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Abstract

Brazil experienced one of the most severe recessions in its history from 2014 to 2016. Following a pattern shown for previous economic downturns in other countries, the Brazilian recession was preceded by a substantial increase in household debt from 2003 to 2014. This study utilizes a novel individual level data set on household borrowing in order to provide details of the household debt boom. The data set allows for a decomposition of the rise in household debt by the type of debt and by the source of debt, and it allows for an analysis of the income of individuals taking on more debt during the boom. We conclude with an exploration of potential causes of the rise in household debt.

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I Introduction

Brazil experienced a substantial rise in household debt from 2003 to 2014, followed by a severe recession. This chapter explores the rise in Brazilian household debt using novel credit registry data from the Central Bank of Brazil.

Brazil is an interesting case study given broader trends in the world economy over the past 40 years. For example, research demonstrates a robust relationship between expansions in household debt and subsequent downturns (e.g., Mian et al. 2017; IMF (2017); Drehmann et al. 2018). Aggregate data show that the 2003 to 2016 Brazilian economic cycle fits this pattern.

Furthermore, emerging markets in particular have experienced a large rise in the use of household credit in recent history. Bahadir and Gumus (2016) show a large rise in the household debt to GDP ratio in a number of emerging economies from 1993 to 2014, with Thailand, Brazil, Turkey, and Korea showing especially large increases. Muller (2017) shows that household credit as a fraction of GDP in emerging economies has increased by 15 percentage points from 1980 to 2014, while corporate credit to GDP ratios has remained relatively flat.

Brazil also represents an interesting setting because of the nature of the economic expansion from 2005 to 2014. During this expansion, there were a variety of programs instituted to help increase living standards and income, especially among lower income Brazilians. As part of this effort, a number of legal reforms of the financial system and government programs targeting the poor increased the availability of credit to a large fraction of the Brazilian population.[1]

The goal of this chapter is to characterize the household debt cycle in Brazil from 2003 to 2016 using individual-level credit registry data from the Central Bank of Brazil. Researchers have increasingly relied on such credit registries in many countries. However, most registries used in research cover business loans. In contrast, the data set examined here covers the universe of loans made to households in Brazil. This chapter showcases this data set by exploring basic facts about the large rise in household debt in Brazil.

In particular, what type of debt drove the credit boom? Who were the main lenders? How did borrowing vary across the income distribution? These questions cannot be answered using aggregate data; the credit registry data are uniquely positioned to help answer these questions. We hope this exercise is useful to researchers more broadly, as we anticipate that household credit registries will become available to researchers in other countries over time.

The first main result presented uses aggregate data to show that the Brazilian experi-

[1] Brazil introduced legal changes to facilitate repossession of collateral by financial institutions ("Lei de Alienação Fiduciária"), a new bankruptcy law, and a new law on payroll lending. Government programs targeting low-income households include "Bolsa Familia" – a major conditional cash transfer program for education – and "Minha Casa Minha Vida" – which subsidizes house buying.

ence from 2003 to 2016 was quite typical of previous expansions in household debt in other countries as illustrated by Mian et al. (2017). In particular, there appears to have been a large expansion in household debt, most likely driven by credit supply factors, followed by a severe recession. Second, we explore the characteristics of the household debt boom, highlighting the shift in 2011 in which government-owned banks began lending quite aggressively relative to the private banking sectors. In this sense, the Brazilian experience is similar to the one of China, where the banking sector – mostly under state-control – fueled a large credit boom in the aftermath of the global financial crisis (Cong, Gao, Ponticelli, and Yang 2017). And third, we show that the credit expansion was associated with a substantial increase in access to lending for lower income Brazilians.

The final section of the chapter examines potential causes of the rise in household debt, highlighting the importance of the macroeconomic context, institutional reforms, government programs, and international capital flows. We note from the outset however that our goal is not to pin down the exact cause of the debt expansion, which we believe is a fruitful avenue for future research.

II Aggregate View

In 2015 and 2016, Brazil experienced its most severe recession on record since the early 1980s; GDP contracted in eight straight quarters during this time period.[2] Figure I shows annual real GDP growth from 1996 to 2016, and the magnitude of the recession is evident. The recession was marked with a sizable decline in consumption, which is shown in the right panel of Figure I. The decline in consumption in 2015 and 2016 is significantly larger than in any other year going back to 1996.[3]

What caused the recession? The search for causes of severe economic downturns is a bit like the search for the Holy Grail in macroeconomics, and this chapter is not intended to answer this question definitively. However, the Brazilian economic cycle from 2003 to 2016 followed closely the pattern seen in many historical episodes involving a large increase in household debt (Mian et al. 2017, 2018).

The left panel of Figure II shows the large increase in the household debt to GDP ratio of Brazil from 2005 to 2014. The ratio increased from 0.10 to 0.25 in 10 years. To put this into perspective, the rise in the household debt to GDP ratio in Greece and Spain from 2004 to 2007 was about 0.20, and the rise in the household debt to GDP ratio for the United Kingdom from 1986 to 1989 was about 0.10. The household debt boom in Brazil lasted longer than the typical three to five years shown in Mian et al. (2017). This is

[2]The aggregate data used in this subsection are from standard sources. Namely, national accounts data is from the World Bank's World Development Indicators database, household debt data is from the BIS dataset on Credit to the non-financial sector, and information on sectoral employment is from RAIS, the employer-employee dataset of the Brazilian Ministry of Labor.

[3]Differently from the US subprime mortgage crisis, however, the 2015-2016 recession in Brazil was not characterized by a sharp increase in default rates on household debt.

likely due to a substantial acceleration in lending by public banks in 2011, a phenomenon which is discussed in detail below.

Mian et al. (2017) use a sample of 30 countries over the past 40 years to show that a rise in the household debt to GDP ratio from year $t-4$ to year $t-1$ predicts a decline in economic growth from year t to year $t+3$. Brazil is not in the sample used in their study, and so an evaluation of Brazil provides an out-of-sample test of the predictive relationship. The right panel of Figure II presents the scatter-plot that corresponds to the specification reported in Mian et al. (2017) using data from Brazil from 1996 to 2016:

$$\Delta_3 y_{t+3} = \alpha + \beta_{HH} \Delta_3 d_{t-1}^{HH} + \epsilon_t, \tag{1}$$

where $\Delta_3 d_{t-1}^{HH}$ is the change in the household debt to GDP ratio from four years ago to last year, and $\Delta_3 y_{t+3}$ is the log change in real GDP from this year to three years forward.

As the right panel of Figure II shows, there is a negative relationship in the short time series of data for Brazil. In particular, the sharp economic downturn was preceded by a large rise in household debt. The plot point for 2013 implies that a rise in household debt from 2009 to 2012 of five percentage points was associated with a decline in real GDP growth from 2013 to 2016 of more than five percentage points.

The estimate of β_{HH} in this small sample is -0.85 with a p-value of 0.11. The estimate of β_{HH} in Mian et al. (2017) is -0.33 with a p-value below 0.01. Given the extremely small sample, it is perhaps not surprising that the estimate for Brazil is less precise. However, it is larger in magnitude than the Mian et al. (2017) estimate. Interestingly, compared to the timing in Mian et al. (2017), the relationship between the build-up of household debt and the subsequent recession in Brazil was slightly longer. For example, replacing $\Delta_3 y_{t+3}$ with $\Delta_3 y_{t+5}$ in the specification above yields a coefficient estimate of -1.00 with a p-value of 0.004. The typical household debt boom in the Mian et al. (2017) sample is three to five years. But as already mentioned above, Brazil experienced a significant rise in household debt for eight years before the recession.

Despite the difference in timing, there are a number of similarities between the household debt boom in Brazil and the general patterns found across other countries in other time periods in Mian et al. (2017) and Mian et al. (2018). For example, the period prior to the recession was characterized by a substantial growth in consumption, as shown in the right panel of Figure I. The current account deficit also increased substantially in size, especially late in the economic cycle, as shown in Figure III.

Finally, the expansion in the Brazilian economy from 2005 to 2014 was associated with a large rise in employment in the construction and non-tradable sector. The ratio of employment in these sectors relative to employment in the tradable sector increased substantially from 2007 to 2014, as shown in Figure IV. Mian et al. (2018) use a sample of

56 countries going back to the 1960a and show that household debt booms are commonly associated with a rise in the non-tradable to tradable employment ratio, which they interpret as evidence that credit booms tend to operate by boosting household demand as opposed to firm productivity. The Brazilian experience follows this pattern.

III Novel Data Set on Brazilian Household Debt

The aggregate patterns shown above suggest an important role of household debt in the Brazilian economic cycle of 2003 to 2016. To investigate this further, this chapter introduces a novel data set covering Brazilian household debt at the individual level.

This novel dataset is sourced from the Credit Information System of the Central Bank of Brazil, which was launched in 2003. The Credit Information System records detailed information on credit relationships between individuals and Brazilian banks.[4] The data is transmitted monthly from financial institutions to the Central Bank of Brazil, and covers all credit relationships of individuals that have a total exposure with a financial institution above a given reporting threshold.[5] In the period between 2003 and 2016, the Credit Information System contained information on around 117 million unique individuals. In an effort led by the Research Department of the Central Bank of Brazil, we extracted a random sample of 15 million individuals – 12.8% of all those ever to appear in the Credit Information System in this period – along with all their transactions recorded in the dataset.[6]

Figure V shows the number of individual clients reported in the Credit Information System as a whole (solid black line) and in the extracted sample (dashed black line). In the same Figure we also report the number of clients in the sample scaled by a factor of 117/15 for comparability with population totals (dashed red line).[7] As shown, there are two breaks in the time series of number of clients, which correspond to the two reductions in reporting threshold that occurred in 2012 and 2016. Notice that threshold reductions sensibly affect client composition. Thus, when examining the composition of borrowers over time in the empirical analysis, we impose a constant (5,000 inflation-adjusted R$) threshold throughout the period under study. Changes in the reporting threshold have instead relatively small impact on aggregate household debt balance as the monetary

[4]The Credit Information System is a confidential dataset of the Central Bank of Brazil. The collection and manipulation of individual loan-level data were conducted exclusively by the staff of the Central Bank of Brazil.

[5]The reporting threshold has changed over time: 5,000 BRL (around 1500 USD) in the period between January 2003 and December 2011, 1,000 BRL (about 500 USD) in the period between January 2012 and May 2016, 200 BRL (60 USD) in the period starting in June 2016.

[6]In particular, we acknowledge the participation of Sergio Mikio Koyama and Toni dos Santos in this process. The extraction of this sample is intended to facilitate the use of the Credit Information System in future research. To the best of our knowledge, this is the first publication presenting the data. The final extracted sample has around 4.2 billion observations at contract-month level.

[7]The scaling number is population size divided by sample size, both expressed in number of individual clients across all periods.

value of the debt of marginal borrowers that enter into the system after each reduction is modest.[8]

The data contains detailed information on each transaction, including type of debt, name of the lender, outstanding balance, interest rate, and maturity. For the scope of this chapter we focus on end-of-year outstanding balance by type of debt and type of lender.

The Credit Information System uniquely identifies the borrower in each credit relationship using the fiscal code. This allows us to match credit relationships of each borrower with data on individual characteristics from the Annual Social Information System (RAIS). RAIS is an employer-employee dataset covering all formal workers employed in Brazil.[9] For the scope of this chapter, and since the credit registry has limited information on income, we use RAIS to extract information on individual annual labor income.

IV Characteristics of the Household Debt Boom

IV.A Composition of household debt

The micro-level data set on household credit allows for a comprehensive analysis of the composition of household debt during the large increase from 2003 to 2014. Figure VI shows the total rise in household debt in Brazil with the main components broken down. As it shows, total household debt rose in real terms almost five-fold from 2003 to 2014 before shrinking during the recession.

The rise in household debt is seen across a number of categories, and is not limited to mortgage debt as is typical in many advanced economy episodes. In particular, there is a substantial rise in mortgage debt, auto debt, and payroll loans. Other components of debt such as credit card debt and non-payroll loans also rise substantially, although they represent a smaller share of total debt and so their impact on total debt levels is limited.[10]

Figure VII shows each component on its own scale. The increase in auto loans in Brazil is especially striking. From 2009 to 2012, loans made for auto purchase increased by almost three times. The auto loan peak is in 2012, which is quite early in the overall debt cycle.[11] From 2012 to 2014, auto loans decline substantially even though the economy was not yet in recession. A macro-prudential tightening episode between December 2010

[8]The notes below each Figure report whether the data used includes all individuals or only those above the imposed constant threshold.

[9]Employers are required by law to provide detailed worker information to the Ministry of Labor. See Decree n. 76.900, December 23^{rd} 1975. Failure to report can result in fines. RAIS is used by the Brazilian Ministry of Labor to identify workers entitled to unemployment benefits (*Seguro Desemprego*) and federal wage supplement program (*Abono Salarial*).

[10]Non-payroll loans include other personal loans whose payments are not directly deducted from paychecks.

[11]Notice that the 2012 peak is not driven by the change in reporting threshold in the Credit Information System, as most auto loans are above the old threshold. The trends reported in Figures VI and VII are unchanged if we restrict our focus to individuals with end-of-year outstanding balance above an inflation-adjusted reporting threshold of 5000 BRL.

and November 2011 has been mentioned as one of the triggers of this decline (Takeda and Dawid 2013). We return to this in the next subsection.

There is a close association between the rise and fall of the auto loan market in Brazil and aggregate auto purchases, as shown in Figure VIII. Total vehicle sales in Brazil rose from 100,000 per month in the early 2000s to more than 300,000 per month during the peak in 2012. It is difficult to ascertain the direction of causality, but at the least it is hard to imagine that large increase in auto purchases would have been possible without the large increase in auto financing.

Payroll loans also increase substantially from 2003 to 2014, from almost zero to 300 billion BRL. The importance of the payroll market can be seen when comparing it to non-payroll and credit card loans in Figure VII. While there was a substantial increase in all three forms of credit, the magnitude of the rise in payroll loans is an order of magnitude larger.

The market for payroll loans expanded in many countries in Latin America during this time period (Guthrie 2013). The basic feature of this type of consumer credit is that banks are able to automatically deduct payments from the individual's paycheck, thereby significantly lowering the probability of default driven by factors other than a decline in income.

An important feature of payroll lending is the institutional arrangement that allows banks to deduct payments directly from paychecks. In Brazil, the substantial expansion of payroll lending is closely linked to a law passed in December 2003. In particular, the new law regulated the use of payroll loans for private sector employees and private sector social security beneficiaries. Lenders authorized by the social security administration of the Brazilian government were able to collateralize loans using the wages of workers paying into the social security system, as long as the total payments were no more than 30% of the borrower's income. Coelho et al. (2012) show that the introduction of this law led to a large increase in payroll lending and a substantial decline in interest rates.

Mortgage debt also expanded during the Brazilian household debt boom, although the inflection point of the rise is later than for payroll loans and auto debt. In particular, the rise in Brazilian mortgage debt accelerates from 2011 to 2014. Mortgage debt continued to expand from 2011 to 2014 while auto loans shrank; the next subsection provides some context to help understand this contrast.

IV.B Government-controlled banks and a tale of two booms

When it comes to the type of household debt and its source, the rise in household debt in Brazil from 2003 to 2014 is a tale of two booms: one from 2003 to 2011, and the other from 2011 to 2014. Figure X shows debt growth by category of debt for these two time periods. During the first period, there is substantial growth in all types of debt, with the rise in payroll loans being especially large. However, the 2011 to 2014 period

is characterized by a substantial decline in the annual growth rate of auto loans, payroll loans, and non-payroll loans. In contrast, the growth rate of mortgage debt and credit card debt increases.

There is also a break in the source of household debt in 2011. A unique feature of the credit registry data is that it allows us to break down credit by the type of lending institution. In particular, the analysis below divides Brazilian banks into two categories depending on whether the bank is under government or private control. Data on bank control is sourced from the Central Bank of Brazil database of financial institutions characteristics (Unicad). Government controlled banks include those controlled by federal government and by states (e.g. Banco do Brasil, Caixa Economica Federal). Privately controlled banks include private domestic, private foreign banks, private banks with mixed control (domestic/foreign) (e.g. ITAU, Santander, HSBC). Traditionally, large government banks such as Banco do Brasil (BB) and Caixa Economica Federal (Caixa) are very responsive to federal government pressures and instrumental in the application of its policies. For example, in response to the global financial crisis, both BB and Caixa lowered interest rates to stimulate credit supply in 2008.

By splitting banks into these two categories, it becomes clear that after 2011 the behavior of government-controlled versus private banks diverges. Figure XI shows total outstanding debt owed to private and government-controlled banks from 2003 to 2016. During the early part of the credit boom, the debt provided by private banks grew at a substantially higher rate than debt provided by government controlled banks. However, there is a clear shift after 2011. Debt to private banks began to fall while debt to government-controlled banks rose substantially.

Figure XII breaks down debt owed to private versus government-controlled banks by the type of debt. The explosion in auto financing from 2003 to 2011 was driven almost entirely by private banks. As auto loan growth fell for private banks post-2011, there was an expansion in debt to government-controlled banks, although it was not large enough to offset the decline by private banks.

Government-controlled banks, and Caixa in particular, were the major players in mortgage markets during this time period. The large increase in mortgage debt after 2011 was driven mainly by government-controlled banks, although there is also some evidence of an increase in mortgage lending by private banks.

The shift in lending by government-controlled banks can be seen most clearly in payroll loans. Prior to 2011, growth in payroll loans by private and government-controlled banks was similar. However, a large gap in lending occurred from 2011 to 2014. Growth in payroll debt to government-controlled banks was 17.5 percent from 2011 to 2014, whereas it was flat for private banks over the same time period. Government-controlled banks also entered the credit card market starting in 2011, although private banks also increased lending in this market in the later time period.

Taken together, the evidence in Figure XII suggests a relative expansion in lending by government-controlled banks from 2011 to 2014. This relative expansion fits a common narrative on the political environment in Brazil during this time period. Brazilian media report that government-controlled banks reduced their interest rate spread since 2012 under pressure from the federal government (OGlobo 2012).[12] The government hoped that this move would induce private banks to lower their rates in response (Silva Júnior 2012). Instead, our data indicates the expansion in lending by government-controlled banks resulted in a sizable increase in their market-share. This increase was particularly strong in the types of credit in which public banks specialize, such as mortgages and payroll lending.

IV.C Credit growth across the income distribution

In section IV.B we showed that the rise in household debt in Brazil from 2003 to 2011 was mostly fueled by private banks, while government controlled banks expanded credit supply during the 2011 to 2014 period. In this section we investigate whether these two booms affected different types of borrowers in terms of income. One advantage of matching data from the Credit Information System with individual characteristics from RAIS is that we can study credit growth across the labor income distribution.

Figure XIII shows average annual growth of outstanding debt by income group and time period. We divide individuals observed in both the credit registry and RAIS into four income categories based on their average monthly labor income.[13] Additionally, we look at debt growth by income category separately for each of the two booms: 2004-2011 and 2011-2014.

As shown, during the first boom, debt growth decreases monotonically with income. Workers earning up to three minimum wages experience an average debt growth almost twice as large as workers earning more than ten minimum wages in this period. In contrast, during the 2011 to 2014 boom, the average annual debt growth is similar across the income distribution, and it is lower than in the first boom for all income groups.

The large credit growth among lower income Brazilians in the period 2004 to 2011 is consistent with the increase in financial inclusion that we observe in the micro data.[14] Figure XIV shows that workers earning five or less minimum wages went from 33 percent

[12]Notice that presidential elections were to be held in October 2014. Dilma Roussef, incumbent and president since 2011, won the 2014 elections.

[13]Monthly labor income in RAIS is reported in multiples of the national minimum wage. Minimum wage in Brazil is adjusted annually based on previous year inflation. We should emphasize that, to the extent that workers with salaries above the minimum wage experienced lower wage increases relative to the national minimum wage adjustment, some of the effects presented in this section could be driven by mechanical reallocation of borrowers into lower income brackets.

[14]Our data only captures access to *formal* bank credit. Borrowing in the informal lending sector is not observed. Thus, all our results refer to formal credit growth and any shift from informal to formal lending is counted as an increase in overall credit in the economy.

to almost 60 percent of individuals in our sample in the period from 2003 to 2011. Notice that the increase in financial inclusion of lower income individuals is concentrated in the first boom. During the second boom – characterized by credit expansion from government controlled banks – the share of workers earning five or less minimum wages among individuals in our sample remained constant. This is consistent with the fact that credit growth in the second boom was concentrated in the mortgage market, which – outside of government programs – is traditionally limited to relatively higher income individuals in Brazil.

V Potential Causes of the Household Debt Boom

V.A Macroeconomic Context

Brazil experienced a period of relative macroeconomic stability in the early 2000s. Important factors that favored macroeconomic stability were the adoption of the Real Stabilization plan in 1994 and the implementation of inflation targeting since 1999 (Martins et al. 2011). These institutional changes ended a period of high inflation that lasted throughout the 1980s and into the early 1990s.

A number of restructuring programs of the Brazilian banking system introduced by the government in the mid-1990s also contributed to macroeconomic stabilization.[15] These programs facilitated the restructuring of banks in financial difficulties after the introduction of the Real plan, increased Central Bank's supervision on the largest federal banks (Caixa Economic Federal and Banco do Brazil) and favored the privatization of banks owned by Brazil' state governments (Lundberg 2011, Goldfajn et al. 2003).[16]

In addition, in the late 1990s the Central Bank of Brazil started collecting information on credit histories and current debt balances of borrowers from commercial banks. First, this collection was done through the Registry of Credit Risk (CRC) launched in 1997. Then, it was done through the Credit Information System (SCR) started in 2003 (which are the data used in this paper). These credit information systems allowed Brazilian banks to check the credit histories of potential clients that are using the financial system.

Overall, in the early 2000s Brazil had inflation under control for the first time in decades and a financially sounder and more transparent banking system than in previous years. These are important aspects of the macroeconomic context in which the household credit boom started.

[15] In particular: the Program of Incentives for Restructuring and Strengthening the National Financial System (PROER), the Program for the Strengthening of the Federal Financial Institutions (PROEF) and the Program of Incentives for the Reduction of the State Role in Banking Activity (PROES).

[16] Goldfajn et al. (2003) estimate the fiscal cost of the three programs at around 8-9 percent of Brazilian GDP at the time.

V.B Institutional Reforms and Domestic Programs

Legal reforms and government programs introduced in the 2000s contributed to the rise in household debt in Brazil between 2003 and 2014.

As mentioned in section IV.A, the Brazilian government introduced a new law on payroll lending in 2003. Payroll loans, which offer repayment through automatic deductions from wages or pension payments, became extremely popular after the introduction of the new law, especially among retirees and public sectors workers. Coelho et al. (2012) exploit the staggered chartering of Brazilian banks to lend to recipients of social security benefits and find that the expansion of payroll lending led to an increase in personal loans and lower interest rates.

In August 2004, the Brazilian government introduced a new law to facilitate the repossession of physical collateral by banks when borrowers default on their loans. The new Lei de Alienação Fiduciária (Fiduciary Law) affected, among others, the auto loan and the mortgage markets. For example, until 2004, banks needed court approval to resell repossessed car, a lengthy process in a country characterized by inefficient legal system (Ponticelli and Alencar 2016). The 2004 reform allowed banks to quickly resale cars repossessed from delinquent borrowers, increasing the diffusion of auto loans among Brazilians. Using loan-level data from one of the largest Brazilian banks Assunçao et al. (2013) show that the reform fostered an expansion in car loans, especially among higher-risk lower-income borrowers, and lower interest rates. Martins et al. (2011) focus on the housing market and argue how macroeconomic stability and institutional reforms introduced in the early 2000 have helped fostering the mortgage market.

Overall, institutional reforms that fostered payroll loans and improved repossession of collateral by creditors were conductive of a major change in the structure of household debt in Brazil. Loan categories that use wages, real estate or vehicles as collateral increased their share in Brazilian household debt from 43.3 to 61.8 percent between 2004 and 2016, and their share in Brazil GDP from 3.3 to 15.6 percent in the same years (see Figure XV).[17]

Government programs targeting lower-income individuals might have also contributed to the increase in household debt observed in Brazil from 2003 to 2014. Among the largest programs introduced or expanded under President Lula are Bolsa Família, a social program that provides cash transfers to low-income families conditional on their children attending school, and Minha Casa Minha Vida (My House, My Life). The latter was instituted in 2009 with the objective of subsidizing house buying for low income up to middle-income households. The program offers mortgages at below market rates that depend on the monthly income of the applicant household. Minha Casa Minha Vida is funded by the federal government and mostly implemented by the Caixa Economica

[17]These percentages refer to the share of car loans, mortgages and payroll loans divided by total household debt (source: SCR) and by GDP.

Federal (CEF), a government controlled bank and the largest mortgage lender in Brazil. According to data from the Ministério das Cidades (Ministry of Cities), in the period between 2009 and 2014, around 2.5 million units were completed under the program, for a total government investment of around 240 Bn BRL.[18] Minha Casa Minha Vida could have contributed to the large increase in mortgages observed in Brazil during the second boom from 2011 to 2014 and documented in Figure VII.[19]

V.C International Factors

Another important consideration is the international financial environment. As mentioned above, Brazil experienced net capital inflows beginning in 2008 and substantially increasing in size from 2010 to 2014. This pattern is not unique to Brazil; as shown by Ahmed and Zlate (2014), there was a sharp rebound in net private capital inflows into many emerging markets starting in last 2009.

There is an active debate in the international finance literature on the underlying source of the sometimes dramatic changes in net capital inflows into emerging economies such as Brazil (e.g., Byrne and Fiess (2011), Moghadam (2011), Ghosh et al. (2012), and Forbes and Warnock (2012)). While there is no consensus, several studies show an important role of monetary policy in advanced countries, with monetary easing in advanced countries leading to capital inflows into emerging markets.

One study focuses on Brazil in particular. Barroso et al. (2016) use a structural vector autoregression to first estimate the effect of U.S. quantitative easing on a set of global variables such as commodity prices, global trade, and emerging market risk. The study then estimates the effect of these global variables on a variety of outcomes in Brazil. The results suggest a reasonably strong effect of U.S. quantitative easing on capital inflows into Brazil. Further, the effect on household debt in particular is large. As the article notes, "the estimates for the credit variables indicated quantitative easing stimulated Brazilian non-earmarked credit (from 0.3 p.p. of GDP to 0.7 p.p of GDP on each policy round) with the bulk of the effect coming from the household sector, and mostly from private banks."

The results suggest that a fruitful avenue for future research is to explore the effects of international capital flows, perhaps driven by monetary policy in advanced countries, on the growth in household debt in Brazil.

[18] Source: Ministry of Cities, data can be downloaded from `dados.gov.br`.

[19] Notice that the Minha Casa Minha Vida subsidizes housing differently depending on household income. The lowest income category – which receives the most generous subsidies — is not reported in SCR, as the funding and the risk attached to these operations is retained by the federal government through the FAR (*Fundo de Arrendamento Residencial*).

VI Concluding Remarks

Brazil experienced a significant increase in household debt from 2003 to 2014, followed by the most severe recession on record since the early 1980s. This chapter provides a preliminary investigation of the connection between these two patterns using a novel credit registry data set covering household debt in Brazil.

The aggregate evidence is consistent with previous research showing that household debt expansion predicts lower subsequent growth, and the micro-data from the credit registry elucidates several interesting characteristics of the boom. In particular, the boom from 2003 to 2011 was widespread across the types of debt with auto debt and payroll loans playing a particularly important role. Further, this was a period of inclusion into the credit markets of lower income individuals. However, the credit boom after 2011 was different; it was driven primarily by government bank lending via mortgages and payroll loans, and there was a lack of further inclusion of lower income individuals.

The analysis in this chapter is descriptive, but it points to several potential causal channels. In particular, the large increase in household debt may have been favored by legal reforms in the financial sector, government programs and international capital inflows. We look forward to future research that further explores these channels.

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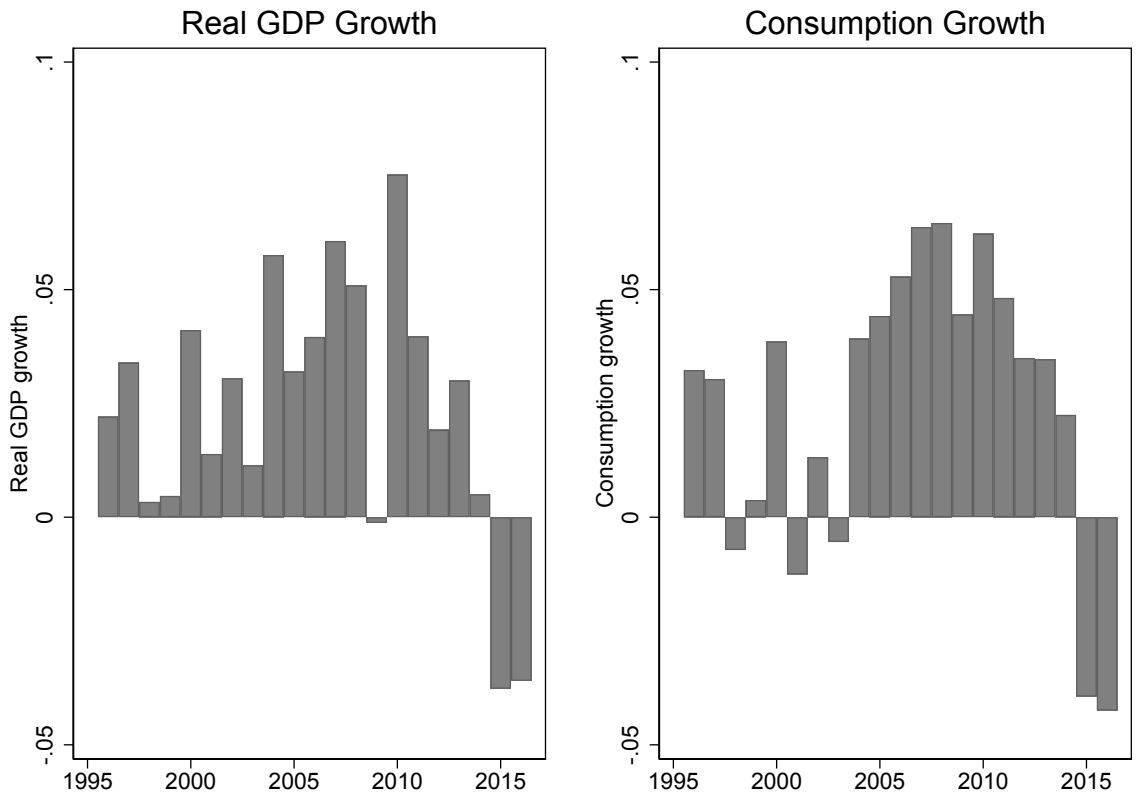
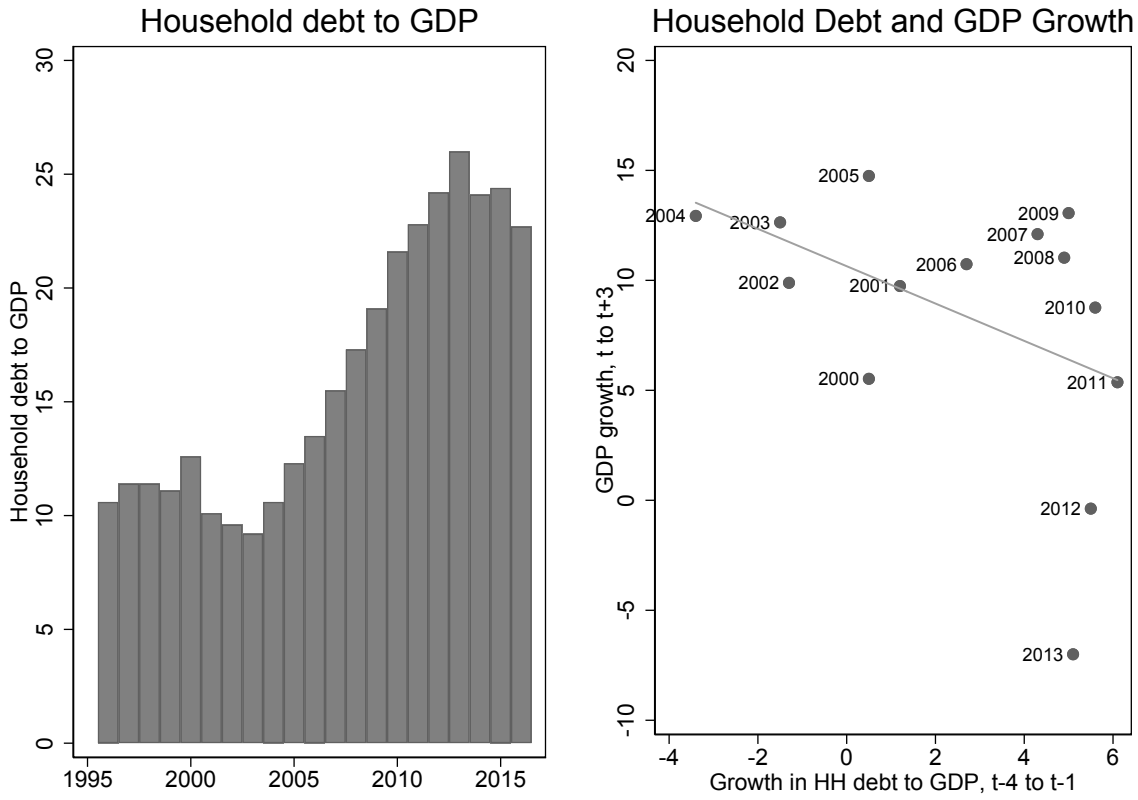
Figures and Tables

Figure I: Brazil Aggregate View: 1996-2016



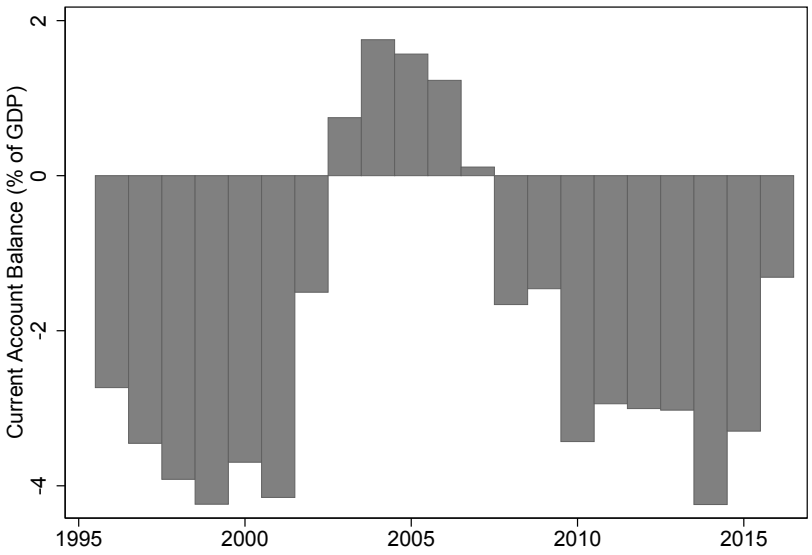
Notes: source: World Bank's World Development Indicators.

Figure II: Household Debt and GDP Growth



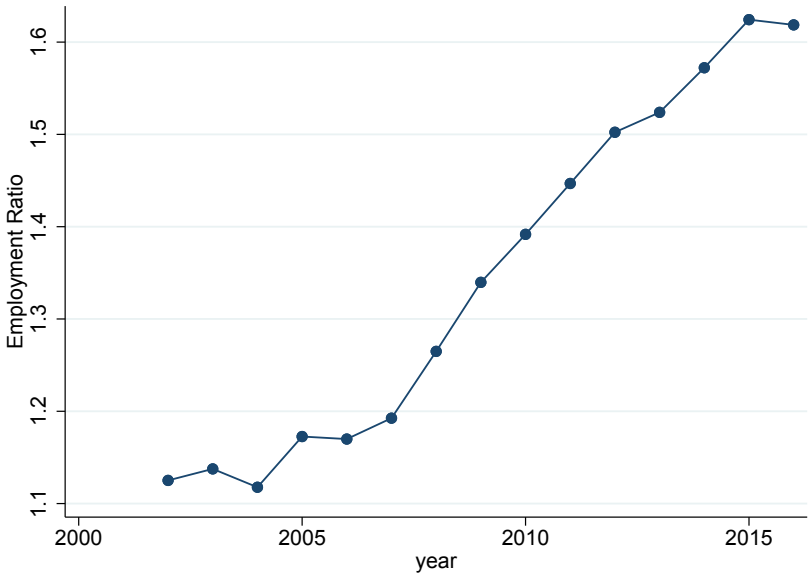
Notes: source: data on household debt is from the BIS dataset on "Credit to the Non-Financial Sector", data on GDP growth is from World Bank's World Development Indicators

Figure III: Current Account Balance



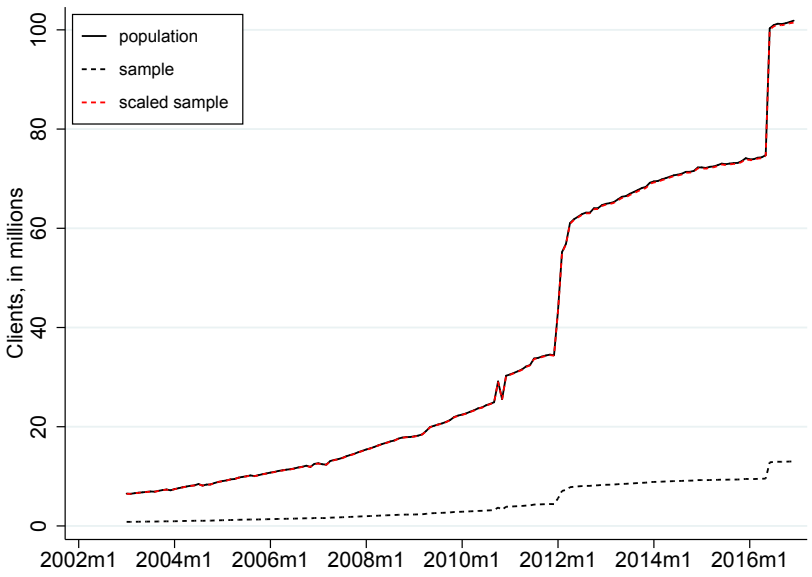
Notes: source: World Bank's World Development Indicators.

Figure IV: Employment in Non-Tradables over Tradables Sector



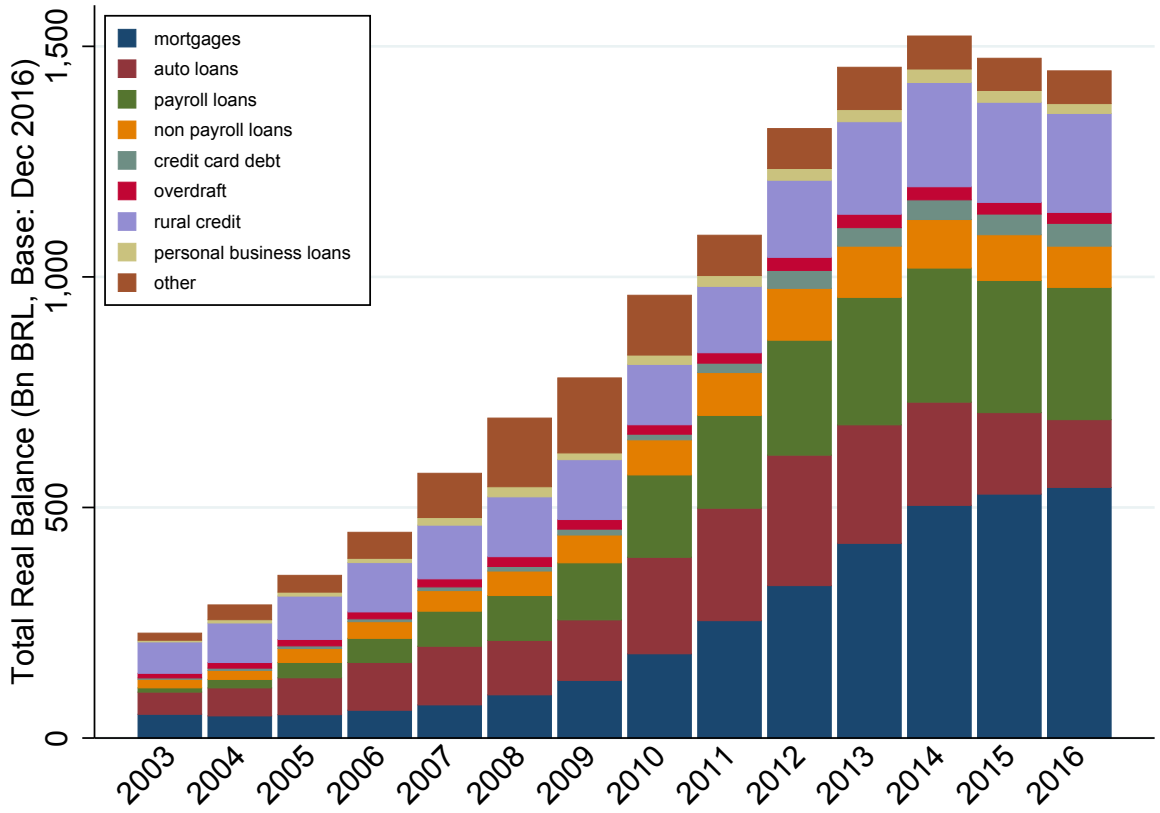
Notes: source: Annual Social Information System (RAIS).

Figure V: Number of Individuals in Credit Information System



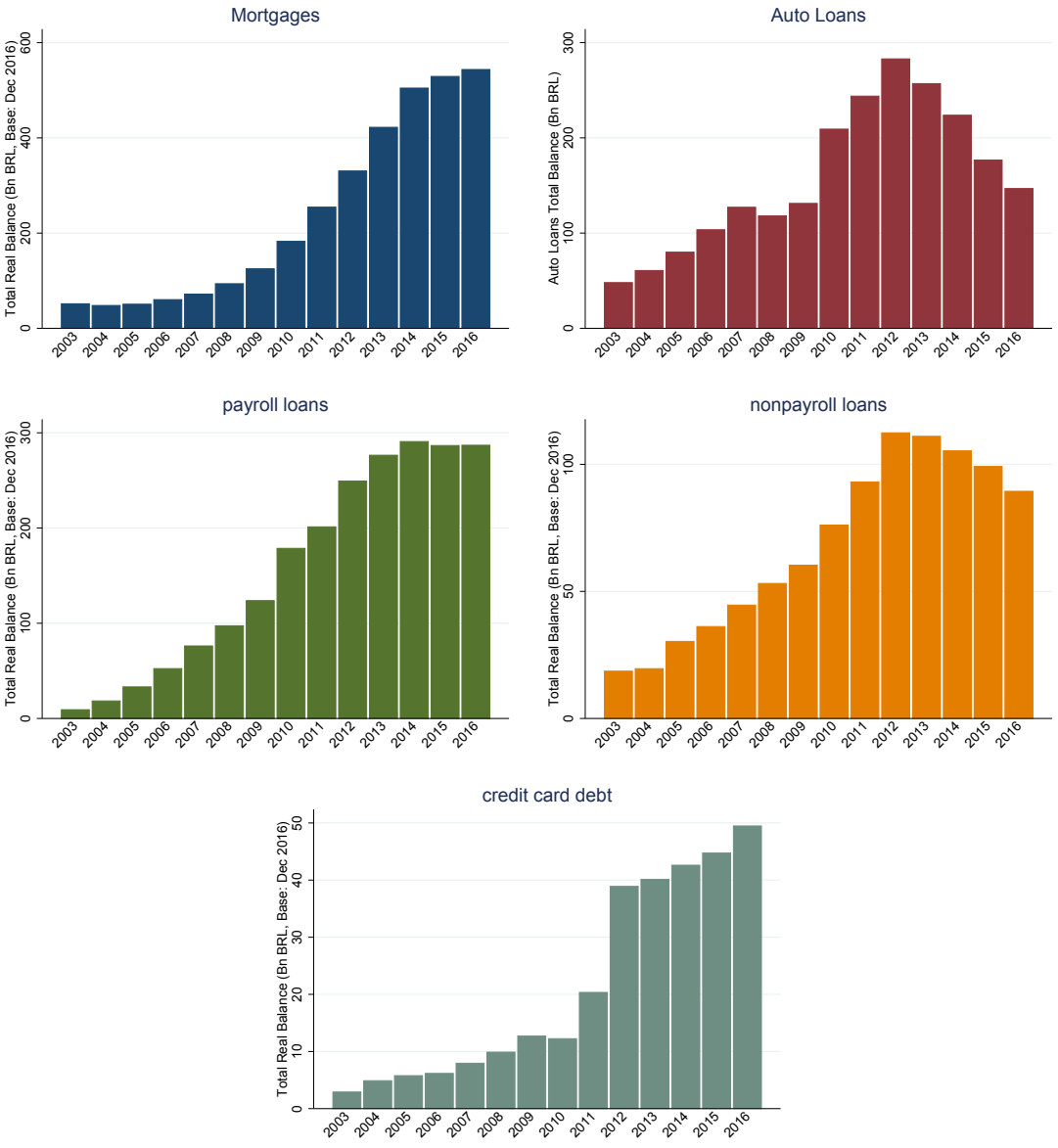
Notes: source: Credit Information System (SCR), Central Bank of Brazil. The sample series shows total number of individual clients by month in the 12.8% random sample of individuals extracted from SCR. The scaled sample series is obtained by multiplying total clients by month in the extracted sample by 117/15.

FIGURE VI: HOUSEHOLD DEBT COMPOSITION 2003-2016



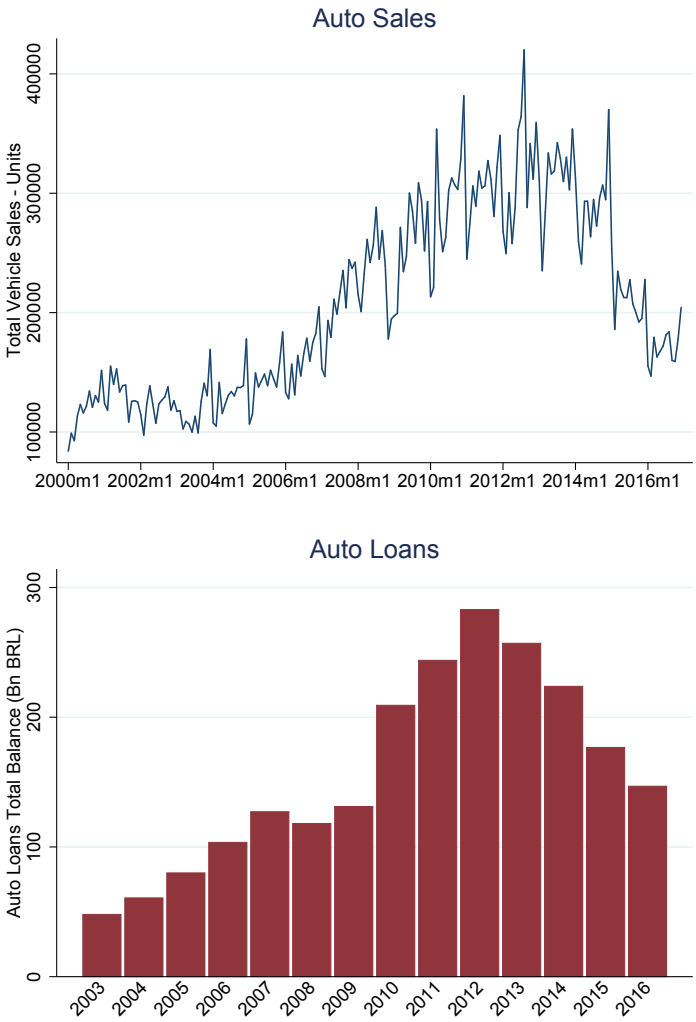
Notes: source: Credit Information System (SCR), Central Bank of Brazil. Aggregates are constructed starting from the 12.8% random sample of individuals extracted from SCR, and scaled to be representative of the population of individuals in SCR.

FIGURE VII: SELECTED CATEGORIES: 2003-2016



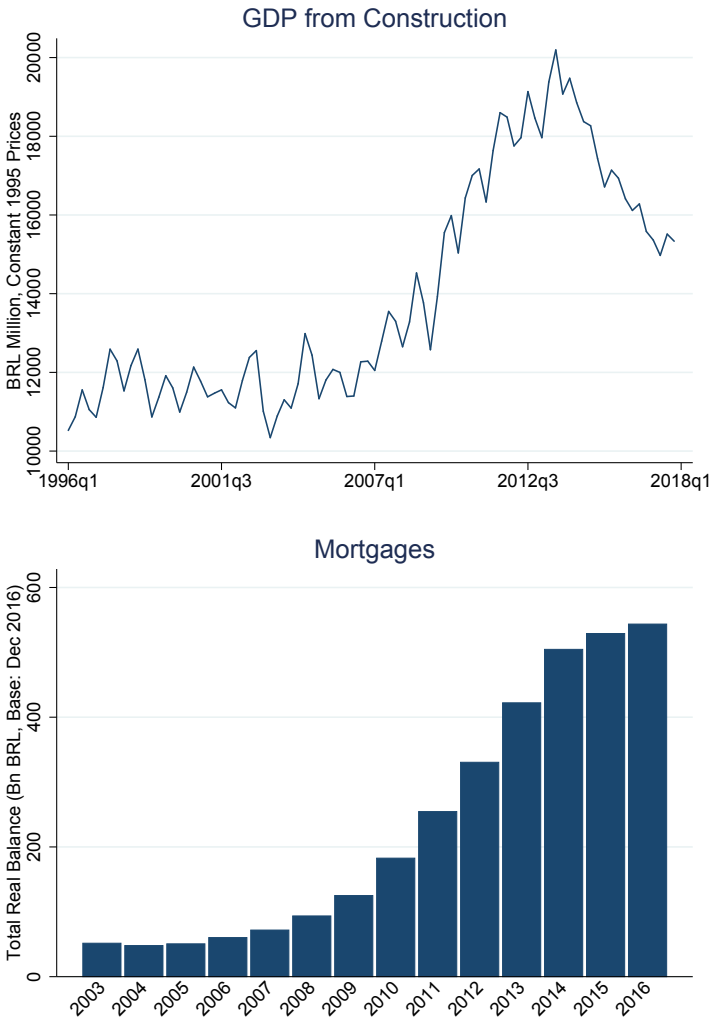
Notes: source: Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled).

Figure VIII: Auto



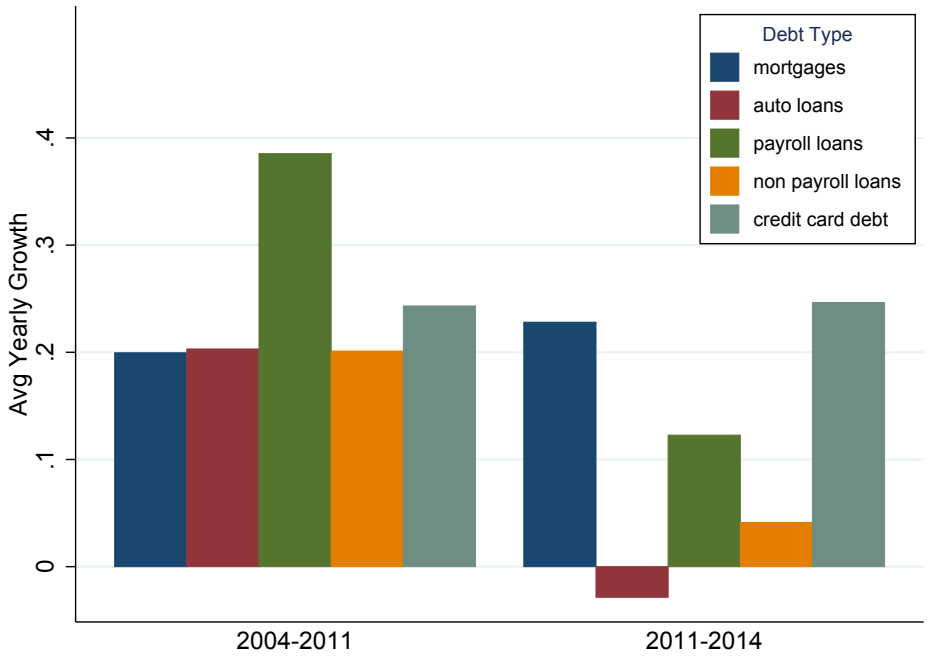
Notes: source: data on car sales is from the Central Bank of Brazil. Data on auto loans is from the Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled).

Figure IX: Construction



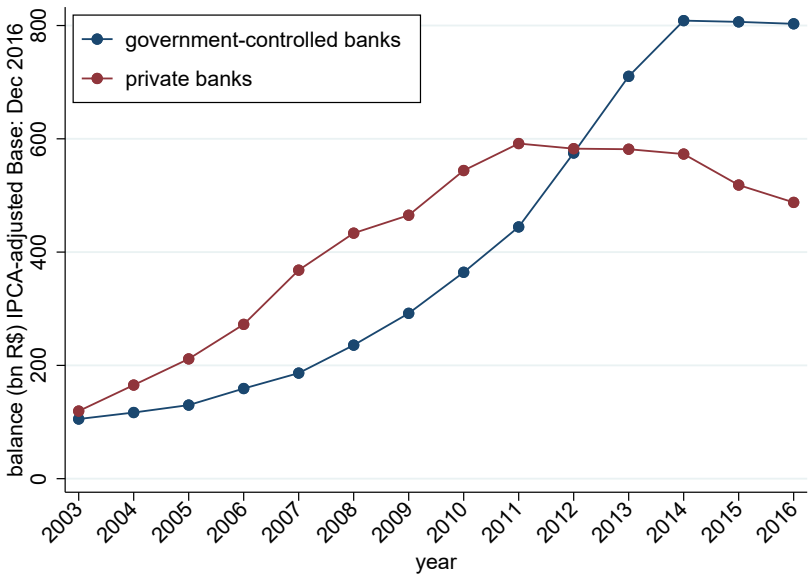
Notes: source: data on GDP from construction sector is from IBGE. Data on mortgages is from the Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled).

Figure X: Average Growth by Debt Type and Sub-Period



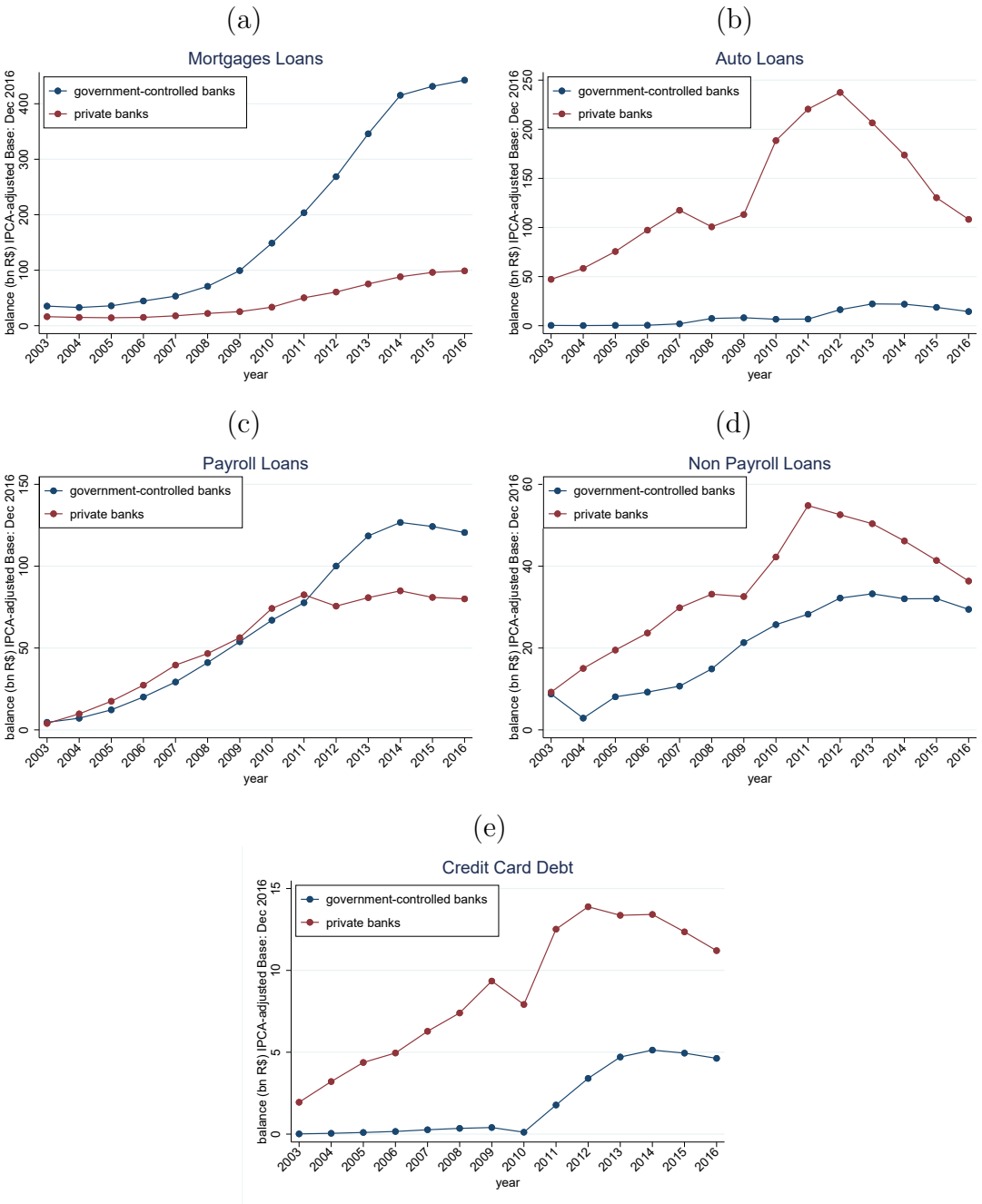
Notes: source: Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled).

Figure XI: Total Lending to Household by Bank Control



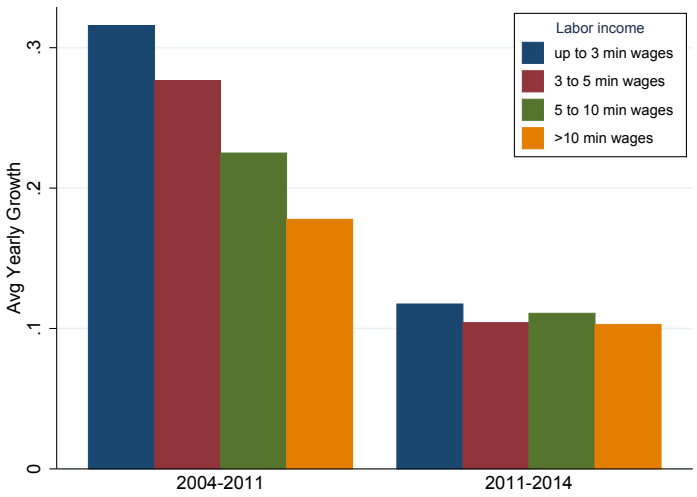
Notes: source: household debt is from the Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled). To control for the change in threshold in 2012 we focus on individuals with end-of-year balance above 5,000 inflation-adjusted R$. Bank control is from Unicad, Central Bank of Brazil.

Figure XII: Bank Control by Debt Category



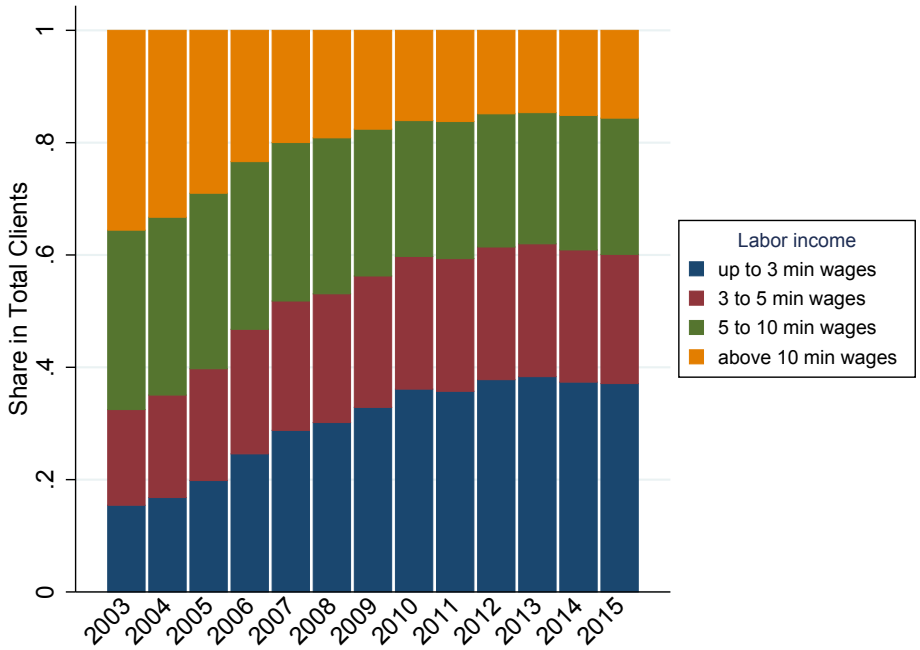
Notes: source: household debt is from the Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled). To control for the change in threshold in 2012 we focus on individuals with end-of-year balance above 5,000 inflation-adjusted R$. Bank control is from Unicad, Central Bank of Brazil.

Figure XIII: Debt Growth by Labor Income Level



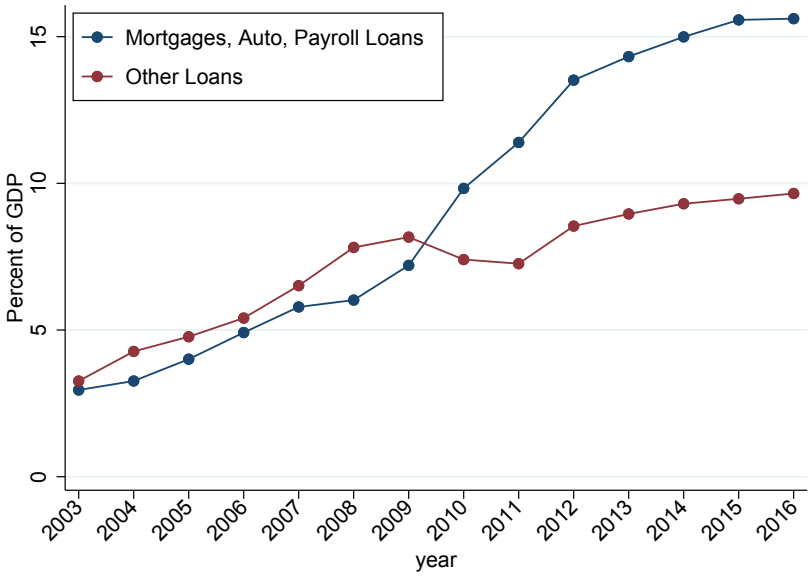
Notes: source: household debt is from the Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled). To control for the change in threshold in 2012 we focus on individuals with end-of-year balance above 5,000 inflation-adjusted R$. Labor income is from the Annual Social Information System (RAIS).

Figure XIV: Share of Clients By Labor Income Level



Notes: source: Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled). To control for the change in threshold in 2012 we focus on individuals with end-of-year balance above 5,000 inflation-adjusted R$. Labor income is from the Annual Social Information System (RAIS).

Figure XV: Household Debt over GDP by Use of Collateral



Notes: source: Credit Information System (SCR), Central Bank of Brazil (12.8% random sample of individuals, scaled). Other Loans include: non-payroll loans, credit card debt, current account overdrafts, rural credit, personal business loans and others.