

Household credit bubble in Brazil: The unbearable lightness of having

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Abstract

We analyze the solvency scenario for Brazilian household credit by using an extended version of the fiscal reaction approach. This model enables us to assess the impact of credit risk proxies. We take into account disaggregated credit for different sources of financing. Our results suggest that non-earmarked and total household credit are insolvent based on negative causality from debt-to-GDP to surplus between amortization and granting of credit as a proportion of GDP.

Keywords: Fiscal reaction approach; Solvency; Brazilian household credit

JEL Codes: D14; E51; H63

1. Introduction

In the early 90's Latin American economies have experimented a financial liberalization by moving toward an open and market-based development model instead of a state-based model. The context of this change is well described in Stallings and Studart (2006), while Matos (2017) empirically adds to discussion about its drivers. In this heterogeneous group comprised by twenty emerging countries, the specific case of Brazil is very interesting because of its idiosyncrasies.

First, referring to income, Brazilian economists used to say: “there are two nations in the same territory”. However, according to Matos et al. (2013) there is also a discriminatory credit policy evidenced by the formation of two clubs characterized by a regional bias: states located in the Northeast and the North regions are predominantly in the second club. Matos and Correia (2017) study this cross-state heterogeneity and find that the demand for credit plays a more important role than supply from 2004 to 2013. This evidence corroborates De Jesus Filho and Matos' (2017) previous finding based on a disequilibrium model, which identified shortages in this credit market from 2000 to 2009.

Second, although the austerity policy adopted in the 90's is held in check by the deepest economic and political crisis in Brazil's recent democratic history,¹ the government has stimulated household debt growth, without concerning to the level of human capital, profile of default or even employment status. Counterintuitively, household credit is reaching high levels even as loan interest rates are high; for the first time, household credit has exceeded firm credit. During the last decade the trajectories of household debt-to-cumulative income ratio, income commitment to pay loan rates and income commitment to amortization are very worrying.

Third, one can emphasize the disturbing evidence reported in Matos et al. (2015) about Brazilian household loan delinquency, which is driven by poverty and unemployment; and precisely in Northeast region, in states such as Alagoas and Rio Grande do Norte unemployment rates are systematically higher than 12%, while the percentage of the poor population remains higher than 25% in Maranhão and Alagoas for more than twenty years. One can summarize Brazilian household credit market as heterogeneous, apparently inconsequential and driven by demand variables. In this scenario, we are convinced that it is worthwhile to broaden this discussion by modeling household credit solvency. More specifically we are aligned with Elekdag and Wu (2013) and Hansen and Sulla (2013), aiming to evidence if Brazil's recent economic conditions are consistent with sustainable financial development. In other words: should we be worried about a possible Brazilian household credit bubble? Otherwise, this recent excessive credit growth and its cycles are due to patterns of bank funding sources and to improvement of demand fundamentals.

Methodologically, building on Bohn's (2007) fiscal reaction function, we propose for the first time an approach which enables us to infer about the solvency of Brazilian household credit disaggregated by source of financial resources: non-earmarked, earmarked and total. This framework has been widely used in the empirical literature of public finance in Brazil, such as Matos, Simonassi and Pinto (2013), for instance. We provide an empirical exercise from April 2011 to August 2017 based on our innovative extended version which enables us to measure the causality from debt-to-GDP to surplus between amortization and granting of credit as a proportion of GDP, besides the role played by relevant credit risk proxies: the percentage of credit portfolio with arrears, the delinquency rate and the average term of new operations.

This letter is structured as follows. In the next section, we discuss about Brazilian credit market conjuncture, while in the third section we describe our methodology and report the empirical exercise results. Final considerations are presented in the fourth section.

¹ For more details on the recent fiscal and monetary policies in Brazil, see Afonso, Araújo and Fajardo (2016).

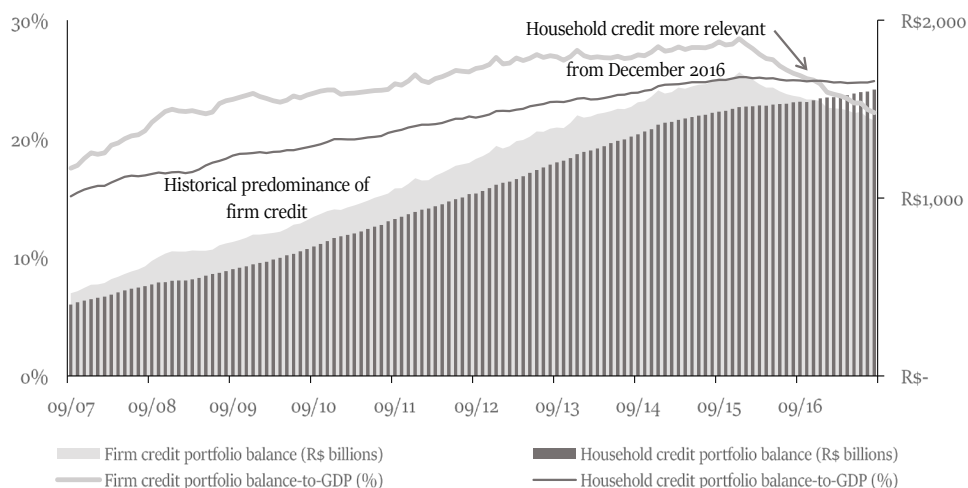
2. Brazilian Credit Market

According to the World Bank dataset, the growth rate of Brazilian credit-to-GDP ratio from 2004 to 2011 was 11.4%, one of the highest rates worldwide. The average percentage of credit-to-GDP in Brazil during this period was approximately 39%, the third ranked value in a sample comprised by Latin American economies.

Separating Brazilian credit market into households and firms, we are able to show the predominant role of new operations in the productive sector during the period from September 2007 to November 2016. Firm credit share reached its highest value in December 2008, equivalent to 56.57% of the total credit balance in Brazil, while in December 2015 firm credit-to-GDP rose to 28.45%. However, accounting for historical time series, only recently, in December 2016, household credit has played for the first time, the most important role in the Brazilian financial system. According to the database of the Central Bank of Brazil (CBB), in August 2017, household credit reached 52.85% of the total credit balance in the country, which corresponds to 25% of GDP. Over the whole last decade, household credit has grown at an average monthly rate of 1.17%, while firm credit has grown at a monthly rate of 0.95%.

Most strikingly, while firm credit has displayed a strong downward trend in 2016, with an average rate of -0.86% per month, household credit has continued to grow, even after November 2016, a politically turbulent period in Brazil. Household credit grew even during the subprime crisis in 2007 and 2008, according to Figure 1.

Figure 1. Evolution of firm and household credit in Brazil during the last decade.



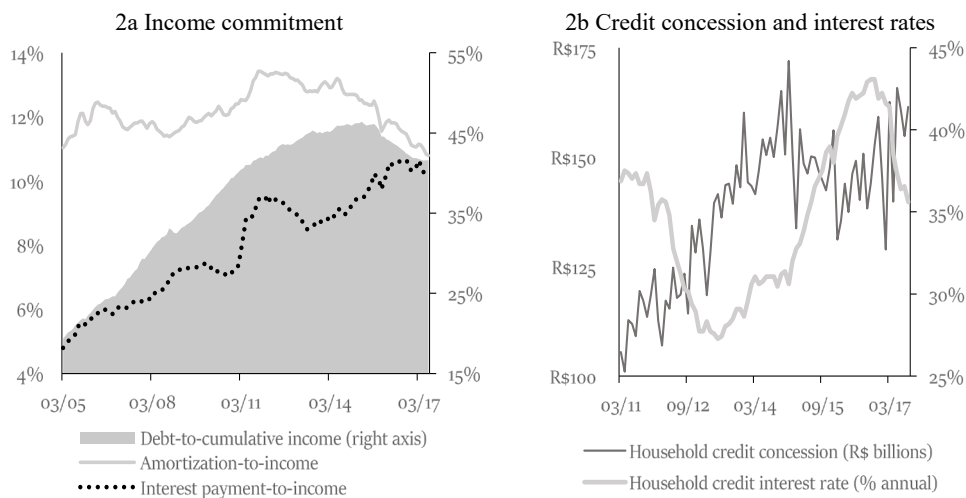
Source: Central Bank of Brazil.

Regardless of the benefits due to firm or household credit, we need to better understand the drivers of Brazilian households, its role in the financial market and if its evolution is (or not) worrying. Figure 2 is useful for this last purpose.

According to Figure 2a, household amortization-to-income ranges from 10.5% to 13.5% during the period from March 2005 to July 2017, displaying a downward trend from mid-2014, a path that should not raise concerns. However, we can evidence a robust growth of the income commitment that accounts for loan interest rates. The difference between amortization-to-income and interest payment-to-income, which was already higher than 6% at the beginning of the sample period, is lower than 0.8% at the end of the sample period. It is still very troublesome the growth of debt-to-cumulative income, rising from almost 20% in March 2005 to more than 46% in April 2015. In the last two years, this ratio has dropped and is currently 41.6%.

Figure 2b shows that while household credit concession has grown until June 2013 in an environment characterized by a strong reduction in loan rates, during the last four years, household credit has risen, with more volatility and along with growth in loan rate. This concession has risen from R\$ 136 billion in June 2013 to R\$ 159 in December 2016, due to excessive demand, while loan rates have increased from 27.4% to 41.9% during the same period.

Figure 2. Brazilian household credit.



Source: Central Bank of Brazil.

3. Empirical exercise

Our exercise adds to the findings on Brazilian household credit. In principle, the applied research studying credit and economic 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, since most of the credit variables are only available from March 2011.

We propose and estimate here an extended version of fiscal reaction, most recently described in Bohn (2007), which enables us to model household credit solvency taking into account for different financing sources: non-earmarked, earmarked and total resources. This is one of the most commonly used approaches to model the sustainability of government debts, based on budgetary intertemporal constraint and the impossibility of infinite debt rollover.

We are able to propose an adaptation of the model originally designed for government debt, which incorporates *i*) household reaction in terms of surplus between amortization-to-GDP and concession-to-GDP in time t due to changes of debt-to-GDP in time $t - 1$, *ii*) the respective cycles and *iii*) the impact of proxies of credit risk measured by the percentage of credit portfolio in arrears, delinquency and average term of new operations. This framework is given by:

$$\frac{Amo_{i,t}}{GDP_{i,t}} - \frac{Con_{i,t}}{GDP_{i,t}} = \alpha + \varphi_I \frac{Int_{i,t-1}}{GDP_{i,t-1}} + \varphi_A \frac{\widetilde{Amo}_{i,t}}{GDP_{i,t}} + \varphi_C \frac{\widetilde{Con}_{i,t}}{GDP_{i,t}} + \varphi_P Arr_{i,t-1} + \varphi_D Deli_{i,t-1} + \varphi_T Ter_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

In this model, $\frac{Amo_{i,t}}{GDP_{i,t}}$ is the amortization-to-GDP in time t for resource i , which can be earmarked, non-earmarked or total. This notation is useful for estimating an equation for each household credit segment, whose difference is the resource. For the other terms, $\frac{Con_{i,t}}{GDP_{i,t}}$

is concession-to-GDP in time t for resource i , $\frac{Int_{i,t-1}}{GDP_{i,t-1}}$ is debt-to-GDP in time $t - 1$ for resource i , while $\frac{\widetilde{Amo}_{i,t}}{GDP_{i,t}}$ and $\frac{\widetilde{Con}_{i,t}}{GDP_{i,t}}$ denote the respective cycles extracted from Hodrick-Prescot filter ($\delta = 14400$). This characterization corresponds to the default approach suggested in Bohn (2007).

We also estimate this version, but we report and make our main considerations based on the extended version, which incorporates the effects of the percentage of credit portfolio with arrears, $Arr_{i,t-1}$, delinquency rate, $Deli_{i,t-1}$, and the average term of new operations, $Ter_{i,t-1}$, all in time $t - 1$ for resource i .

As usual, we perform some preliminary testes about stationarity of our main variables, besides the cointegration test involving amortization-to-GDP and concession-to-GDP for each financing source. According to the results reported in Table 1, it seems that we do not care about spurious results in estimation. Our endogenous variables are stationary and then they do not cointegrate based on trace test.

Table 1. Preliminary results (Period: from April 2011 to August 2017)

Stationarity test ^a	Brazilian Household Credit		
	Nonearmarked resources credit	Earmarked resources credit	Total credit
Amortization-to-GDP in t	-9.31343 ** [0.0000]	-4.61515 ** [0.0003]	-7.85953 ** [0.0000]
Concession-to-GDP in t	-6.18084 ** [0.0000]	-3.81226 ** [0.0042]	-5.26553 ** [0.0000]
Cointegration test ^b			
Amortization-to-GDP and Concession-to-GDP in t	0.15116 [0.0684]	0.12976 [0.2003]	0.14900 [0.1146]

^a Phillips & Perron (1988) test with intercept, whose null hypothesis is presence of unit root. ^b Johansen (1991) trace test with intercept, whose null hypothesis is cointegration. Eigenvalue and respective p-value reported taking into account for none cointegration vector. P-values reported in brackets. * p-value < 0.05
** p-value < 0.01

Our main results are reported in Table 2. The results suggest – as expected for this framework – that the difference between amortization and new concession reacts positively to contemporaneous amortization cycles and negatively to concession cycles. The most important results are associated with the parameter φ_I that measures the sensitivity of household reaction to the previous variation in the debt-to-GDP. In this case, the null hypothesis of the solvency of the segment of credit is not rejected when this parameter is statistically non-zero and positive, indicating a household austerity reaction in time t , after an increase in the household debt in time $t - 1$. This parameter is significant in all credit modalities, but the sustainability of household credit is rejected at 1% with both non-earmarked and total resources.

This evidence is corroborated based on the estimation of the same approach however taking into account for real credit variables, instead of their ratios to GDP.

Table 2. Household credit solvency (Period: from April 2011 to August 2017) ^a

Estimation		Brazilian Household Credit		
Variable	Parameter	No-nearmarked credit	Earmarked credit	Total credit
Constant	α	0.01335 ** [0.0002]	-0.00299 ** [0.0010]	0.00595 [0.2217]
Debt-to-GDP in $t-1$	φ_1	-0.00117 ** [0.0000]	0.00038 ** [0.0000]	-0.00092 ** [0.0004]
Amortization-to-GDP cycles in t	φ_A	1.09723 ** [0.0000]	0.96321 ** [0.0000]	1.09055 ** [0.0000]
Concession-to-GDP cycles in t	φ_C	-1.11610 ** [0.0000]	-1.11974 ** [0.0000]	-1.10972 ** [0.0000]
Percentage of credit portfolio with arrears in $t-1$	φ_P	-8.88 e-5 [0.2674]	0.00035 ** [0.0000]	0.00108 ** [0.0000]
Delinquency rate in $t-1$	φ_D	0.00024 ** [0.0001]	0.00031 [0.2091]	-0.00036 [0.2571]
Average term of credit concession in $t-1$	φ_T	0.00012 ** [0.0001]	-1.71 e-5 ** [0.0001]	0.00010 ** [0.0000]
Complementary results				
Adjusted R ²		0.98283	0.95441	0.96368
Wald test (p-value)		24.4282 **	54.1468 **	116.6941 **
$H_0: \varphi_P=\varphi_D=\varphi_T=0$		[0.0000]	[0.0000]	[0.0000]
Wald test (p-value) H_0 :		716.4285 **	262.7021 **	332.6972 **
All parameters are null		[0.0000]	[0.0000]	[0.0000]

^a Difference between amortization-to-GDP and concession-to-GDP (both in t) as a dependent variable, according to equation (1). P-values reported in brackets. * p-value < 0.05 ** p-value < 0.01

When one pays attention to the composition of total credit, in terms of the new operations, non-earmarked credit ranges between 84% and 92% of the total household credit concessions. However, its influence in terms of total portfolio balance is lower and has a smooth downward trend, decreasing from 70% of the total credit concessions in April 2011

to 51% in August 2017. Since non-earmarked credit still has a larger share in total credit than earmarked credit and has a greater elasticity (in absolute value), -0.00117 compared to 0.00038 , which is three times larger, total household credit also seems to be explosive. The individual and joint significance of the credit risk proxies used in the extended fiscal reaction model highlight the longer-term effect of the new operations by stimulating both total credit and non-earmarked credit in the direction of household austerity. The delinquency rate seems to have a positive effect on austerity in terms of non-earmarked credit, while the portfolio with arrears is important only for total credit austerity.

4. Conclusions

Earmarked household credit in Brazil is mainly used for rural credit (1/3) and real estate financing (2/3), while non-earmarked credit is characterized by non-payroll loans, credit cards, overdraft, vehicles and other types of credit that are generally associated with the consumption of non-durable goods, semi-durable goods and services, which although relevant, are negligible and in many cases unnecessary. This type of credit, whose interest rates are on average six times higher than the interest rate charged on earmarked loans, has a higher delinquency rate and its credit cost index (measured by CBB) is five times the same index for earmarked credit. We claim here that this household credit should not be stimulated by the government as a means of increasing social welfare unless accompanied by an improvement in social, economic, labor market and human capital indicators. Otherwise, this might be the next bubble to be blown.

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