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ISSN 0034-7140 (print) | ISSN 1806-9134 (online)
DOI 10.5935/0034-7140.20170016
Revista Brasileira de Economia, 71(3), 347–359

What Drives Inequality of Brazilian Cross-State Household Credit?*

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Contents: **1. Introduction; 2. Brazilian credit market; 3. Methodology; 4. Empirical exercise; 5. Conclusion.**

Keywords: **Household credit; Panel data; Poverty; Per capita income; Gini index; Years of schooling.**

JEL Code: **O54, O16, G18.**

According to Matos et al. (2013) credit policy in Brazil has been discriminatory and strongly characterized by a regional bias. We address this issue by aiming to identify Brazilian cross-state credit drivers. Methodologically we follow Matos (2017) by proposing a panel model to estimate relationships between real per capita Brazilian household credit and a set of relevant social, economic and financial variables. Our main findings considering all federal subnational entities during the period from 2004 to 2013 suggest that demand for credit plays a more relevant role than the supply thereof. Our evidence may be useful in writing theoretical models dealing with credit patterns in Brazil.

Segundo Matos et al. (2013), a política creditícia no Brasil tem sido discriminatória e fortemente caracterizada por um viés regional. Este artigo aborda este tema, visando identificar os determinantes da concessão de crédito nos estados brasileiros. Metodologicamente, o exercício empírico segue Matos (2017) ao se basear fazer uso de um painel na estimação das relações entre o crédito real per capita obtido pelas famílias e um conjunto de variáveis sociais, econômicas e financeiras. Considerando todas as unidades da federação ao longo do período de 2004 a 2013, os resultados obtidos sugerem que os determinantes pelo lado da demanda sejam mais influentes que os determinantes pelo lado da oferta. Essa evidência empírica pode ser útil no desenho de novos arcabouços teóricos sobre crédito no país.

1. INTRODUCTION

When observing the literature discussing the economic role played by credit markets – from seminal papers such as Schumpeter (1934) to more recent contributions such as Rajan and Zingales (1998) – most of the related research diverges into two different but related approaches: a) the effects of credit on social and economic variables[1] and b) the analysis of credit drivers.

Here, we add to the discussion about credit drivers, following one of the most promising lines of research developed by Cottarelli et al. (2005), Kiss et al. (2006), Hansen and Sulla (2013) and Matos (2017).

*First draft December 2015. The financial support from CNPQ-Brazil is gratefully acknowledged. We are thankful to anonymous referees and the editor for their insightful comments. We thank Ricardo Brito, Arnaldo Santos and seminar participants at Federal University of Ceará for their comments and suggestions. The usual disclaimer applies.

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[1]Concerning the role of financial intermediation on poverty, development and income inequality, we can mention some recent World Bank's contributions, as Ravallion (2001) and Beck et al. (2006).

Received on May 24th, 2017
Final Acceptance on June 01th, 2017

More specifically, we are the first to enter this debate aiming to identify significant drivers able to explain the heterogeneity of household credit across states of Brazil (including the federal district). This country is a very interesting case because the Brazilian context is even more cumbersome and depressed than in other emerging economies. Following this, we list features that motivate our country choice.

First, Bernanke and Gertler (1995) suggest theoretically that the volume of credit is pro-cyclical, but this is not necessarily true for Brazil. The austerity established within this economy in the '90s is held in check by the deepest economic and political crisis in its recent democratic history. In a counterintuitive way, credit volume provided to Brazilian families is reaching high levels even for a scenario characterized by elevated household loan interest rates. Under the argument that Brazil has a low credit to GDP ratio (54% in mid-2015) the government has stimulated the debt increase among the population, irrespective of the level of human capital, profile of default or employment status. Therefore, for the first time in decades, household debt in relation to cumulative income over the last twelve months within the National Financial System is higher than 46%, even with annual interest rates close to 35% for individuals considering all modalities of lending, according to the Central Bank of Brazil. A decade ago, this debt ratio was less than 19%.

Second, one can see a recent, intuitive but uncomfortable evidence reported in Matos et al. (2015) about Brazilian household loan delinquency. According to the main findings of this paper, poverty and unemployment play a significant role in household decisions to honor a financial commitment or not.

Third, Brazilian economists used to say: "there are two nations in the same territory"; this usually refers to income. However according to Matos et al. (2013), based on an application of the Phillips and Sul (2007) framework to Brazilian states, it is also possible to prove the existence of a discriminatory credit policy. These authors are able to illustrate the formation of two clubs strongly characterized by a regional bias with, a representative presence of states located in the Northeast and North regions included in the second group.

Fourth, unfortunately this heterogeneity is broader because one can see many other disparities related to the financial system or human capital. For instance, on average in the Northeast and North regions, families and companies may have difficulty gaining access to the banking sector because there were 5.5 agencies per 100,000 inhabitants; whereas in the South, there were 14 agencies per 100,000 inhabitants (according to the Central Bank of Brazil, during the period of 2004 to 2013). On the demand side, while the Northeast has the lowest values for years of schooling (ranging from 4.9 to 6.1) the average value in the South is higher than 7.4 years.

Fifth, Brazilian and other Latin American economies have experimented with a recent financial liberalization starting in the 1990s, after moving toward an open, market-based development model in place of one that relied on the state and was closed to foreign trade and capital flows. Stallings (2006), Edwards et al. (2007) and Hira and Gaillard (2011) are relevant sources about the consequences of this experience. To summarize, this evidence suggests the following key ideas: i) there exists a discriminatory credit policy across Brazilian states, and ii) there exists a robust, persistent and broader heterogeneity between those states based on many social and economic variables. This unusual scenario has motivated us to study Brazilian credit drivers through panel data, covering the period from 2004 to 2013, applying this method to all federal subnational states.

We are convinced that it is timely and opportune to ask how human capital, employment and income, combined with the development of the Brazilian financial system can influence heterogeneous levels of Brazilian household credit volume.

Methodologically, we follow the recent related literature, such as Kiss et al. (2006), Hansen and Sulla (2013) and Matos (2017), to propose a contemporaneous panel model; in other words, we estimate the relationship between the level of real per capita household and a set of economic variables rather than trying to identify causality in the model. However, because credit may display autoregressive behavior, our approach can be useful in a dynamic version when one intends to measure the effects of timing and causality in this market.

The key issue to be addressed here is the choice of a representative, feasible, parsimonious and observable set of exogenous variables from among a wide range of intuitive variables that may drive the evolution of credit in Brazilian states. Although we have looked to extract these series from many different data sources, our empirical exercise lacks cultural, historical and political variables. In our final specification, we work only with macroeconomic, microeconomic, labor market, social and financial variables.

Our main findings suggest that demand for credit plays a more relevant role than supply thereof. More specifically, households' levels of human capital and real income are significantly related to improving credit; reducing the level of inequality across families is also important. We also show that poverty can motivate household credit through microcredit programs developed by public banks.

This article is structured into five sections including this introduction. Section 2 gives an account of an overview about credit evolution in Brazil, before presenting our methodology in the third section. We discuss our empirical analysis in the fourth section. Concluding remarks are offered in the fifth section.

2. BRAZILIAN CREDIT MARKET

According to the World Bank dataset, Brazil's credit to GDP growth rate during the period from 2004 to 2011 was one of the highest worldwide at 11.4%. According to Matos (2017) the average value of credit to GDP ratio for Brazil during this period is approximately 39%, the third ranked value in a sample containing 14 Latin American economies. Only Panama and Honduras, with 77% and 44%, respectively, show higher ratios than Brazil.

On the one hand, those numbers characterize the Brazilian credit market as a highlight among emerging countries. In this sense, we must mention that the strong growth of household credit in this period is due to the growth of payroll loans and incentives to mortgage, according to Doctor (2015).

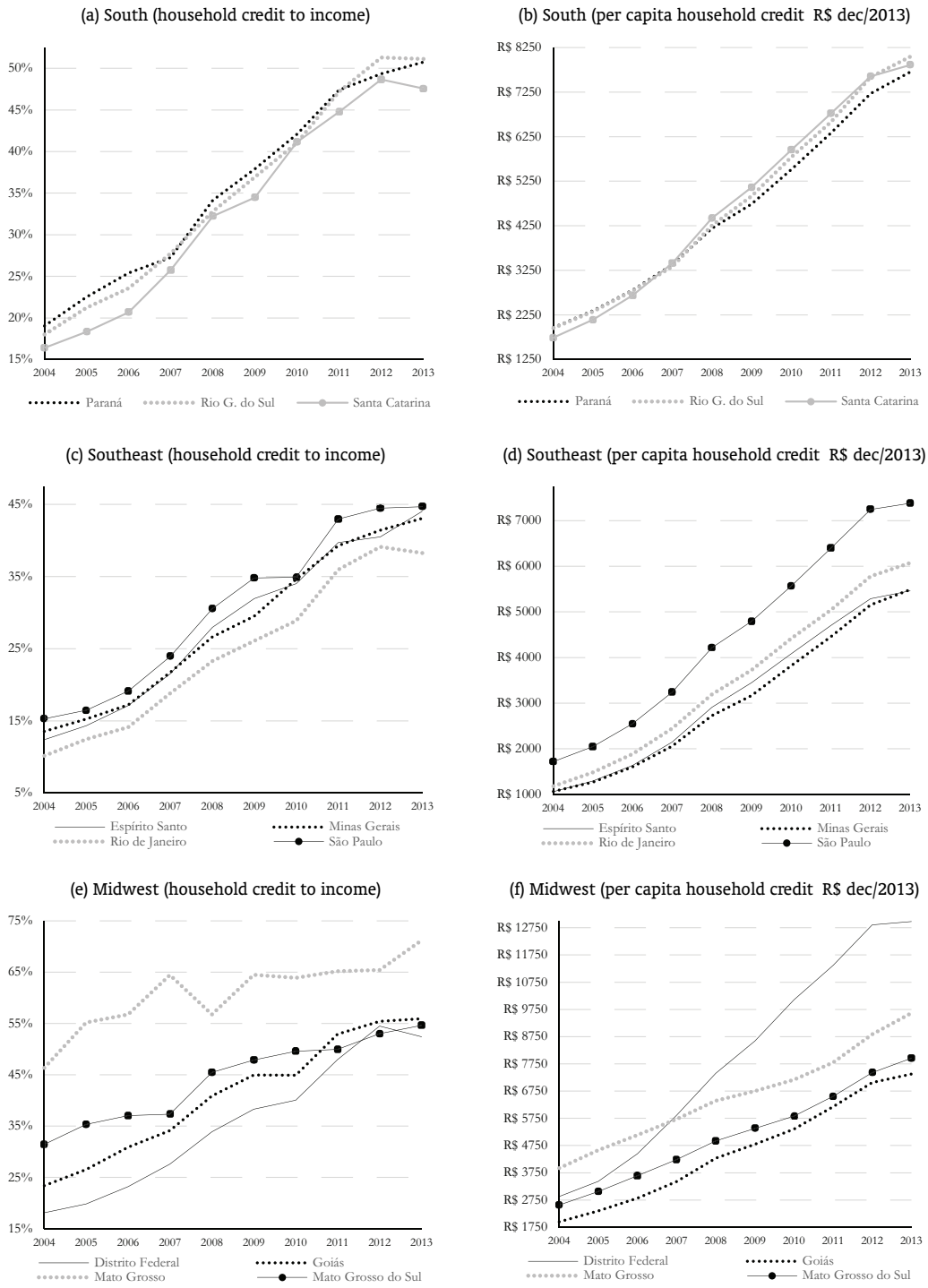
However, it is necessary to disaggregate credit in the Brazilian states so that inequality can be illustrated in that country. In Figure 1, we plot the evolution from 2004 to 2013 of our endogenous variable, real per capita household credit for each Brazilian federal subnational entity, considering all types of credit to families.

The evolution of the aggregate volume of household credit shown in Figure 1 shows a visible growth trend in all time series, both in absolute per capita terms or as a ratio of per capita income. Except for entities located in the Midwest region, the pattern of evolution is such that Brazilian entities begin with a credit to income ratio ranging from 5% to 20%, and reach ratios ranging from 35% to 55% at the end of the period (2013). The exceptions are Mato Grosso with 70% and Amazonas and Pará, with less than 35%.

When we address real per capita series, the divergences are much more worrying because the regions with lower per capita income also display lower levels of per capita household credit, as we can see in the North and Northeast regions. Once more, in Amazonas, Pará and Sergipe, we see per capita credit levels less than R$ 2750 in 2013, while in the Southeast region all entities reach values above R$ 5000, and in the Southern region, the level is close to R$ 8000. In accordance with previous publications such as Matos et al. (2013), we see in this figure apparent similarities and convergence patterns among entities located in a same region, especially in the regions of South, Southeast and Northeast. In the Midwest region we find some extreme series when we consider credit to income ratio, such as Mato Grosso, and Distrito Federal when we observe real per capita credit.

This heterogeneous cross-state context has motivated us to identify possible credit drivers.

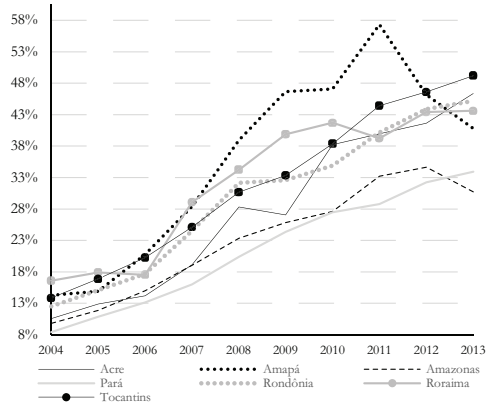
Figure 1: Brazilian household credit (per capita and as a ratio of household income), over the period from 2004 to 2013, for all Brazilian federal subnational entities.



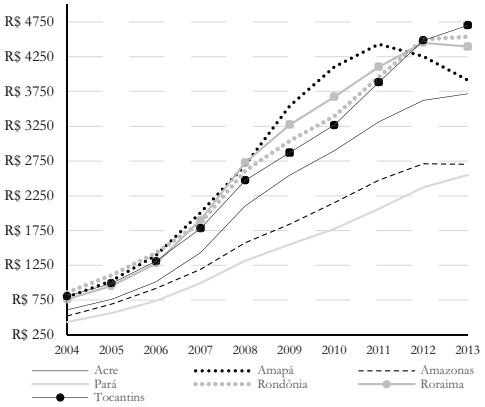
Source: Central Bank of Brazil and IPEADATA.

Figure 1: Continued from previous page.

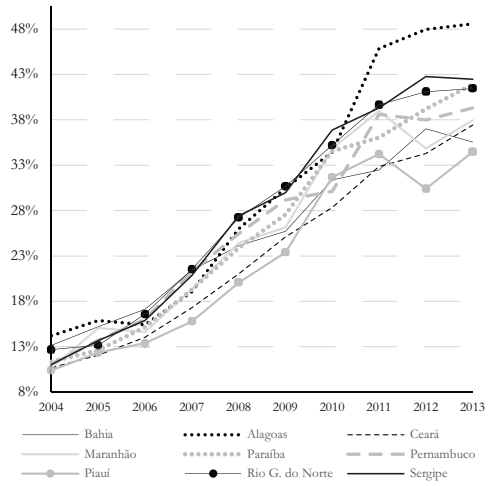
(g) North (household credit to income)



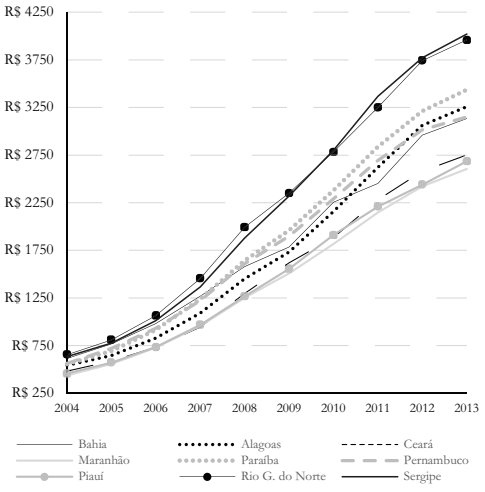
(h) North (per capita household credit R$ dec/2013)



(i) Northeast (household credit to income)



(j) Northeast (per capita household credit R$ dec/2013)



Source: Central Bank of Brazil and IPEADATA.

3. METHODOLOGY

Some recent empirical contributions to the discussion of credit drivers are Cottarelli et al. (2005), Kiss et al. (2006), Hansen and Sulla (2013) and Matos (2017). The main difference between the existing literature and our work concerns cross-section data because these studies have used cross-country panel data, while our purpose is modelling the cross-state heterogeneity in Brazil. As we have already emphasized, the key issue to be addressed here (associated with the estimation methodology) is the choice of a representative, feasible, parsimonious and observable set of exogenous variables from among a wide range of intuitive variables which may drive credit evolution in Brazilian entities.

Regarding the supply side, we can see in Brock and Suarez (2000) some possible impacts of household delinquency on credit market issues in Latin American economies, as this phenomenon spreads

and increases in volume, motivating us to use this variable in an explanatory role. According to Holmstrom and Tirole (1997), the level lending banks engage in depends positively on the quantity of bank capital. According to Bernanke and Blinder (1992), an exogenous reduction in insured deposits is accompanied by a decreased in bank lending. To measure the effect of the presence of banks and financial institutions we followed Nguyen (2014), who shows that branch closures (even in crowded markets in the United States) can have large effects on local credit supply. Finally, from the perspective defended by Alesina and Perotti (1996), highly unequal societies would create incentives for individuals to engage in activities outside the formal market, as well as discouraging socio-political instability in the accumulation of capital in view of the increased uncertainty affecting the credit market.

The demand side seems to be more complex, since some intuitive variables are latent for developing countries. According to Cottarelli et al. (2005), growth in the credit to private sector ratio was essentially driven by domestic saving flows, which suggests to using variables that capture this saving profile of families and companies. Becker (1975) states that the poor tend to save by investing in human capital, while the rich save by accumulating physical and financial assets, while according to Coudert and Pouvelle (2010) a higher level of income can be associated with a higher level of credit. In the same direction, richer families and bigger companies tend to offer better collateral sources. For the same reasons, in general, societies with more years of schooling should be able to demand more credit. Regarding the labor market, most credit programs (even in developing economies) require a minimum level of formal employment, except for some programs such as some temporary microcredit lines.

Given our purpose, we believe that the class of linear models is not adequate in which the error in each time period is assumed to be uncorrelated with the explanatory variables in the same time period because this may be a strong and unnecessary assumption. We can confront this issue and also account for the omitted variables problem by applying a balanced panel data framework, if we assume that the unobserved effect – a random variable, drawn from the population – can be treated as a time constant. Our panel model in its full and unrestricted version can be written as:

$$\begin{aligned} HC_{i,t} = \varphi_i + \varphi_H \cdot HD_{i,t} + \varphi_D \cdot BD_{i,t} + \varphi_N \cdot NB_{i,t} + \varphi_G \cdot GI_{i,t} \\ + \varphi_S \cdot SC_{i,t} + \varphi_U \cdot UN_{i,t} + \varphi_P \cdot PO_{i,t} + \varphi_I \cdot IN_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{1}$$

where the subscript i refers to each Brazilian entity, and t to each year of our sample. Here, our dependent variable is real per capita household loan volume, denoted by HC.

On the supply side, household delinquency is indicated by HD, BD refers to real per capita bank deposits, number of bank branches per 100,000 adults is given by NB and GI is Gini income inequality index. On the demand side, SC measures years of schooling, UN corresponds to unemployment rate as a percent of total labor force, PO meaning the rate of poor people, and household real per capita income is given by IN.

The nature of this unobserved effect (φ_i) and whether it will be treated as a random or fixed effect is discussed based on respective tests, whose results are considered to define our final panel estimation setup.

Regarding the properties of estimators, we do not have to care about the cases where T is of the same order as N, or where T is much larger than N because our N could be seen as sufficiently larger than T, so we can assume rough independence in the cross-section dimension. Finally, while some other econometric techniques require strong assumptions about distributions, under the panel model, we only need the stationarity of the underlying process.

4. EMPIRICAL EXERCISE

4.1. Dataset and summary statistics

In principle, all applied research working with credit, economic, social and financial variables in developing economies has to address the trade-off between T and N. For the Brazilian economy, our first

main limitation concerns the time-series, even when extracting the series from the most important economic data source – the Central Bank of Brazil and IPEADATA. We aim to have a balanced panel for all twenty-seven Brazilian federal subnational entities, so we work with main variables on a yearly frequency during the period from 2004 to 2013 (the most recent year of macroeconomic series). With regard to the endogenous variable, we have already discussed its evolution in each Brazilian entity, plotted in Figure 1. In Table 1, we observe its average values, considering the period from 2004 to 2013. It is usually believed that Brazil is a continental country and that the heterogeneity of its per capita income is not good. However, Matos et al. (2013) show that for the period from 2004 to 2009, we also see a kind of abyss in terms of credit policy created by a huge dispersion, and by the formation of two groups strongly characterized by regionalism. This regionalism showed a representative presence of states located in the Northeast and North regions that was present in the second group. This trend remains true until 2013, according to the first column in Table 1.

In the Northeast region, credit values range from approximately R$ 1,440.00 to R$ 2,210.00; this upper bound is less than half the volume observed in Paraná – the lower bound in the South region. We can also show that the wealthiest regions (the South and Southeast) are upwards of three orders of magnitude larger than the values presented by regions with lower per capita credit, such as the Northeast. In the North, values are higher than R$ 2,000.00 for all states, with the exception of Pará and Amazonas. In the Midwest and Southeast, there is an intraregional homogeneity with some outlier behaviors due to the presence of São Paulo and Distrito Federal.

Concerning all exogenous variables used here, we report their average values in Table 1. Since we aim to model the evolution of household credit in Brazil, our explanatory variables should be able to measure its oscillation among Brazilian entities and along the time series, considering idiosyncratic Brazilian issues related to the financial system, human capital, the labor market, poverty and income distribution.

We observe that, in addition to having higher values for per capita credit, the South and Southeast regions also display better or more comfortable values for most exogenous variables, corroborating what Brazilian economists used to say: "there are two nations in the same territory". On the supply side, we can see that in the second column in Table 1, in accordance with previous publications of the Central Bank of Brazil, there are apparent similarities and convergence patterns among entities located in the same region. However, in the South, loan delinquency ranges between 3% and 5%, in the Northeast (with the exceptions of Sergipe, Rio Grande do Norte and Paraíba) loan delinquency is greater than 6.8%. In the Southeast, Rio de Janeiro is dispersed across the other ones, whose patterns are very similar to each other.

With regard to the ratio of the number of branches per 100,000 habitants, the disparity again takes place in a regional context, where Maranhão acts as the lower bound in terms of perception of the banking system, with a rate almost four times less than that of São Paulo. In the Northeast and North regions families and companies may have difficulty accessing the banking sector because there are 5.5 agencies per 100,000 inhabitants, while in other regions, this ratio is closer to or above 10 per 100,000 inhabitants. In the South, this variable has an average close to 14 per 100,000 inhabitants.

We also take into account the total value of demand, time and savings deposits at domestic money deposit banks – commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. This variable ranges from about R$ 300 in Piauí to more than R$ 22,260 in Distrito Federal.

Heterogeneity remains even if we limit ourselves to an intraregional analysis, with São Paulo showing a volume of per capita deposits close to four times that of Minas Gerais.

Finally, looking at the levels of Gini index we can see a cross regional oscillation, so that the Northeastern and Northern states, as well as Distrito Federal, have higher values, but with a lower dispersion if we compare them with poverty levels for all entities.

On the demand side, while states in regions of the Midwest, Southeast and South have rates of poverty ranging between 5.6% and 11.7%; other regions present astounding numbers such as 40.6% in

Table 1: Average values of the variables over the period from 2004 to 2013, for all Brazilian federal subnational entities.

	Endogenous variable	Supply side					Demand side		
	Household real per capita loan volume (R$ dec/2013)	Household loan delinquency rate (%)	Number of Bank Branches per 100,000 habitants	Real per capita bank deposit (R$ dec/2013)	Gini inequality index	Years of schooling	Unemployment rate as a percent of total labor force (%)	Poverty (%)	Household real per capita income (R$ dec/2013)
	Source: Central Bank of Brazil	Source: Central Bank of Brazil	Source: Central Bank of Brazil	Source: Central Bank of Brazil	Source: IPEADATA	Source: IPEADATA	Source: IPEADATA	Source: IPEADATA	Source: IPEADATA
Northeast region									
Alagoas	1,739.21	6.812	4.565	532.02	0.564	4.939	10.565	39.898	5,643.36
Bahia	1,779.73	7.282	5.874	865.93	0.554	5.691	10.585	32.596	6,783.93
Ceará	1,515.86	6.925	4.755	1,786.78	0.547	5.667	7.666	33.149	6,265.49
Maranhão	1,442.51	7.966	4.056	325.07	0.560	5.261	7.990	40.596	5,433.31
Paraíba	1,887.03	5.849	5.180	519.05	0.566	5.528	9.124	33.051	6,953.80
Pernambuco	1,809.52	7.671	5.862	1,089.94	0.555	6.059	11.330	35.062	6,670.69
Piauí	1,479.59	7.122	4.138	302.23	0.563	5.054	5.945	36.406	6,345.89
Rio Grande do Norte	2,206.08	5.880	5.179	759.77	0.559	6.014	10.199	29.580	7,577.43
Sergipe	2,194.71	5.963	8.373	1,306.01	0.556	6.135	10.266	29.462	7,492.07
North region									
Acre	2,201.63	5.029	5.791	690.54	0.572	6.254	8.217	30.164	7,740.09
Amapá	2,815.85	6.033	5.104	402.96	0.515	7.686	12.861	26.056	7,725.02
Amazonas	1,677.00	6.752	4.716	801.90	0.529	7.230	10.757	28.591	7,095.44
Pará	1,434.96	6.117	4.500	566.40	0.516	6.126	8.961	30.110	6,520.81
Rondônia	2,729.49	4.809	6.655	825.90	0.511	5.193	6.930	20.345	8,893.13
Roraima	2,751.49	7.032	5.270	660.77	0.541	7.318	10.382	27.293	8,083.83
Tocantins	2,656.44	5.269	6.123	526.20	0.533	6.340	6.899	25.023	7,971.95
Midwest region									
Distrito Federal	7,993.85	4.632	13.277	22,260.47	0.605	9.462	10.795	10.660	21,521.44
Goiás	4,558.85	4.942	10.329	955.69	0.510	6.938	7.105	10.043	10,699.47
Mato Grosso	6,593.70	4.821	9.988	1,175.50	0.515	6.810	6.967	10.789	10,661.08
Mato Grosso do Sul	5,157.57	3.718	9.242	995.21	0.523	6.964	6.542	9.729	11,351.56
Southest region									
Espírito Santo	3,202.58	4.495	10.848	2,341.72	0.523	7.153	7.869	10.272	10,755.52
Minas Gerais	3,080.62	4.496	9.864	1,951.89	0.514	6.768	7.707	10.438	10,347.20
Rio de Janeiro	3,522.25	6.568	11.384	3,928.09	0.543	8.223	9.684	11.653	13,780.25
São Paulo	4,515.72	4.921	15.059	8,501.05	0.505	8.121	8.880	9.092	14,176.02
South region									
Paraná	4,619.82	3.860	12.756	4,084.51	0.504	7.346	5.906	10.582	12,524.44
Rio Grande do Sul	4,757.91	3.590	14.046	3,170.53	0.500	7.326	6.070	10.703	13,052.96
Santa Catarina	4,770.15	3.736	14.347	2,052.12	0.452	7.610	4.046	5.660	13,884.43

Maranhão or 39.9% in Alagoas. Following Barro and Lee (2013) suggestion for human capital, we use years of schooling, and according to Table 1, the Northeast region shows us the lowest values, ranging from 4.9 to 6.1. However, the average value for the South region is higher than 7.4 years.

With few exceptions (such as Piauí), unemployment levels in the Northeast region are quite higher than those registered in the South region. Observing the Midwest region's behavior as suggested by other variables, we can characterize it as a type of intermediate region geographically as well as statistically. The exception again is Distrito Federal, which has a very high unemployment rate comparable to the Northeast region. Regarding per capita income, except for São Paulo in the Southeast region and Distrito Federal in the Midwest region we observe an intraregional homogeneity among the average values. As seen with credit, the values displayed by the South and Southeast regions for per capita income range from 2 to 3 times the values registered in the North and Northeast regions.

4.2. Main results and discussion

First, as a type of preliminary test we can see that all variables are stationary at 1%, except for the number of bank branches and bank deposits, according to Table 2. To address this issue, we work with these series in level and also in first difference (stationary series) to see the robustness of our results.

Table 2: Unit Root Panel Test^{a,b}.

Supply side			
Household loan delinquency rate	Number of Bank Branches per 100,000 adults	Real per capita bank deposit	Gini inequality index
-13.0776**	1.2576	-0.4136	-19.6156**
[0.0000]	[0.8957]	[0.3396]	[0.0000]
Demand side			
Years of schooling	Unemployment rate as a percent of total labor force	Poverty	Household real per capita income
-6.7488**	-3.8082**	-8.5309**	-9.6995**
[0.0000]	[0.0001]	[0.0000]	[0.0000]
Endogenous			
Household real per capita loan volume			
-2.5147**			
[0.0060]			

Note: ^{a} Levin et al. (2002) panel unit common root test with intercept, over the period from 2004 to 2013. ^{b}Respective p-values are reported in the box brackets.Indicates the rejection of nonstationary hypothesis at 5% level.*Indicates the rejection of nonstationary hypothesis at 1% level.

Concerning the setup, according to Table 3 we must treat unobserved effect φ_i as a fixed effect based on the rejection of the Hausman (1978) test, and because we are working with all Brazilian entities. To

be robust to heteroskedasticity, we conduct our statistical inferences using the White cross-section covariance coefficients method. See Wooldridge (2002) for a further discussion about our estimation setup.

Our main results are also reported in Table 3. We adopt an empirical strategy aiming to exploit the lack of a microfundamented model by performing a type of backward procedure, estimating from an unrestricted (full) version to a better-specified one. In detail, this backward procedure suggests that the best fitting version is the one with the highest value for the power of explanation considering all possible combinations of all variables (i.e. all eight variables, then combinations considering only seven variables, then combinations considering only six variables, and so on). We also estimate restricted versions, taking into account only one side, demand or supply, to explain the levels of equilibrium of Brazilian household credit.

The results of the unrestricted specification in the first column of Table 3 show some instances of individual insignificance in supply side variables and unemployment. The results of one-sided versions (second and third columns of Table 3) show that observing only demand or supply variables does not seem to be an adequate solution because some individual insignificance or even explanatory power, mainly in the supply-side model.

We provide our final conclusive evidence based on the better-specified version (fourth column of Table 3), where all parameters are individually significant at 1%. It is nontrivial that financial system variables do not seem to be relevant in this final specification. As one could expect theoretically, for the supply side our evidence corroborates Alesina and Perotti (1996), since highly unequal societies could affect the credit market. Regarding the demand side, we are aligned with Coudert and Pouvelle (2010) when we show that a higher level of income can be associated with a higher level of credit.

We can also show a positive and significant relation between household credit and human capital measured by years of schooling; at the same time, our results suggest that poorer individuals tend to obtain more loans in Brazil. These results are qualitatively robust, using the number of bank branches and bank deposits in level or in first difference. Both variables are not relevant in our better specified version.

Our final conclusive evidence is based on the F-statistic and our adjusted R^2, which is higher than 95%. This leads us to believe that we have offered an evidence about the overall fit of the model proposed; thus we are able to suggest some feasible policies.

Table 3: Full Model Panel Estimation[a,b,c,d].

	Unrestriced model	Restricted models		Better specified model
		Supply side	Demand side	
Constant	-5.132e-03*	1.212e-05**	-1.318e-05**	-4.777e-04*
	[0.036]	[0.001]	[0.000]	[0.030]
Supply side				
Household loan delinquency rate	0.777	-45.671		
	[0.975]	[0.514]		
Number of Bank Branches per 100,000 adults	108.861	413.565*		
	[0.058]	[0.026]		
Real per capita bank deposit	0.116		0.657**	
	[0.259]	[0.000]		
Gini inequality index	-1.573e-04**	-2.540e-05**		-1.633e-05**
	[0.000]	[0.000]		[0.000]
Demand side				
Years of schooling	803.728**		1.064 e-03**	866.906**
	[0.006]		[0.000]	[0.003]
Unemployment rate as a percent of total labor force	6.142		-18.195	
	[0.844]		[0.581]	
Poverty	86.883**		54.496**	90.995**
	[0.000]		[0.000]	[0.000]
Household real per capita income	0.862**		0.860**	0.931**
	[0.000]		[0.000]	[0.000]
Complementary results				
Adjusted R^2	95.646%	79.622%	93.765%	95.324%
F-statistic	174.819	36.034	135.852	183.772
	[0.000]	[0.000]	[0.000]	[0.000]
Hausmant test	144.035	66.899	139.417	144.900
	[0.000]	[0.000]	[0.000]	[0.000]

Note: [a]Panel estimation results based on estimation over the period from 2004 to 2013, for all twenty-seven Brazilian federal subnational entities. [b]We specify the White cross-section covariance coefficients method, to get robustness to heteroskedasticity. [c]We take into account for fixed effects, as suggested by the rejection of the H0 of the Hausman (1978) test and because we use all Brazilian entities. [d]Respective p-values are reported in the box brackets. *Indicates the rejection of individually insignificant parameter hypothesis at 5% level. **Indicates the rejection of individually insignificant parameter hypothesis at 1% level.

5. CONCLUSION

In practice, our evidence indicates that household characteristics, mainly their levels of human capital and income, are relevant by providing society more equal access to the financial system as growth catalyzer. The evidence as to whether poverty in the states motivates acquisition of household credit through programs such as Microcredit (developed by Bank of Northeast) shows the relevance of this type of initiative, as does the rapidly growing market share held by such types of credit and payroll loans among households.

Theoretically, we know that a definite answer must be the consequence of a microfundamented model, which has yet to be written or tested – and we have certainly not found it. However, our evidence can work as a starting point for this consumption-based model because the omission of relevant variables can be a source of standard models' inability to address credit patterns in Brazil. We recognize that our approach requires further generality, in the sense that this exercise could be performed on a longer spanning time-series, based on more disaggregated data, as cross-city panel data, or taking into account cross-effects due to contagion in the region, as evidenced by Viale et al. (2014) for Mercosur. We also recognize that further progress should require use of primary source data based on questionnaires. Another possible extension would be to examine household credit by type of credit.

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