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Household financial fragility in Brazil (2005-2023): a Minskyan analysis¹

June, 2023

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Abstract

The increase in households' indebtedness has been a striking feature of the Brazilian economy since the 2000s. This paper aims at analyzing the evolution of Brazilian households' indebtedness and financial fragility from 2005 to 2023. The hypothesis is that 'Great Indebtedness' is related to an increase in Brazilian households' financial fragility. As a theoretical reference, the paper uses the Minskyan idea of 'survival constraint,' originally used to analyze the management of cash flows and balance sheets by firms, applied to households: to 'survive,' households are required to keep cash-inflows and outflows balanced – in their case, this word is even more appropriate, because personal bankruptcy can be associated with evictions, poverty, and famine, among other social vulnerabilities. In the empirical part, the paper combines an analysis of descriptive statistics of BCB data and a novel composite index of Brazilian households' financial fragility based on debt service, labor underutilization, quality of loans and delinquency rates. An analysis of data suggests that financial fragility follows the dynamics of mini-cycles, and periods of increase in indebtedness are not necessarily contemporary to periods of increasing financial fragility: for instance, the COVID-19 crisis prompted a significant increase in indebtedness, but other policies such as unconditional cash transfers were able to provide the necessary cash-flows for Brazilian households managing their 'survival constraints' in a more flexible way. Despite this, we highlight the indebtedness and financial fragility of households is a major feature of Brazil's economic and social degradation nowadays.

Keywords: Financial Fragility; Survival Constraint; Household Indebtedness; COVID-19; Brazil.

JEL Codes: D14; E21; E44; G50; G51.

¹ We are grateful to Lara Bonatti for the help with databases. The usual caveats apply.

Introduction

The increase in households' indebtedness has been a striking feature of the Brazilian economy since the 2000s. The debt-to-income ratio of Brazilian households grew from 16.5% in 2005 to 49.0% in 2022. This trend persisted across different phases of the economic cycle, encompassing the commodity boom of the 2000s, the 2008-2009 global financial crisis, the 2010-2011 recovery, and the COVID-19 crisis.

Recent literature offers different interpretations of this phenomenon. Mora (2014), for instance, interprets household credit expansion between 2003 and 2012 as a deliberate macroeconomic policy strategy aimed at stimulating income and employment growth. Lavinás (2017), on the other hand, presents a critical perspective on this strategy, arguing that it expressed financialization of households, particularly through payroll loans collateralized by social policy. She argues that credit expansion increased financial vulnerability and socioeconomic insecurity among Brazilian households.

Garber et al. (2019), in line with the international literature on household debt and economic downturns (see Mian et al. 2017), argue that the substantial increase in household debt between 2003 and 2014 was primarily driven by the increase in credit supply, following regulatory reforms. In their view, debt expansion ultimately contributed to the severe recession experienced during 2015-2016. For Gentil and Bruno (2022) household overindebtedness should be seen as the response to income loss resulting from wage reductions, high unemployment and underemployment, as well as the dismantling of labor regulation and the social protection system in recent years. Similar interpretation is offered in Barba and Pivetti (2009), for the US economy.

In this paper, we approach the issue of Brazilian household indebtedness from a different perspective. We resort to the works of the U.S. economist Hyman Minsky. The existing literature on his contributions often downplays his analysis of household debt (e.g.

Cynamon and Fazzari 2013; Leclaire 2023). The author lived in a different historical time, but he acknowledged the transformative shifts that were already taking place within capitalism: “The increase of the items that can be financed by debt and of the ease with which households can debt-finance has meant that the link between household wage income and household consumption is not as close as in the past.” (Minsky 2016: 30). The theoretical framework set by Minsky lays the ground for a cash-flow approach to understanding the dynamics of household debt, which we believe can provide valuable insights into the more recent Brazilian experience.

The aim of this paper is to analyze the evolution of Brazilian households’ indebtedness and how it associates with financial fragility of households from 2005 to 2023. Based on statistics provided by the Brazilian Central Bank, we will present a comprehensive empirical assessment of Brazilian households’ financial fragility. To complement the descriptive statistics, we propose a composite indicator encompassing multiple dimensions of the phenomenon of household indebtedness to identify different phases of the process. It is a first approximation to deal with the macroeconomic behavior of the dynamics of household debt. The hypothesis we want to test is that the ‘Great Indebtedness’ of Brazilian families is associated with an increase in Brazilian households’ financial fragility.

The paper first delves into the Minskyan concept of the ‘survival constraint,’ initially used to analyze cash flow and balance sheet management in firms, and applies it to households. Next, we present an empirical analysis of the evolution of household indebtedness, drawing on statistics from the BCB database. In sequence, we build a composite index of financial fragility for Brazilian households following the methodology proposed by the OECD (2005). This composite index incorporates estimates of debt service, labor underutilization, loan quality, and delinquency rates, which, to the best of our knowledge, represents a novel contribution to the existing literature. In the conclusion, we summarize the main findings of the paper and discuss the main contemporary policy issues regarding indebtedness and financial fragility among Brazilian households.

1 Households' financial fragility in a Minskyan framework

1.1 Setting a framework based on Minsky's insights

The economist Hyman Minsky, one of the main authors of the American post-Keynesian tradition, discusses in depth the role of debt in the economy and its interplay with market conditions. His starting point to explain the dynamics of business cycles is the analysis of cash flows and the management of debts and financial obligations by economic units (Mehrling 1999). According to Minsky (2008; 2016), the business cycle and the institutional set-up of the financial system – including financial regulation – are explained by changes in financial practices which are reflected in different *financial structures* that conform the dynamics of modern monetary economies.

He proposes analytical financial structures as the combination of the individual financial positions of economic units and institutional settings. The former can be appreciated in terms of what Minsky termed 'survival constraint' or 'survival condition,' which requires that 'total money expenses be less than or equal to total money receipts (ignoring whatever initial liquidity the firm possesses) for every time period from the initial position to the firm's horizon' (Minsky 2004: 127).

In other words, to comply with the survival constraint, a financial unit needs to match cash inflows and outflows, assets and obligations, so that there are no persistent imbalances.² Neilson (2019: 44) shows "the most important mechanism of financial capitalism is the one that gives debt its force; the requirement to pay." Therefore, we can say that the concept of survival constraint gives an ordering principle for modern monetary economies, forming a web of debt-credit relations that set economic dynamics.

² With the exception of the central government or the central bank, in the currency in which they issue, depending on the institutional configuration in force (Torres Filho 2020: 741).

Different types of cash flows need to be made compatible not only in the present but in the future. Minsky (2008: 223) defines three main types: income flows, balance sheet flows, and portfolio flows. His analysis originally had a focus on (non-financial) firms, but it can be extended to all economic units that are faced with the need to manage their cash flows and balance sheets on a daily basis. In the case of households, the source of their inflows and outflows are less complex than in the case of firms. The income streams concerns cash inflows coming from wages, salaries, retirements and social benefits, while cash outflows are, for example, from taxes and day-to-day expenses. Balance sheet streams comprise payments of interest and principal on existing liabilities – “legacy” flows from the past –, as well as inflows of rents and quasi-rents on financial and/or fixed assets. Portfolio flows materialize when fixed or financial assets are traded.

The well-known financial postures defined by Minsky – hedge, speculative or Ponzi – can be used to analyze households’ financial positions, i.e., how they manage their survival constraints. The financial postures indicate the financial fragility, or the degree of mismatch in financial flows generated by the three different cash flows defined above. Alternatively, one can interpret financial positions in light of the margins of safety with which a unit manage their constraint.³

Minsky when analyzing the U.S. experience in the 1960s and the 1970s, provides an analysis of households’ financial positions at that time:

For households, the cash flow income that is mainly relevant to the financial structure is the difference between wage income as the major component of household disposable income and cash payment commitments on household debt. The secondary household financial relation of importance, which is especially relevant for the various forms of ‘to the asset’ (mortgage, conditional sales) contracts, is between the value of the hypothecated asset and the face or book value of the outstanding debt. (Minsky 2016: 28)

³ The higher the margins of safety, the lower the financial fragility. Minsky (1977: 16) lists three types of margins of safety: (i) the excess of expected revenues over contracted obligations for all for all time periods; (ii) the excess of the present value of assets over liabilities; and (iii) the proportion of very liquid assets in agents’ portfolios (cash kickers).

He divided debt-financing practices of households into two components: the financing of consumption and the financing of ownership of assets, typically financial assets (Minsky 2016: 31). In his evaluation, households' debt-financing of consumption would be hedge financing, and complements,

only a fall in income (wages) can transform such contracts into examples of Ponzi financing. Housing is typically financed by hedge financing. Positions in common stocks and collectables, such as gold, are often financed in a Ponzi fashion.

It should be remarked that, at that point, the author conducted a static analysis of households' financial fragility, leaving no room for his financial instability hypothesis – stability breeds instability.

Pushing forward Minsky's reasoning, we can say that a household's degree of mismatched exposures is strongly determined by the terms on which the unit has borrowed money (maturity and cost) and by the volume and stability of resources it has available in the present and is expected to have in the future (flow of income, net reserves etc.) to pay the services of outstanding debts, besides current expenses. The difficulty in making such flows compatible is determined by the difference in their temporality, but also by the availability of alternative sources of cash. In this context, credit in adequate conditions is as an essential element for the management of an agent's cash flows. Access to the credit market in favorable conditions can be used not only to smooth consumption patterns, but for a more complex set of transactions in a modern setting of financial decisions by households.

In that sense, the idea of a 'survival constraint' related to the household's financial fragility takes on an even more fitting connotation. The difficulty in honoring debt commitments might entail a spiral of overindebtedness and eventually result in personal 'bankruptcy.' Though the legal status of the bankruptcy of individuals may vary from country to country, in practice, actual 'bankruptcy' might lead to evictions, poverty, and famine, among other mounting social vulnerabilities, preventing households from meeting their minimal levels of subsistence.

1.2 Dimensions of household financial fragility

When assessing the degree and the evolution of households' financial fragility from a Minskyan perspective, one should take into account some features of households' financial relations.

Firstly, we have the balance sheet structure which translates into the leverage ratio of a given household. *Ceteris paribus*, the higher the household leverage the greater the risk of mismatching cash inflows with cash commitments assumed in the past. Nevertheless, households can increase their leverage and pay their debt with a safe margin if, for example, their income level has increased or they have continuous access to loans, revolving or from other kinds. The former case usually takes place in periods of economic growth, while the latter will depend on financial inclusion and creditworthiness, among other things.

However, leverage – a stock – does not give a proper account of cash *flows* needed. It is the debt service ratios that reflect the share of cash inflows used to service debt, given interest rates, principal payments and loan maturities. As households need to service their debts, an increase in debt burden might decrease the actual disposable income of households and have a negative impact on consumption and aggregate demand (Mian, Straub and Sufi 2021). If financial obligations increase relative to income over time, financial fragility also increases. This might also occur due to a decrease in disposable income or by an increase in income volatility.

Indeed, as labor income is the most relevant source of income to a great deal of households, the evolution of wages and their volatility, which depend on labor markets, will be a central aspect in defining financial fragility. Minsky (2016: 29) states that:

Consumer and mortgage debt can become Ponzi-like only if actual wage income falls short of anticipated and other sources of disposable income, for example, unemployment insurance, do not fill the gap (...)

Therefore, not only labor markets are relevant, but also social protection and general social policy can play a role in defining households' financial fragility. Literature on financialization, such as Barba and Pivetti (2009), Lavinás (2017) and Gentil and Bruno

(2022), highlights that the general decrease in wages in developed countries and the financialization of social policy bred households' financial vulnerability.

In that context, households increasingly relied on debt to accommodate consumption patterns and to manage their survival constraints. The access to and quality of debt is central at this point. Loans of lower quality, characterized by higher costs and shorter maturities, indicate the potential for mounting financial commitments and an increased risk of financial fragility. The larger the share of such loans the more prominent payment obligations will be in the short term, and the larger the risk of mismatch of cashflows.

Of course, the availability of loans of better quality will depend not only on credit demand. Indeed, we should remember that from a Keynesian perspective the dynamics of the credit market can be synthesized by the interaction between two groups of agents: on the one hand, those who, due to their spending plans, demand resources to match the need for money in the present; on the other, those who create money (banks)⁴ or are willing to diminish the liquidity of their portfolios.^{5,6}

Finally, one should notice that default is also another dimension of financial fragility, being usually a consequence of the severe or persistent mismatch of financial flows in the context of high debt service ratios, or deeply frustrated expectations with regard to income flows. Increasing arrears or high delinquency rates signal that the household's financial situation is deteriorating in an almost irreversible way if labor market and credit conditions do not change favorably. In that sense, default is a result of increasing fragility as it might quickly outline Ponzi-like positions.

⁴ In modern financial systems, the prerogative of money creation is restricted to the central bank and the banks (Torres Filho 2008). Since central banks do not lend directly to the public, our analysis is restricted to banking institutions.

⁵ Nowadays, there is a wider variety of agents that can give up liquidity in their portfolio, such as non-financial investors who engage in peer-to-peer lending. In this case there is no money creation.

⁶ To discuss the supply of credit is beyond the aims of this paper, but one can consult Alves Jr., Dymski and Paula (2008) for a post-Keynesian approach to banking strategies and the behavior of credit markets.

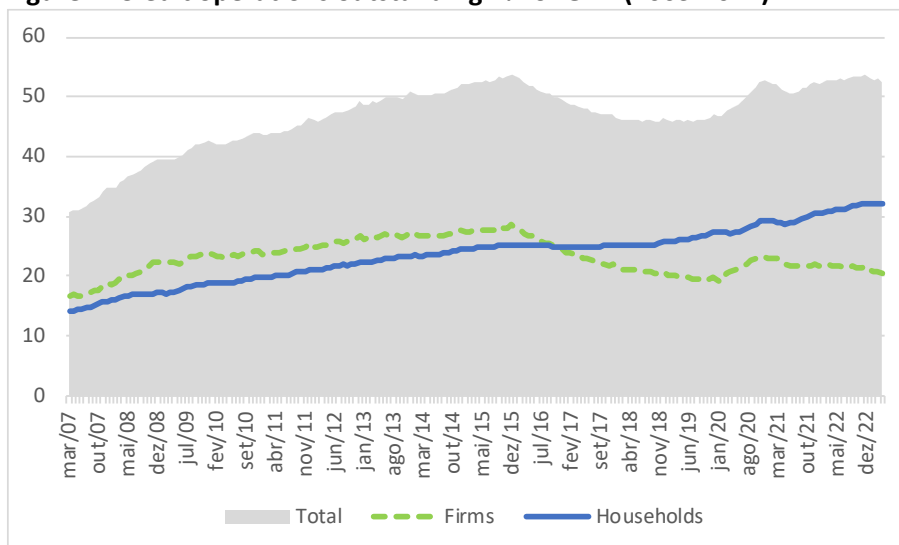
Summing up, the phenomenon of financial fragility of the households takes multiple dimensions in the theoretical framework inspired by Minsky. Households face a survival constraint and have different ways to manage their cashflows. In the remainder of this paper, the rationale presented in this section will be used to analyze the case of household financial fragility in Brazil in the 21st century from a macroeconomic perspective.

2 Household credit in Brazil (2000-2023)

Despite displaying historically very high real interest rates when compared with other developing and developed economies, credit expansion has been an important characteristic of Brazilian recent development. Figure 1 shows that credit as a share of GDP increased along the 2000s and until 2014, and it slowed down from then until 2019 when it started to increase again. It also shows that the contraction in credit expansion in the mid-2010s is primarily explained by the behavior of credit to non-financial firms, a byproduct of the effects of the recession on financially fragile firms (Corrêa, Lemos and Feijó 2017) and the shrinkage of development banks' credit, especially BNDES (Martins and Torres Filho 2022).

In fact, one can see that the upward trend of household credit operations outstanding as a percentage of GDP was uninterrupted until 2016, when a brief period of stagnation followed suit. However, differently from corporate credit, household credit started to grow again in the last quarter of 2018 and gained momentum during the COVID-19 crisis.

Figure 1. Credit operations outstanding - % of GDP (2003-2022)



Source: Central Bank of Brazil.

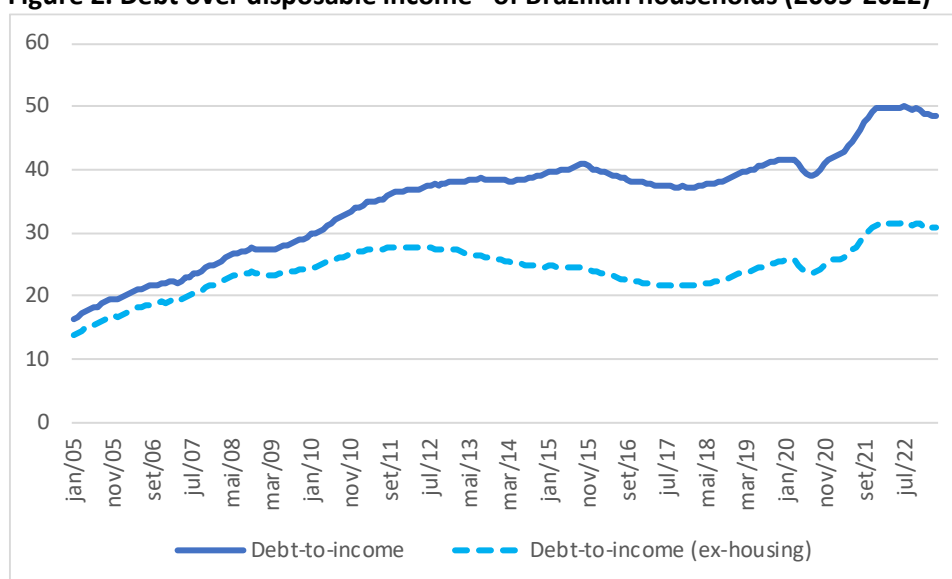
Mora (2014) argues that credit expansion in Brazil was a deliberate macroeconomic policy strategy aimed at stimulating income and employment growth. As a policy of credit inclusion, the data shows that household credit expanded steadily since the mid-2000s. This evolution occurred in different moments of the economic cycle, as measured by economic growth, interest rates and labor market conditions. Favorable external conditions produced by the commodities prices boom and the favorable international liquidity cycle before in the 2000s widened policy space, allowed for a slight decrease in interest rates, and set the Brazilian economy in motion in terms of economic growth (Annex I). From 2003 to 2014, the average GDP growth was 3.5% per year. Household consumption, in turn, expanded by 4.1% per year, fueled by the improvement in income distribution (through the increase of the real minimum wage and income policies to fight inequality) and an increase in employment rates and household credit.

In 2015-2016, the Brazilian economy experienced its most severe recession since the post-war period, and the subsequent recovery has been sluggish. The GDP decrease in both 2015 and 2016 exceeded 3.0% each year. Furthermore, the average GDP growth from 2017 to 2019, prior to the pandemics, was only 1.4% per year on average. The stagnation of the Brazilian economy can be attributed to austerity policies implemented since 2016. In addition, the labor deregulation reform has placed Brazilian households in a challenging labor market characterized by high levels of unemployment and stagnant

average real earnings. The COVID-19 crisis in 2020 ‘added insult to injury’ into the Brazilian poor macroeconomic performance, but government countercyclical policies, though erratic, were able to contain the worst effects of the shocks.

Several indicators qualify household credit performance which are relevant to the discussion about the evolution of financial fragility of the households. Starting with the debt-to-income ratio (Figure 2), this ratio⁷ grew from 16.5% in 2005 to 49.0% in 2022. Over this long period, two different expansion phases can be seen. The first was in the period from 2005 to 2015; the second was from 2019 to 2022. From 2016 to 2018, it is observed a period of slowdown brought on by the strong economic recession of 2015-2016. It is relevant to notice that residential real estate loans had an outstanding performance from 2009 to 2015, a phenomenon that contributed to the upward phase of the credit cycle to last.

Figure 2. Debt over disposable income* of Brazilian households (2005-2022)



Source: Central Bank of Brazil.

⁷ This measure takes into account the stock of household debt to households’ gross disposable national income (HGDNI) accumulated over 12 months. The broad measure encompasses consumer and residential real estate loans. HGDNI is a restricted concept that sums labor income and social benefits less taxes based on the National Accounts System.

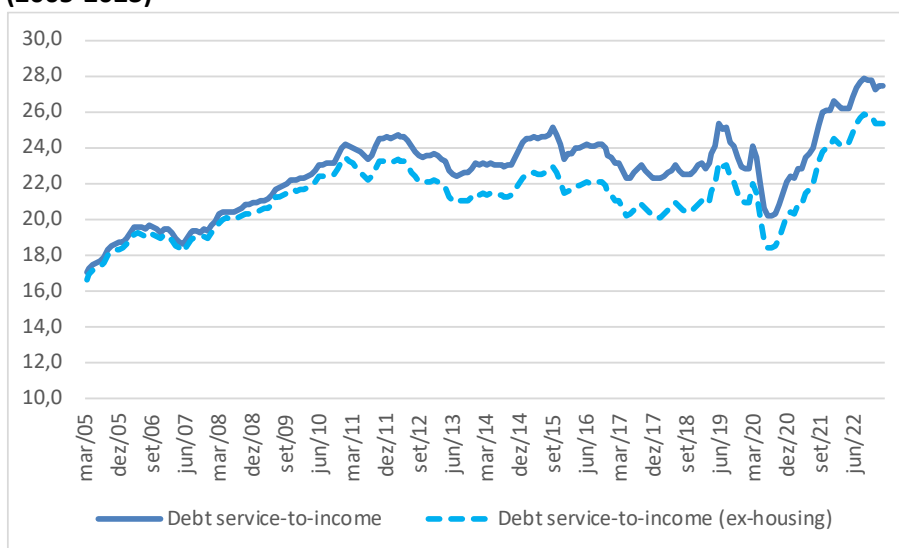
Another indicator is the debt service ratio⁸, that also had a notable increase, from 17.0% in March 2005 to 27.4% in February 2023 (Figure 3). From 2005 and 2011 it rose from 17% to 24%. Afterwards, in the wake of the COVID-19 pandemic, from 2020 to 2023, the indicator presented a significant increase, climbing from 20% to 28%. The higher commitment of servicing household debt observed during 2005 to 2011, occurred in a context of significant increase of income, employment and formalized jobs, as well as better income distribution. Therefore, higher levels of leverage and of share of income used to service debt meant that the speed of incurring debt even overtook the rhythm of increase in household income.

This was fostered by at least two important groups of factors. On the micro level, the unprecedented scale of banking inclusion that brought a significant part of the Brazilian population to the banking system (and potentially as credit users) and some regulatory innovations (e.g., payroll loans⁹). On the macroeconomic level, the high interest rate was also an aspect to be considered. The second period of increase was from 2018 to 2022. During this period the Brazilian economy presented slow economic growth, high unemployment and a decrease in formal jobs.

⁸ This measure takes into account interest and principal payments to monthly households' gross disposable national income (HGDNI). The broad measure encompasses consumer and residential real estate loans. HGDNI is a restricted concept that sums labor income and social benefits less taxes based on the National Accounts System.

⁹ In payroll loan schemes, banks are able to automatically deduct payments from the individual's paycheck thereby significantly lowering the probability of default. The total monthly payments cannot be more than a certain threshold of the borrower paycheck income. This line is mainly used by social security beneficiaries and public servants, and increased sharply since it was created in 2003.

Figure 3. Debt service over disposable income of Brazilian households – seasonally adjusted (2005-2023)



Source: Central Bank of Brazil.

The deterioration in the labor market conditions negatively impacts household incomes, increasing their survival constraint. Figure 4 shows the evolution of unemployment and underutilization rates in Brazil from 2002 to 2023.^{10,11} The series reveals a continuous improvement in the Brazilian labor market from 2002 to 2014, which was subsequently reversed after the 2015-2016 recession. The COVID-19 pandemic dealt a significant blow to labor markets in Brazil, but there has been notable improvement since mid-2021, though with a significant decrease of real effective average earning of employed people.

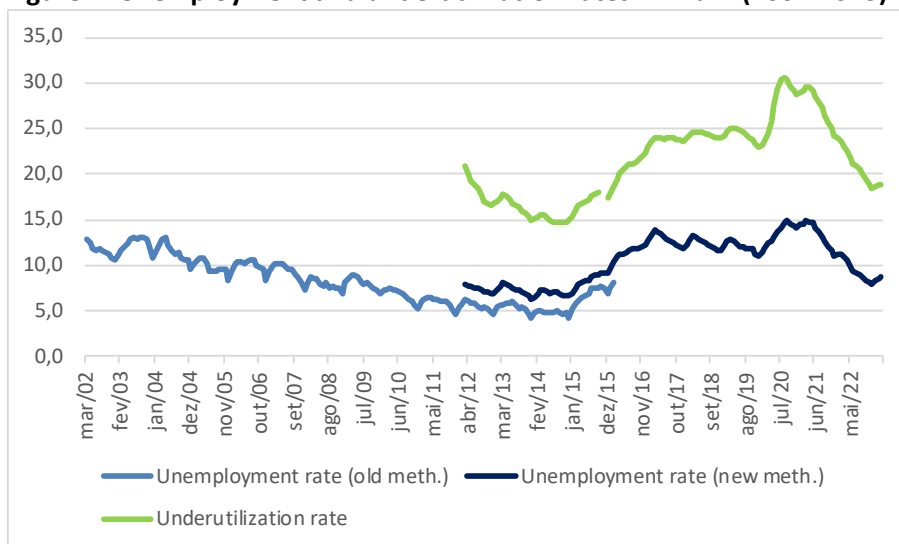
With a tight labor market, one condition to households to face increase in debt commitments is access to credit markets. Figure 5 shows the evolution of new loans in constant prices to households from 2000 to 2023. The break in the series is due to

¹⁰ As Faberman and Rajan (2020), we believe the labor underutilization rate (U-6 in the U.S. terminology) is a more accurate measure, as it adds up to unemployed workers all persons marginally attached to the labor force, including discouraged workers, plus total employed part time for economic reasons.

¹¹ There was a methodology change introduced by IBGE in 2012, which brought about the use of more accurate measures starting from that year onwards.

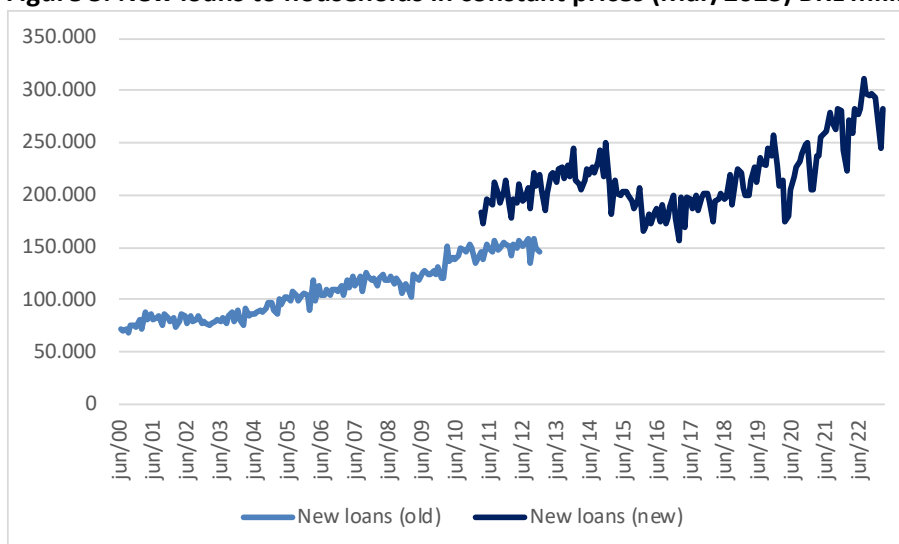
methodological reasons.¹² One can see that, except for a brief period in 2014 and 2016, households' access to credit has steadily increased from 2000 to 2023.

Figure 4. Unemployment and underutilization rates in Brazil (2002-2023)



Source: IBGE.

Figure 5. New loans to households in constant prices (Mar/2023) BRL million (2000-2023)



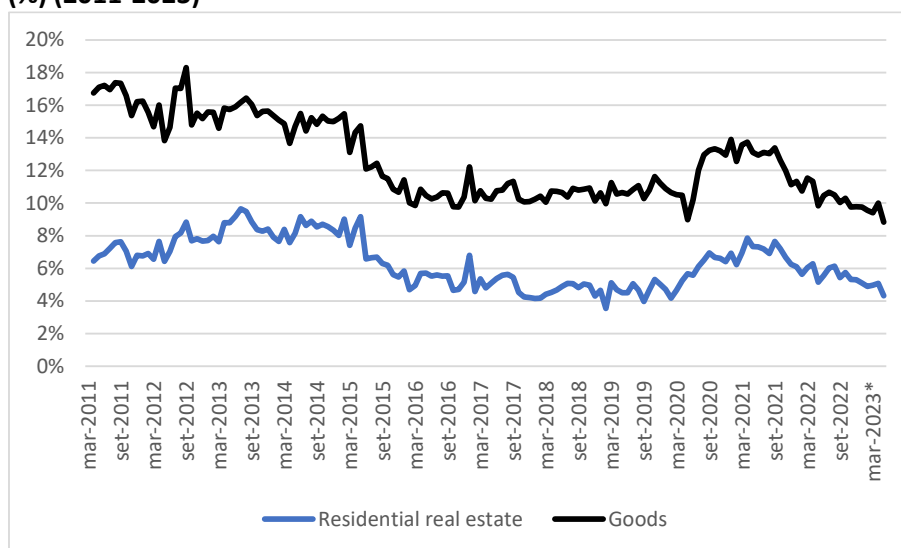
Source: Authors' calculations based on data from the Central Bank of Brazil.

¹² There is a methodological break in the time series due to changes in the information collected by the System of Credit Information (SCI) of the Central Bank of Brazil. Up to 2012, SCI gathered information on the sum of loans above the threshold of BRL 5,000 for the same client; from 2012 onwards, this threshold was lowered to BRL 1,000, including a larger set of transactions

Although households had access to new loans along most of the period, it is important to investigate the kind of loans demanded. As seen in Section 1, in managing cash-flows, households can recur to credit in order to buy a home, cover consumption plans, to service and roll-out debt, among other things. Therefore, an important qualification on the indicator of increasing leverage is to investigate the motive for the credit expansion.

In the first half of the 2010s, financing to vehicles and other goods and to residential real estate represented about 1/4 of new loans (Figure 6). Therefore, part of new household loans was motivated by and contributed to an expansion of consumption of high price goods, a signal of improving living standards of the Brazilian population. However, during economic stagnation, the new upward trend in household credit was more mixed, with loans without a pre-specified destination and with features that would characterize them as loans of *lower quality*.

Figure 6. Share of residential real estate and vehicles and other goods financing in new loans (%) (2011-2023)



Source: Authors' calculations based on data from the Central Bank of Brazil.

By loans of lower quality, we mean the credit lines that are more expensive, with higher interest rates, and present larger delinquency rates. Table 1 illustrates the categories identified with such features, namely overdraft, credit card revolving loans (Rev.), and

credit card financing or installment loans (Inst.), as well as credit card ‘spot’ or purchase loans. An overdraft is a loan that allows a client to keep using their account after its balance reaches zero. Credit card loan in Brazil is divided into three categories: (i) ‘spot’ or credit card purchases, in which the client borrows against their credit card limit and then pays back in the due time (normally one month), with no interest added to scheduled payments; (ii) financing or installment loans, which are financed by the card issuer with incidence of interest, which is paid monthly over a set repayment term; and (iii) revolving credit, which is the finance the outstanding credit card balance (remaining after payment due date) or cash withdrawals that generate one payment due at next credit card bill. While credit card purchases do not charge interest, the last two categories are associated with very (very) high interest rates.

Figure 7 shows the percentage of loans of lower quality according to the availability of data. Data shows a decrease in the share of bad quality loans from 2012 to 2019, a peak and valley in 2020 following the effects of the Emergency Aid cash transfers, and then an increase from 2021 on. The decrease of bad quality loans can be interpreted as the strategies of Brazilian banks regarding the quality of their credit portfolios. In this sense, they turn towards payroll loans and other loans with guarantees amid the 2015-2016 recession and attempts to renegotiate with clients that defaulted (Martins et al., *forthcoming*). Also new regulatory changes limited debt-spiral in credit card revolving balances¹³.

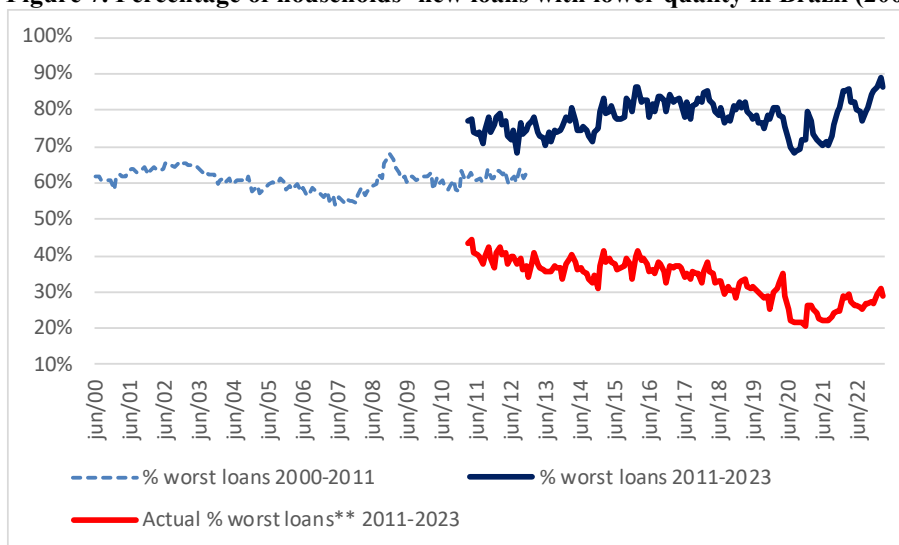
¹³ Resolution no. 4,549/2017 of the National Monetary Council set that the outstanding balance of credit card when not fully settled by the due date can only be subject to financing in the form of revolving credit until the due date of the subsequent bill. After this timeframe, the financial institution has to offer alternative credit lines – e.g., credit card installments or regular consumer loans – with better conditions.

Table 1. Household new loans by category – selected indicators (yearly averages)

	New loans (BRL billion)					Delinquency rates 90 days (%)					Interest rates (% py.)				
	Total	Over-draft	Credit card			Total	Over-draft	Credit card			Total	Over-draft	Credit card		
			Rev.	Inst.	Spot			Rev.	Inst.	Spot			Rev.	Inst.	Spot
2011	99	25	13	2	34	5	12	34	3	0	36	150	288	113	0
2012	106	26	13	2	38	5	14	37	5	0	32	135	290	112	0
2013	122	27	16	2	46	5	13	35	3	0	28	124	261	104	0
2014	134	28	17	2	53	4	13	34	0	0	30	152	292	106	0
2015	130	30	16	3	55	4	15	37	0	0	35	214	378	122	0
2016	128	30	15	2	58	4	16	37	1	0	41	273	474	151	0
2017	139	30	16	3	64	4	15	37	1	0	36	278	409	163	0
2018	154	31	16	4	74	4	14	35	2	0	31	265	309	167	0
2019	177	32	17	5	86	3	15	35	4	0	30	264	304	174	0
2020	179	26	15	4	86	3	15	37	6	0	25	119	313	152	0
2021	224	29	19	6	113	3	10	30	5	0	26	125	336	166	0
2022	268	36	28	8	147	4	12	41	7	0	33	130	381	178	0
2023*	266	38	31	10	154	4	13	46	9	0	36	131	421	188	0

Source: Authors' calculations based on data from the Central Bank of Brazil. *March 2023.

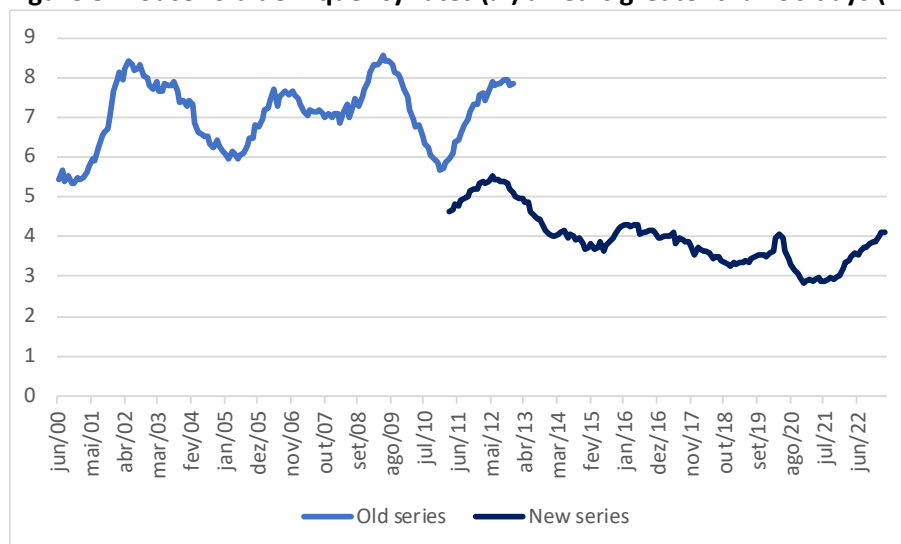
Figure 7. Percentage of households' new loans with lower quality in Brazil (2000-2023)



Source: Central Bank of Brazil. For new loans from 2000 to 2011: overdraft and credit cards. From 2011 to 2023: overdraft and credit cards without credit card purchases.

Finally, Figure 8 shows the delinquency rates in Brazil for household loans (it refers to payments that are more than 90 days past due,¹⁴ observe that defaulted loans recognized as a loss by the financial institution are not in that sum). Although indebtedness indicator increased along the time, as shown before, and labor marked and average real wages lost value, delinquency rates decreased from 2011 until 2021. This decrease can be explained by the significant and steady decrease of interest rates from 2016 to 2021 that probably contributed to reducing pressures on debt service payments on household expenses in a context of household debt growth. From 2021 on, it was the surge in interest rates and the deterioration in the quality of credit which have made the lives of borrowers more difficult and household default rates have risen. It is also worth mentioning the large participation of payroll loans that present a very low delinquency rate.

Figure 8. Household delinquency rates (%) arrears greater than 90 days (2000-2023)



Source: Central Bank of Brazil.

Summing up, we showed in this section that, even though household indebtedness tells a story of increasing financial fragility, in practice we need a more in-depth analysis to properly assess the behavior of financial fragility. An increase in debt might finance

¹⁴ According to the Central Bank of Brazil, delinquency rates measure the sum of outstanding credit operations with at least one payment past due 90 days, divided by the total outstanding credit operations balance of that kind. This index disregards operations classified as losses.

enhanced living conditions or set in motion a debt-spiral that might result in overindebtedness and social vulnerability. We argued that financial fragility – and not indebtedness – is a key to understand such different possibilities. In the next section we will develop a composite indicator to better understand how financial fragility of Brazilian households evolved over time.

4 A composite indicator of Brazilian households' financial fragility (2005-2023)

4.1 Empirical literature on households' financial fragility

Indebtedness (leverage) and financial fragility are two distinct concepts. However, they are interconnected in some way. When building an indicator of financial fragility, it is important to recognize the interconnections between them, but also the limits that separate what these concepts communicate.

As Pedrosa (2019) argues considering the corporate sector, changes in the leverage ratio are not necessarily associated with changes in systemic financial fragility. In the household sector, the accumulation of debt and leverage can smooth consumption patterns but also spur more fragile financial positions in the short-term, even though the medium-term effects on financial fragility will depend on macroeconomic developments: household credit might have positive effects on demand, directly and via multipliers, resulting in larger incomes, which might foster the capacity of households to repay debts in a second moment (Barba and Pivetti, 2008; Pariboni, 2016; Mian and Sufi, 2018; Brochier and Freitas, 2021). On the other hand, large debt burdens can lower aggregate demand, thus affecting negatively income¹⁵ and prompting periods of financial instability (Mian, Straub and Sufi, 2021; Pedrosa, Brochier and Freitas, 2023).

¹⁵ In addition, the literature on financialization highlights that *financial expropriation*, i.e., ‘the extraction of bank profits through direct transfers of personal revenue’ (Lapavitsas, 2011, p. 263), follows from the increase in households’ indebtedness.

So far, the Minskyan literature on households' financial fragility is very restricted (Leclaire, 2023). Relatively scarce households' individual level data, covering incomes, balance sheets, debt service etc., is an obstacle, though some mainstream contributions focusing in the United States and Europe can be found (Johansson and Persson, 2006; Zajączkowski and Żochowski, 2007; Michelangeli and Pietrunti, 2014; Ampudia, van Vlokhoven and Żochowski, 2016). Often such approaches attribute a discretionary threshold to determine if a household is financially fragile or not¹⁶, while other contributions refer to alternative measures such as the ability to cope with unexpected expenses, based on survey data (Lusardi, Schneider and Tufano, 2011; Hasler, Lusardi and Oggero, 2018; Clark, Lusardi and Mitchell, 2021).

In this section we depart from the focus on households' individual-level data and develop a composite indicator of households' financial fragility to Brazil based on Minsky's insights on the survival constraint. We acknowledge that financial fragility is a multidimensional concept, which accounts for the ability to repay debts in due time. In this sense, we dislocate the discussion of households' indebtedness from measures of aggregate 'leverage,' such as household liabilities over disposable income¹⁷, to a more complex set of variables. For building this index we will follow OECD's (2005) methodology for composite indicators.

Such indicators can summarize complex and multi-dimensional realities, enabling users to compare complex dimensions more effectively. For the purposes of this paper, a composite indicator of households' financial fragility seems to fit as the management of financial positions by households demands the understanding of the complex interactions among indebtedness, debt service, labor markets, income, delinquency rates and so on. It is an entirely novel contribution to the literature.

¹⁶ Brunetti, Giarda and Torricelli (2016, p. 648) are an exception as they extrapolate past data to calculate the typical financial practices of Italian households.

¹⁷ Though this ratio mixes measures of stocks and flows, it is widely used in the literature.

4.2 A Minskyan indicator of Brazilian households' financial fragility (2005-2023)

Our theoretical framework, adapted from the works of Hyman Minsky, sees households as financial units that are subject to a survival constraint. In our empirical exercise, four dimensions will be considered to assess Brazilian households' financial fragility. Firstly, there is a dimension related to the mismatch of households' financial expenditures and incomes, the *debt-service dimension*. Secondly, the capacity of households to source cash-inflows from labor income. In that respect, the second dimension of financial fragility is the current *state of labor markets*. We use unemployment rate and underutilization rate. Thirdly, there is a *qualitative dimension* of household loans. We use the evolution of the share of household loans with lower quality; associated to very expensive interest rates. Fourthly, we use *default* as the last dimension of households' financial fragility, representing a situation of persistent cash flow mismatching. This data is sourced from the Central Bank of Brazil and the Brazilian Institute of Geography and Statistics (IBGE).

The composite indicator of households' financial fragility (CIHFF) is then set as follows:

$$CIHFF = f(\text{debt service } (ds), \text{labor market } (lm), \text{credit quality } (cq), \text{default } (d))$$

We transformed all the series in indexes of basis 100, assuring that all series have the same unit of measurement. We calculate CIHFF for two different periods due to the methodological changes in time series, one from March 2005 to December 2012 and one from March 2012 to February 2023. The reference for the basis is derived from the average of each indicator between March 2012 and December 2012.

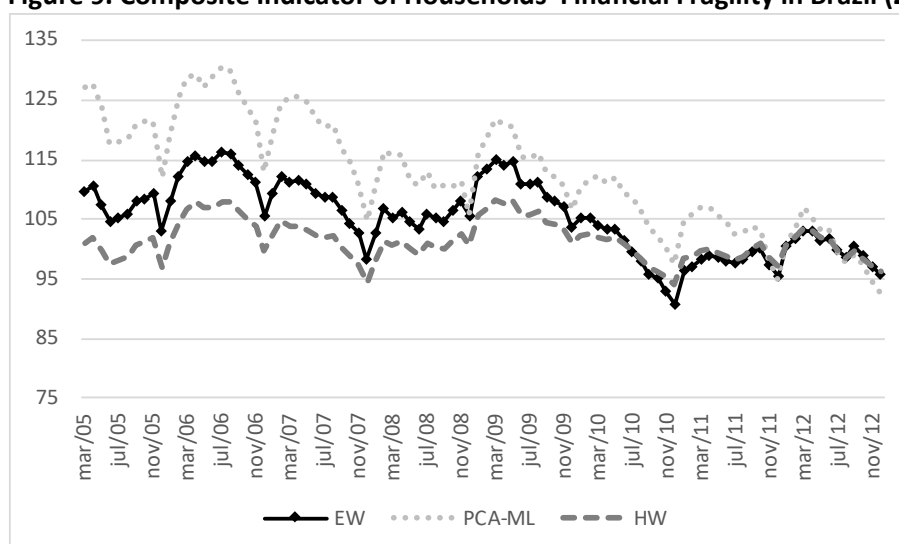
We use three different methods for weighing the composite indicator: equal weights (EW), hierarchical weights (HW) and weights based on principal component and common factor analysis for the two subsamples (PCA-ML) – see Annex II for more information. The differences in these methods have an impact on the levels of the series; however, their significance diminishes when examining the general trends of CIHFF observed from 2012 to 2023.

The two subsamples are split into different periods, as financial fragility appears to evolve in mini-cycles, characterized by alternating peaks and valleys (Figure 9).

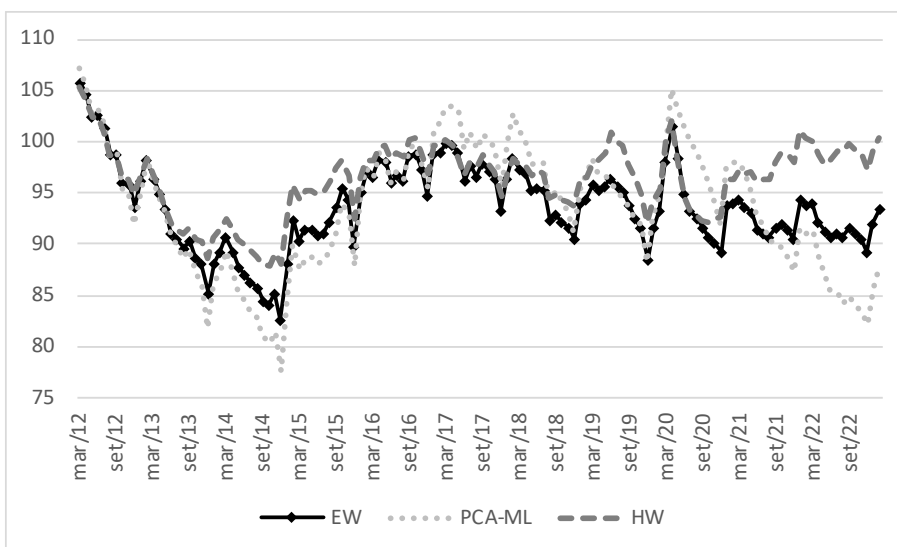
During the time span encompassing March 2005 to December 2012 (Figure 9(a)), these mini-cycles can be observed in the following periods: (i) from 2005 until the onset of 2008; (ii) from 2008 to 2010; and (iii) an upward phase from 2011 to 2012. In this period, we highlight the mini-cycle of the global financial crisis, in which the increase of financial fragility is associated to the contraction of economic activity and the recovery that followed.

During the time span encompassing March 2012 to February 2023 (Figure 9(b)), we can see (i) a huge decrease in fragility from 2012 to 2014, and (ii) an increase in fragility which was not properly reversed since the 2015-2016 recession. The first movement can be associated with the then rapid decrease in interest rates, which contributed to tame delinquency rates in a context of high employment. The second movement is more complex, as it mixes the effects of the 2015-2016 recession, the stagnation that followed and the COVID-19 crisis.

Figure 9. Composite Indicator of Households' Financial Fragility in Brazil (2005-2023)



(a) Sample 1: 2005-2012 (*lm* refers to unemployment rate, *cq* includes credit card purchases and refers to loans above BRL 5,000, *d* refers to loans above BRL 5,000)



(b) Sample 2: 2012-2023 (*lm* refers to underutilization rate, *cq* does not includes credit card purchases and refers to loans above BRL 1,000, *d* refers to loans above BRL 1,000)

Source: Authors' calculations.

We highlight the increase indebtedness since 2018 already took place in an environment of increased financial fragility. With lockdowns and the COVID-19, household financial fragility skyrocketed (February March 2020) but the government policies were able to set a new scenario. In other words, our empirical results indicate that despite a significant increase in indebtedness following the COVID-19 crisis, there was no corresponding rise in financial fragility.

While this finding appears to contradict Minsky's insights, there are several factors that may help explain this behavior. Firstly, prior to the COVID-19 crisis, there was a notable shift in credit supply towards higher-quality household loans. This strategic adjustment by Brazilian banks aimed to address the decrease in interest rates during the 2017-2020 period, with a particular focus on lending to creditworthy households and offering improved credit terms (Martins et al., forthcoming).

Secondly, this outcome could be attributed to the unconditional cash transfers provided by the Emergency Aid program, which allocated BRL 293 billion in 2020 and BRL 57 billion in 2021 to Brazilian households. Even though an analysis of the actual effects of Emergency Aid (EA) cash transfers is beyond the scope of this paper, we can attribute a significant role to this policy in providing households with greater flexibility in managing

their cash flows. Indeed, CIHFF peaked in March 2020, signaling a potential stark deterioration, but the indicator got back on track as soon as the transfers took place¹⁸.

Thirdly, it is important to acknowledge that our analysis is based on aggregated data, which, by its nature, may inadvertently disregard or downplay issues of inequality. The Central Bank of Brazil's Reports of Financial Citizenship reveal substantial disparities in debt service ratios between individuals in the lower income distribution bracket and those in the top 1%. Delinquency rates also exhibit significant differences, with the bottom half experiencing four times higher delinquency rates compared to the top 1% (Central Bank of Brazil, 2021; 2022).

Conclusions

Household indebtedness reached an all-time high in Brazil in recent years. This data point is usually used in the media and academic literature to indicate that Brazilian households are in dire straits. In this paper we used a Minskyan framework to analyze this issue, assuming that such lenses can provide a more sophisticated analysis of household fragility in general, and in the Brazilian case in particular. This topic is important because household financial fragility can metamorphose into social distress.

Descriptive statistics show that while household credit increased continuously from 2005 on, the features of this expansion varied over time. In the recent surge of indebtedness, households are hypothecating an increasing part of their income to service debts, but the quality of these loans is not the lowest when compared to historical data. Moreover, delinquency rates were kept under control until 2021, a consequence of smaller interest rates and government policies to cope with the COVID-19 crisis, especially EA cash

¹⁸ Lavinás, Bressan and Rubin (2022) argue that EA cash transfers were functional to keep the dynamics of households' indebtedness in motion and maintain the profitability of Brazilian banks. In their own words: 'The provision of liquidity to households, despite partially offsetting income losses and preventing the collapse of demand, facilitated the reorganization of the household debt cycle by reversing the trend of increasing delinquency rates' (Lavinás, Bressan and Rubin, 2022, p. 84; our translation).

transfers; from mid-2021 onwards, defaults started to increase, mirroring an upsurge in household credit risks.

The first message of our analysis is that household financial fragility is a complex, multidimensional phenomenon. Acknowledging this aspect, we then developed an aggregate composite indicator of household financial fragility to study the Brazilian experience from 2005 to 2023. This approach was chosen because analyzing individual households has several data limitations, including its very limited time span. Attention is given to the period 2012-2023, which shows that the 2015-2016 recession triggered an increase in fragility which was not properly reversed since then. The COVID-19 crisis set the stage for a surge in household financial fragility, but government policies contributed to avoiding this tendency's materialization.

Currently, we are seeing concerted efforts to change the regulatory landscape of household indebtedness. For instance, in 2021, the legislature enacted a new law on the overindebtedness of Brazilian households, introducing a minimum livelihood standard and principles for debt renegotiation, which has been suffering adjustments by the new government. In 2022, the government raised the debt service thresholds of payroll loans from 35% to 40% to public servants and from 40 to 45% for private sector security beneficiaries, and introduced a new form of payroll loan based on the Brazil Aid cash transfers. The latter was subsequently suspended due to a suspicion that, in practice, it aimed to influence the results of the 2022 election. In 2023, we are expecting the announcement of a program aimed at assisting households burdened by debt, known as 'Desenrola Brasil' or 'Untangles Brazil' in a free translation. This program is expected to facilitate renegotiation for lower income households, though we do not know yet its actual terms and features.

The reader should notice that all those measures perpetuate indebtedness, while is not already clear if they will guarantee some room for diminishing household financial fragility. This will depend on the terms offered in the debt renegotiation processes. In addition, a lower level of interest rates on household credit and the recuperation of household income are necessary conditions to reduce the participation of new low quality credit and therefore the probability of a new cycle of household overindebtedness. Therefore, there is a structural component in household financial

fragility that sets the stage for an on-going research agenda. This paper contributed with a first aggregate measure of household financial fragility based on a Minskyan approach, so we believe this methodology can be scrutinized and improved in future research. Other works should also approach this issue from the microeconomic level of the household, despite data availability issues. Finally, this discussion has to be framed in a broader picture of socioeconomic development.

In that sense, it is crucial to reassess the role of household indebtedness from a broader perspective. Credit should be linked to enhance person's livelihood, facilitating the acquisition of goods and assets, mitigating consumption volatility, and providing a more convenient way to make payments. Nevertheless, households should not depend on credit to compensate for income loss caused by deteriorating labor markets or to meet day-to-day expenses that should be shouldered by the state, such as healthcare and education.

References

Alves Jr., A.; Dymski, G. A.; L. F. Paula. 2008. “Banking strategy and credit expansion: a post-Keynesian approach.” *Cambridge Journal of Economics* 32(3): 395-420. doi: <https://doi.org/10.1093/cje/bem035>

Ampudia, M., van Vlokhoven, H., Zochowski, D. 2016. “Financial Fragility of Euro Area Households”. *Journal of Financial Stability* 27: 250-262. doi: <http://dx.doi.org/10.1016/j.jfs.2016.02.003>

Barba, A., and M. Pivetti. 2009. “Rising household debt: Its causes and macroeconomic implications – a long-period analysis”. *Cambridge Journal of Economics* 33 (1): 113-137. doi: <https://doi.org/10.1093/cje/ben030>

Brochier, L., and F. Freitas. 2021. “Debt and demand regimes in canonical growth models: a comparison of neo-Kaleckian and Supermultiplier models”. Paper presented at the 49th Brazilian National Meeting of Economics, On-line, December 6-10.

Brunetti, M., Giarda, E., and C. Torricelli. 2016. “Is Financial Fragility a Matter of Illiquidity? An Appraisal for Italian Households”. *Review of Income and Wealth* 62: 628-649. doi: <https://doi.org/10.1111/roiw.12189>

Central Bank of Brazil. 2021. *Report on Financial Citizenship 2020*. Brasília, DF: Central Bank of Brazil.

Central Bank of Brazil. 2022. *Report on Financial Citizenship 2021*. Brasília, DF: Central Bank of Brazil.

Clark, R. L., A. Lusardi, and O. S. Mitchell. 2021. “Financial Fragility during the COVID-19 Pandemic”. *AEA Papers and Proceedings* 111: 292-96. doi: <https://doi.org/10.1257/pandp.20211000>

Corrêa, M. F.; Lemos, P. M.; C. Feijó. 2017. “Financialization, non-financial corporations and the recent economic cycle in the Brazilian economy.” *Economia e Sociedade* 26(spe): 1127-1148. doi: <https://doi.org/10.1590/1982-3533.2017v26n4art11>

Cynamon, B.; S. Fazzari. 2013. “The End of the Consumer Age.” in *After the Great Recession: The Struggle for Economic Recovery and Growth*, edited by B. Cynamon, S. Fazzari, and M. Setterfield, 129-155. New York: Cambridge University Press.

Faberman, J., and A. Rajan. 2020. “Is the Unemployment Rate a Good Measure of People Currently Out of Work?” Chicago Fed Insights. Accessed in May 25, 2023. <https://www.chicagofed.org/publications/blogs/chicago-fed-insights/2020/unemployment-rate-good-measure-of-out-of-work>

Garber, G.; Mian, A.; Ponticelli, J.; A. Sufi. 2019. “Household debt and recession in Brazil. Handbook of US Consumer Economics.” in *Handbook of US Consumer Economics*, edited by A. Haughwout and B. Mandel, 97–119. New York: Elsevier. doi: <https://doi.org/10.1016/b978-0-12-813524-2.00004-4>

Gentil, D.; M. A. P. Bruno. 2022. “Endividamento das famílias e expropriação salarial no Brasil: o motor da acumulação financeira na pandemia e além.” [Household debt and wage expropriation in Brazil: the engine of financial accumulation during the pandemic and beyond] in *Dominância financeira e privatização das finanças públicas no Brasil* [Financial dominance and privatization of public finance in Brazil] organized by R. Marques and J. C. Cardoso Júnior, 420-444. Brasília: Fonacate.

Hasler, A., A. Lusardi, and N. Oggero. 2018. “Financial Fragility in the US: Evidence and Implications.” The George Washington University School of Business, Global Financial Literacy Excellence Center. Accessed in May 25, 2023. <https://gflec.org/wp-content/uploads/2018/04/Financial-Fragility-Research-Paper-04-16-2018-Final.pdf>

Johansson, M., and M. Persson. 2006. “Swedish Households’ Indebtedness and Ability to Pay: A Household Level Study.” *Sveriges Riksbank Economic Review* 3: 24-40.

Lapavistas, C. 2011. “Theorizing financialization.” *Work, Employment and Society* 25(4): 611–626. doi: <https://doi.org/10.1177/0950017011419708>

Lavinas, L. 2017. *The takeover of social policy by financialization: the Brazilian paradox*. New York: Palgrave Macmillan.

Lavinas, L., Bressan, L., and P. Rubin. 2022. “Brasil: Como as Políticas de Enfrentamento da Pandemia Inauguraram um Novo Ciclo de Endividamento Familiar” [“Brazil: How Pandemic-related Policies Inaugurated a New Cycle of Family Indebtedness”] in *O Brasil no Inferno Global: Capitalismo e Democracia Fora dos Trilhos* [Brazil in Global Hell: Capitalism and Democracy Off the Track], edited by A. Singer; C. Araujo and F. Rugitsky, 249-292. São Paulo: FFLCH/USP.

Leclaire, J. 2023. “Does Household Debt Matter to Financial Fragility?” *Review of Political Economy* 35(2): 434-453. doi: <https://doi.org/10.1080/09538259.2021.1945192>

Lusardi, A., D. J. Schneider, and P. Tufano. 2011. Financially Fragile Households: Evidence and Implications. NBER Working Paper 17072. doi: <https://doi.org/10.3386/w17072>

Martins, N. M.; Sarno, P. M.; Macahyba, L.; Boechat Filho, D. Forthcoming. “Taxa de lucro dos bancos no Brasil: uma análise dos seus componentes e de sua evolução no período 2015-2020.” *Análise Econômica*.

Martins, N. M.; E. T. Torres Filho. 2022. “Regulating development banks: a case study of the Brazilian Development Bank (BNDES) (1952-2019).” *Cadernos do Desenvolvimento* 17: 50-78. doi: <https://doi.org/10.29327/2148384.17.32-3>

- Mian, A., Sufi, A. and E. Verner. 2017. “Household debt and business cycles worldwide”. *The Quarterly Journal of Economics* 132 (4): 1755-1817. doi: <https://doi.org/10.1093/qje/qjx017>
- Mian, A., and A. Sufi. 2018. “Finance and Business Cycles: The Credit-Driven Household Demand Channel.” *Journal of Economic Perspectives* 32 (3): 31-58. doi: <https://doi.org/10.1257/jep.32.3.31>
- Mian, A., Straub, L., and A. Sufi. 2021. “Indebted Demand.” *The Quarterly Journal of Economics* 136 (4): 2243-2307. doi: <https://doi.org/10.1093/qje/qjab007>
- Michelangeli, V., and M. Pietrunti. 2014. “A microsimulation model to evaluate Italian households’ financial vulnerability.” *The International Journal of Microsimulation* 7 (3): 53-79. doi: <https://doi.org/10.34196/IJM.00107>
- Minsky, H. P. 2008. *Stabilizing an unstable economy*. New York: McGraw-Hill.
- Minsky, H. P. 2016. *Can ‘it’ happen again? Essays on instability and finance*. New York: Routledge (First published by M.E. Sharpe 1982).
- Mora, M. 2014. “A evolução do crédito entre 2003 e 2012” [“The evolution of credit between 2003 and 2012”] in *Evolução recente das políticas monetária e cambial e do mercado de crédito no Brasil* [Recent evolution of monetary and foreign exchange policies and the credit market in Brazil], organized by J. R. C. Souza Júnior, 307-344. Brasília: Ipea.
- OECD (Organisation for Economic Cooperation and Development). 2005. “*Handbook on Constructing Composite Indicators: methodology and user guide*.” Paris: OECD.
- Pariboni, R. 2016. “Household consumer debt, endogenous money and growth: A supermultiplier-based analysis.” *PSL Quarterly Review* 69 (278): 211-234. doi: https://doi.org/10.13133/2037-3643_69.278_1
- Pedrosa, I. 2019. “Firms’ leverage ratio and the Financial Instability Hypothesis: an empirical investigation for the US economy (1970–2014).” *Cambridge Journal of Economics* 43 (6): 1499-1523. doi: <https://doi.org/10.1093/cje/bez004>
- Pedrosa, I., L. Brochier, and F. Freitas. 2023. “Debt hierarchy: Autonomous demand composition, growth and indebtedness in a Supermultiplier model.” *Economic Modelling*. doi: <https://doi.org/10.1016/j.econmod.2023.106369>
- Serrano, F.; R. Summa. 2015. “Aggregate demand and the slowdown of Brazilian economic growth in 2011-2014.” *Nova Economia* 25(spe): 803-833. doi: <http://dx.doi.org/10.1590/0103-6351/3549>

Zajączkowski, S. and D. Żochowski. 2007. “The distribution and dispersion of debt burden ratios among households in Poland and its implications for financial stability.” Proceedings of the IFC Conference on “Measuring the financial position of the household sector,” Basel, August 30-31.

Annex I - A summary of the macroeconomic context in Brazil (2003-2022)

Table A1. Selected macroeconomic indicators (2003-2022)

	GDP growth %	Household cons. growth %	Investment rate % GDP	Interest rate (target) % p.p.	Inflation %	Unemployment* %	Real effective earnings* BRL
2003	1,1	4,0	16,6	16,5	9,3	10,9	2.053
2004	5,8	4,5	17,3	17,8	7,6	9,6	2.132
2005	3,2	5,4	17,1	18,0	5,7	8,4	2.176
2006	4,0	6,7	17,2	13,3	3,1	8,4	2.343
2007	6,1	6,5	18,0	11,3	4,5	7,4	2.501
2008	5,1	4,4	19,4	13,8	5,9	6,8	2.621
2009	-0,1	6,2	19,1	8,8	4,3	6,8	2.599
2010	7,5	5,0	20,5	10,8	5,9	5,3	2.751
2011	4,0	3,5	20,6	11,0	6,5	4,7	2.826
2012	1,9	3,6	20,7	7,3	5,8	6,9	2.892
2013	3,0	2,3	20,9	10,0	5,9	6,3	2.939
2014	0,5	-3,2	19,9	11,8	6,4	6,6	2.988
2015	-3,6	-3,8	17,8	14,3	10,7	9,1	3.161
2016	-3,3	2,1	15,5	13,8	6,3	12,2	3.155
2017	1,3	2,3	14,6	7,0	3,0	11,9	3.204
2018	1,8	2,6	15,1	6,5	3,8	11,7	3.261
2019	1,2	-4,5	15,5	4,5	4,3	11,1	3.281
2020	-3,3		16,6	2,0	4,5	14,2	3.193
2021	5,0			9,3	10,1	11,1	2.962
2022	2,9			13,8	5,8	7,9	3.209

Source: Central Bank of Brazil and Brazilian Institute of Geography and Statistics (IBGE).

* From 2012 on such series takes into account the new methodology of the Continuous National Household Sample Survey.

Annex II - Weighing the Composite Indicator of Households' Financial Fragility in Brazil

As stated in OECD's Handbook: 'correlation and compensability issues among indicators need to be considered and either be corrected for or treated as features of the phenomenon that need to be retained in the analysis' (OECD, 2005, p. 15). In this paper, we used three different methods for weighing the composite indicator.

Firstly, we use equal weighting (EW) so the overall indicator is simply the arithmetic average of the normalised indicators. As put forth by OECD (2005, p. 31), 'this essentially implies that all variables are "worth" the same in the composite, but it could also disguise the absence of a statistical or an empirical basis. [...] In any case, equal weighting [...] implicitly implies that the weights are equal.' A major setback of this approach is that this could result in an unbalanced structure in the composite indicator.

In order to address this issue, we adopted two alternatives. In the second place, we attributed hierarchical weighing based on a process similar to the budget allocation process (BAP) but where the experts are senior researchers of the Financial System Observatory of the Universidade Federal do Rio de Janeiro (OECD, 2005, p. 96). We know that this approach might result in arbitrary weights, but we believe it would add information to the discussion in the sense that their judgment regarding financial fragility will result in a more balanced approach, which is not entirely dependent on correlations. In this process, we attributed the following weights to the variables: $ds_w = 0.475$, $lm_w = 0.20$, $cq_w = 0.175$, $d_w = 0.15$. Table A2 summarizes the weights attributed by each author.

Table A2. Weights according to BAP

	Expert 1	Expert 2	Expert 3	Expert 4	Average
Debt service	50%	40%	50%	50%	47,5%
Labor market	20%	30%	20%	10%	20,0%
Credit quality	20%	20%	10%	20%	17,5%
Default	10%	10%	20%	20%	15,0%
Total	100%	100%	100%	100%	100%

Source: Authors' elaboration.

Finally, we used principal components analysis (PCA) to group indicators according to their degree of correlation. As put forth by OECD (2005, p. 89), ‘The idea under PCA/FA is to account for the highest possible variation in the indicator set using the smallest possible number of factors. Therefore, the composite no longer depends upon the dimensionality of the data set but rather is based on the “statistical” dimensions of the data.’ We used the add-in Analyse-it® for Excel to calculate correlations, principal components and common factors. Factors loadings were calculated using orthogonal rotation and the varimax method. Weights were built from the matrix of factor loadings after rotation, and ‘the square of factor loadings represents the proportion of the total unit variance of the indicator which is explained by the factor’ (OECD, 2005, p. 90).

The tables A3 to A6 below present the correlations matrix for the two subsamples (March 2005 to December 2012, and March 2012 to February 2023), the factor loading matrix and the resulting weights. One should notice default and debt service alternate high weights in the two subsamples.

Table A3. Correlation matrix for individual indicators (2005-2012)

Pearson's r	Debt service	Labor	Credit quality	Default
Debt service	-	-0,914	0,519	0,083
Labor	-0,914	-	-0,515	0,007
Credit quality	0,519	-0,515	-	0,268
Default	0,083	0,007	0,268	-

Source: Authors' elaboration using Analyse-it® for Excel.

Table A4. Factor loadings based on principal components and weights (2005-2012)

	Factor 1	Uniqueness	Communality	Weights
Debt service	0,965	0,068	0,932	0,439
Labor	-0,946	0,104	0,896	0,422
Credit quality	0,541	0,707	0,293	0,138
Default	0,058	0,997	0,003	0,002

Source: Authors' elaboration using Analyse-it® for Excel.

Table A5. Correlation matrix for individual indicators (2002-2023)

Pearson's r	Debt service	Labor	Credit quality	Default
Debt service	-	-0,073	0,021	-0,256
Labor	-0,073	-	0,735	-0,688
Credit quality	0,021	0,735	-	-0,654
Default	-0,256	-0,688	-0,654	-

Source: Authors' elaboration using Analyse-it® for Excel.

Table A6. Factor loadings based on principal components and weights (2012-2023)

	Factor 1	Uniqueness	Communality	Weights
Debt service	-0,043	0,998	0,002	0,001
Labor	-0,876	0,233	0,767	0,368
Credit quality	-0,837	0,300	0,700	0,336
Default	0,785	0,383	0,617	0,296

Source: Authors' elaboration using Analyse-it® for Excel.