time series and then on panel time series and panel data and analyses—suggest that inflation presented deleterious effects on financial development during the period investigated here. The main implication of the results is that poor macroeconomic performance has detrimental effects to financial development, a variable that is important for affecting, (e.g., economic growth and income inequality). Therefore, low and stable inflation, and all that it encompasses, is a necessary first step to achieve a deeper and more active financial sector with all its attached benefits.

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## 1. Introduction

We investigate the role of inflation for financial development in Brazil using data covering the period between 1985 and 2004 and ten economically diverse regions. This period is particularly interesting because it captures two distinct regimes in terms of macroeconomic performance in Brazil. On the one hand, the period between 1985 and 1994 covers the time when the rates of inflation were notoriously high, reaching an astounding 82.18 percent *per month* in March 1990. On the other hand, from 1995 onwards, the macroeconomic performance has consistently improved, with inflation presenting relatively much lower and stable rates since then.<sup>1</sup>

The evidence, based initially on the time-series variation and then on panel time series and panel data and analyses, indicates that inflation is detrimental to financial development. The evidence is significant and robust for different data sets, different measures of financial development and different estimators. The main *policy* implication of the results is that the high rates of inflation seen in Brazil in the 1980s and the first half of the 1990s had a clear detrimental effect to a variable that is known to play an important role in economic growth and income inequality. Therefore, low and stable inflation, and all that it encom-

passes, is a necessary first step to be pursued in Brazil if it is to have a deeper and more active financial sector with all its attached benefits.<sup>2</sup>

What distinguishes this paper from previous studies is that, first, we use, as suggested by Fischer (1993), and Besley and Burgess (2003), national data to construct a more disaggregated sub-national data set, which better pinpoints the importance of inflation on financial development in a country so regionally diverse in terms of economic outcomes. Furthermore, to carry out the study, in addition to the time-series data, we take advantage of panel time series and panel analyses, which deal with important empirical issues—non-stationarity, heterogeneity bias, between-region dependence and endogeneity in panels—most of them not discussed in the previous empirical studies, to get better and more informative estimates.

Additionally, the use of panel time series and panel analyses is particularly important because they do not suffer from the usual criticism applied to cross-sectional data and analysis, (i.e., that since a period of high inflation is usually followed by a period of low inflation, high inflation's detrimental effects would be canceled out by low inflation<sup>3</sup>). Finally, we take into consideration the problem of financial repression seen in Brazil during the high-inflation period and therefore use an extra measure of financial development that, to some extent, accounts for this problem.

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<sup>1</sup> Although relatively lower and more stable, inflation rates between 1995 and 2004 were, on the average, at 9.47%, and they even reached double digits in 2003.

<sup>2</sup> For instance, Singh (2006), Singh and Cerisola (2006) and Santiso (2006) highlight the importance of the much improved macroeconomic performance in Latin America in producing better economic outcomes recently. Moreover Carvalho and Chamon (2008) suggest that the growth of real income that took place after the reforms of the 1990s in Brazil has been, for methodological reasons, severely underestimated, which reinforces the role of macroeconomic stability on improved economic welfare.

<sup>3</sup> See Bruno and Easterly (1998).

All in all, we attempt to fill in a gap in the literature by exploring national and sub-national data, with time-series and regional variation, from a developing country that provides a rich ground to study and better understand the impact of inflation on financial development. On the one hand, determining what causes financial development in a developing country like Brazil—which has presented historically high inequality and erratic growth rates, and high rates of inflation for a long period of time—is important because financial development can have an incremental effect on growth, and a progressive effect on inequality.<sup>4</sup> On the other hand, inflation—for its nature in Brazil, in particular during the transitional period from dictatorship to democracy—arises as a natural macroeconomic determinant of financial development.<sup>5</sup>

Theoretical studies related to what is done here include Moore (1986), Choi et al. (1996), and Azariadis and Smith (1996). They highlight the fact that if inflation is high enough, returns on savings are reduced—which leads to a reduction in savings and savers alike—the pool of borrowers is swamped, informational frictions become more severe, and therefore credit becomes scarce in such an economy.

Moreover, Schreft and Smith (1997), Boyd and Smith (1998), Huybens and Smith (1998), and Huybens and Smith (1999) explore the idea that economies with higher rates of inflation do not approach or reach the steady state where their capital stocks would be high, (i.e., there are bifurcations and development traps arise in such economies). Furthermore, these economies obviously present less efficient financial markets because of the higher interest rates that follow high rates of inflation. All the same, the Mundell–Tobin effect is reversed in a high-inflation environment.

On the empirical side, Haslag and Koo (1999) and Boyd et al. (2001), using cross-sectional and panel international data from the 1960s to early 1990s, report that moderate inflation has a negative impact on financial development. Moreover, both studies find evidence of nonlinearities, (i.e., after a particular threshold—15 percent per year in Boyd et al. (2001)—higher inflation presents only smaller marginal negative effects on financial development). Furthermore, Dehesa et al. (2007) use a panel of 120 countries between 1997 and 2004 to report that lower inflation increases the amount of credit in their sample. Finally, Zoli (2007), and Andrianaivo and Yartey (2009) report that in panels of emerging European countries between 1995 and 2006 and African countries between 1990 and 2006, inflation presents detrimental effects to financial development.<sup>6</sup>

All in all, we highlight the importance of a stable macroeconomic environment, with consistent monetary and fiscal policies, which is attainable only by the introduction of stronger economic institutions so that a deeper and more active financial sector emerges with all its consequences on crucial variables such as growth and inequality.<sup>7</sup>

The remainder of this paper has the following structure. Section 2 describes the data sets used and also presents some correlations and

regression plots of the main variables. Section 3 explains the empirical strategies used and reports the main results. Section 4 concludes the paper: it summarises the importance of the results and their implications in terms of policy, and it suggests future work.

## 2. The data

### 2.1. Description of the data

The data sets used come 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 IPEA is an agency of the Brazilian government that, among other activities, compiles primary and provides secondary data from a variety of national sources.

These data sets cover the period between 1985 and 2004 and ten major regions, from North to South: Pará (PA), Ceará (CE), Pernambuco (PE), Bahia (BA), Distrito Federal (DF), Minas Gerais (MG), Rio de Janeiro (RJ), São Paulo (SP), Paraná (PR) and Rio Grande do Sul (RS). To briefly illustrate the importance of these regions in the national context, they accounted for 74 percent of the total population and 84 percent of the total gross domestic product in 1995. Moreover, in terms of regional variation, these data sets include a relatively rich southern region like São Paulo, as well as a region like Pará in the relatively poor North of the country, with a gross domestic product equivalent to just 5 percent of the one produced by São Paulo in 1995.

The first data set used to construct the measures of financial development covering the period between 1985 to 2002 are from the BACEN's Monthly Bulletin and IBGE's National Accounts System. The first annualised monetary aggregate used is  $m_2$ , (i.e., the liquid liabilities). The second monetary aggregate,  $m_3$ , is defined as  $m_2$  plus other financial assets that are more illiquid but with higher rates of nominal and real returns than the ones in  $m_2$ . Moreover, credit to the private sector (credit) and personal credit (personal) are defined, respectively, as credit provided by public and private financial institutions to firms and to individuals, and to individuals only. These monetary aggregates are deflated by the IBGE's national index of consumer prices (INPC).

The gross domestic products (GDPs) and financial domestic products (FDPs)—which account for the gross domestic product of the financial sector by region—are calculated at market prices and deflated by the IBGE's GDP implicit deflator.

We can then calculate the ratios  $m_2/\text{GDP}$ ,  $m_3/\text{GDP}$ ,  $\text{credit}/\text{GDP}$  and  $\text{personal}/\text{GDP}$  at national and regional levels to obtain  $M_2$ ,  $M_3$ ,  $\text{CREDIT}$  and  $\text{PERSONAL}$ , respectively. To calculate these measures at the national level, we use the information on the national monetary aggregates over the national GDPs.

However, to construct the above mentioned regional proxies for financial development, we have to take into account the fact that the data covering the period between 1985 and 2002 on monetary aggregates are provided only at the national level. We therefore use the available national data on monetary aggregates divided by the regional gross domestic products and multiplied by the percentage participation of each region in the financial domestic product. 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. More specifically, with this weighting, the measures of financial development recapture more accurately the regional variation in financial development seen amongst the different regions of Brazil. For example, the Distrito Federal, where the federal capital Brasília is located, São Paulo and Rio de Janeiro, regain their places amongst the most financially developed regions after the weighting.<sup>8</sup>

<sup>4</sup> For instance, King and Levine (1993), Levine and Zervos (1998), Beck et al. (2000), and Beck and Levine (2004) report that financial development has a positive impact on long-run growth. Moreover, Li et al. (1998), Dollar and Kraay (2002), Clarke et al. (2006), Beck et al. (2007) and Bittencourt (2010) report that financial development contributes to reduce inequality.

<sup>5</sup> For instance, Gregorio (1993), Fischer (1993), Barro (1995), Bullard and Keating (1995), Clark (1997), Barro (1998), Bruno and Easterly (1998), and Fischer (2005) confirm the fact that high inflation outweighs the Mundell–Tobin effect and therefore presents a detrimental effect to economic growth. Also, Cardoso et al. (1995), Barros et al. (2000), Ferreira and Litchfield (2001), and Bittencourt (2009) report that the high rates of inflation seen in Brazil in the 1980s and the first half of the 1990s were significantly regressive on income inequality.

<sup>6</sup> In addition, Choi et al. (1996) use national data from different countries, e.g., U.S., Chile, Korea and Taiwan, to report that inflation presents a negative impact on stock-market development.

<sup>7</sup> Singh (2006) reports that the Brazilian authorities have started to implement sounder federal and regional fiscal rules and also inflation targeting from the late 1990s onwards. Nevertheless, Carstens and Jâcome (2005) report that Brazil still has one of the least independent central banks in Latin America, which is always a cause for concern.

<sup>8</sup> Honohan (2004) and Silva (2002) explore further the role of using the financial domestic product as a proxy for financial development.

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