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LOWER FINANCIAL LITERACY INDUCES USE OF INFORMAL LOANS

Deficit de alfabetização financeira induz ao uso de empréstimos em mercados informais

Déficit de educación financiera induce el uso de préstamos en mercados informales

DANILO BRAUN SANTOS [1]
danilobraun@gmail.com
ORCID:0000-0001-8275-1059

WESLEY MENDES-DA-SILVA [2]
mr.mendesdasilva@gmail.com
ORCID: 0000-0002-5500-4872

LAURO GONZALEZ [2]
lauro.gonzalez@fgv.br
ORCID: 0000-0001-9316-6525

[1]*Universidade Federal de São Paulo, Escola Paulista de Política, Economia e Negócios – São Paulo – SP, Brazil*

[2]*Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo – São Paulo – SP, Brazil*

ABSTRACT

Finance literature documents associations between a family's financial literacy and its propensity to borrow. However, most studies focus exclusively on formal loan markets. Based on 2,023 observations about financial behavior of Brazilian families, we examined the impacts of financial literacy on informal borrowing, such as loans from friends or moneylenders. Using multinomial logit models, we compared financial literacy's effects on the propensity to take informal loans between families that did not borrow at all and those who took bank loans. Financial literacy is measured by the investment in capitalization bonds, a financial instrument in the Brazilian market. The results suggest that financial literacy's relevance to informal loans may exceed that for formal credit channels.

KEYWORDS | Loan, informal loan, financial literacy, capitalization bond, behavioral finance.

RESUMO

A literatura de finanças documenta associações entre alfabetização financeira de famílias e sua propensão a tomar empréstimos. Contudo verifica-se predominância de estudos que se concentram exclusivamente em mercados formais de crédito. Com base em 2.023 observações sobre comportamento financeiro de famílias brasileiras, examinamos impactos da alfabetização financeira sobre a tomada de empréstimos em mercados informais, tais como empréstimos obtidos com amigos/conhecidos, ou mesmo agiotas. Com o emprego de modelos logit multinomiais, mensuramos os efeitos da alfabetização financeira sobre a propensão a tomar empréstimos na informalidade, comparando dois grupos: famílias que não contrataram nenhum tipo de empréstimo, e aquelas que tomaram empréstimos bancários. Adotou-se como proxy para o nível de alfabetização financeira o consumo de um produto financeiro encontrado no mercado brasileiro, o título de capitalização. Os resultados sugerem que a alfabetização financeira pode ter maior relevância na propensão a empréstimos informais comparativamente ao crédito formal.

PALAVRAS-CHAVE | *Crédito, crédito informal, alfabetização financeira, títulos de capitalização, finanças comportamentais.*

RESUMEN

La literatura de finanzas documenta asociaciones entre la educación financiera de familias y su propensión a sacar préstamos. No obstante, se verifica la predominancia de estudios que se concentran exclusivamente en mercados formales de crédito. Con base en 2.023 observaciones acerca del comportamiento financiero de familias brasileñas, examinamos los impactos de la educación financiera sobre la toma de préstamos en mercados informales, tales como préstamos obtenidos con amigos/conocidos, o inclusive usureros. Con el empleo de modelos logit multinomiales medimos los efectos de la educación financiera sobre la propensión a sacar préstamos informalmente, comparando dos grupos: familias que no contrataron ningún tipo de préstamo, y las que sacaron préstamos bancarios. La proxy adoptada para el nivel de educación financiera es el consumo de un producto financiero encontrado en el mercado brasileño, el título de capitalización. Los resultados sugieren que la educación financiera puede tener mayor relevancia en la propensión a sacar préstamos informales, comparativamente a la restricción de crédito formal.

PALABRAS CLAVE | *Crédito, crédito informal, educación financiera, títulos de capitalización, finanzas comportamentales.*

INTRODUCTION

The phenomenon of informality in the economy is seen with higher or lower intensity in most countries around the world. Schneider, Buehn, and Montenegro (2010) estimated what they called the *shadow economy* as a percentage of the Gross Domestic Product (GDP) for a group of 162 countries, from 1999 to 2007. The estimated informal economy in Brazil grew monotonically over that period. The average rate of growth was 40.5 percent and the last reading in 2007 was 43 percent. To this effect, the informality of the Brazilian economy is more explicitly similar to that (the average) of countries like Colombia (41%), Uruguay (51.5%), Ecuador (36.6%), and Venezuela (33.4%) than that of economies like China (13.5%), India (24%), Argentina (25.5%), and Chile (20.3%).

The informal economy not only compromises tax revenue but also distorts official figures on unemployment, income, consumption, and other indicators, which jeopardizes public policies that rely on such data. Moreover, Schneider et al. (2010) discuss the potential effects a growing informal economy can have on the official economy. If on the one hand the informal economy competes for labor, on the other hand, it has a positive effect on the formal economy, since at least two-thirds of the earnings from informal work are immediately spent in the official economy. Cole, Sampson, and Zia (2011) believe that one of the fastest ways of promoting financial development in emerging markets is attracting individuals and businesses to the formal financial sector.

According to Pagano (2001), efficient credit depends on a series of support institutions that can provide: (i) a reasonable rate of return for the creditors, (ii) a constant flow of information from the borrowers to the creditors, and (iii) the legal means to foreclose on the guarantees. Yet these institutions require borrowers to present evidence of their earnings, proof of address, and the ownership of foreclosable property. At least in the Brazilian market, there are no explicit hurdles for a worker holding an informal job to secure credit from official sources. In practice, this worker will face difficulties in furnishing documents related to income or assets that could be used as collateral. The flipside is higher risk and interest rates.

The feasibility of guarantee mechanisms is associated with the quality of legal institutions. La Porta, Lopez-de-Silanes, and Schleifer (1999) point out that emerging nations have institutional environments that are less favorable to the transfer of ownership of collateralized assets. An informal economy exacerbates these disadvantages, as assets without formal proof of title reduce in value drastically. Bertrand and Morse (2011) studied the behavioral bias in choosing payday loans and concluded that individuals can be fully informed regarding the interest rate charged by payday loans, can have no problems controlling themselves, and may not have overly optimistic expectations regarding their capacity to pay such loans. Nonetheless, they choose to take payday loans with high interest rates because they may have a pressing need for cash and have no other loan alternatives. In other words, their decision is not necessarily irrational, but reflects a choice to maximize utility vis-à-vis the limitations they face.

An alternative – but not excluding – point of view claims that the lack of financial literacy acts as an important barrier in the demand for financial services and products (Cole et al., 2011). If individuals have no knowledge of the products they are offered, or even if they cannot differentiate between the possible alternatives, they will not pursue the best alternatives. Lusardi (2008) points out that credit has become more accessible, but most individuals still cannot make simple calculations of compound interest.

The issue of financial literacy can be increasingly important as financial products become more abundant and complex. Lusardi and Mitchell (2014) argue that the development of financial markets brought advantages, such as bringing customized contracts and improving access to credit. However, it imposed more responsibility on households, who had to manage their finances responsibly. Some researchers suggest the possibility of a predatory marketing industry (Campbell, 2006; Gabaix & Laibson, 2006). In this regard, Gabaix and Laibson (2006) note that some companies can hide some information from shortsighted consumers (e.g., rates and fees).

An example of this is companies that offer credit cards with no annual fees, hiding the fact that this is only true for the first year of use. Thaler and Tucker (2013) support this argument by suggesting that disclosing product information is the key driver of efficiency in consumer markets, with positive externalities to society. Most studies focusing on informal borrowing analyze moneylending activities (Hoff & Stiglitz, 1997; Madestam, 2014). However, some studies point out that informal loans among friends and relatives represent a significant economic factor (Turvey, Kong, & Huo, 2010; Yuan & Gao, 2012). An Organization for Economic Cooperation and Development (OECD) survey carried out in 14 countries showed that more than one-third of those interviewed, in some of these countries, resorted to their network of acquaintances to secure a loan in the 12 months prior to the interview (OECD, 2013).

This same report suggests that in some countries, and within some groups, an individual's family and friends represent their first option in case of financial needs. Additionally, this

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behavior does not necessarily mean a lack of access to financial services. However, placing excessive trust on one's family and friends can in turn exert financial pressure on these groups and on informal networks. The limited research on this theme, particularly in Brazil, can be explained by inaccessible information on credit activities in the informal market. To the authors' knowledge, the only studies in Brazil focused on the Chinese community (Schiavini, Scherer, & Coronel, 2012; Sheng & Mendes-Da-Silva, 2014) and the state of São Paulo's coffee farming in the late 19th century (Tosi, Faleiros, & Teodoro, 2007; Tosi, Faleiros, & Fontanari, 2011).

In addition, none of the studies on the informal loan market addressed the topic of financial literacy. However, Cole et al. (2011) report that financial knowledge is an important predictor of financial behavior in emerging markets. Lusardi and Tufano (2009), in turn, warn that despite the increasing relevance of loan decisions in the face of recent credit crises, little research has examined the relationship between financial literacy and indebtedness. Therefore, there is a gap in terms of the analysis of the potential effects of financial literacy in Brazil, especially when related to the use of financial services by the lower-income classes. In this sense, moving forward with the understanding of financial literacy may be useful not only for developing better financial products, but also for improving public policies in housing, conditional cash transfers, etc.

This study analyzes the role of financial literacy when individuals take loans from informal sources. This paper is organized as follows. The following section describes the background – strategy used to identify the lack of financial literacy, proxied by investment in capitalization bonds, a financial instrument in Brazil. After that we describe the method employed and discuss the findings, finally we bring the concluding remarks.

BACKGROUND

Strategy employed to evaluate financial literacy

Financial literacy has gained the interest of several groups around the globe, such as policy makers, bankers, employers, community groups, and families planning for their future. It can be a result of the rapid creation of a myriad of new financial products, the increasingly global nature of financial markets with all the complexity it brings, and changes in political and demographic characteristics (Rose, 2008). This argument, together with the idea that literature about informal loans is scarce, supports the relevance and the contribution of this paper.

For the term "financial literacy," this study used the definition employed by the OECD (2013): "A combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately, achieve individual financial wellbeing" (Atkinson & Messy, 2012). The methods used to measure the level of financial literacy vary substantially (Hung, Parker, & Yoong, 2009). Some researchers use hypothetical financial situations (Lusardi, 2008; Lusardi & Mitchell, 2009, 2011a) or fictitious financial products (Carlin & Robinson, 2012).

Although financial literacy can be measured in levels, this study used a dummy variable to identify individuals with little financial literacy. The Brazilian market has a unique and widely available financial product called "capitalization bond," which does not contribute to the financial wellbeing of consumers, since other available products are as affordable as capitalization bonds – or even more so – offer similar or better benefits at lower costs, with fewer penalties and restrictions (Melo, Franklin, & Neves, 2012). Accordingly, this section presents arguments supporting the premise that individuals consuming these bonds have lower financial literacy.

Savings-based financial products

Capitalization bonds are registered securities that can be acquired in a single payment or in installments. Part of the funds invested are used to build capital. Based on contractual conditions, this capital is paid back in currency after a given period. The other part of the funds invested, pays for drawings (capitalization bond holders compete in drawings over the term of the contract and redeem the funds deposited at the end of the period) and administrative expenses.

There are four types of capitalization bonds. According to the National Capitalization Federation (FenaCap, 2013), the *Traditional* type is the most common, accounting for 81 percent of all sales in this segment. This bond returns the total amount paid by the underwriter, provided there were no late payments in the installment plan, if this was the selected form of payment. The second most common is the *Incentive* type, which represents 11 percent of all sales. Businesses use these bonds in sales campaigns or loyalty programs, passing the rights to the drawings on to the respective sales staff or clients. The *Popular* capitalization bond focuses more on the drawing aspect. Accordingly, the issuer only returns 50 percent of the payments when the bond matures. This type represents 8 percent of the segment's sales. Finally, the *Planned Purchase* bond is associated with a given product or service, but it is no longer offered in the market.

In Brazil, this product is regulated by the Superintendence of Private Insurance (Superintendência de Seguros Privados [SUSEP],

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2015), established by the Ministry of Finance in 1966. Today, there are 17 companies that offer this type of product in the market (FenaCap, 2015a), including the country's most important private and government-owned banks. Table 1 shows that revenues from capitalization bonds have grown year after year in Brazil, reaching R$21 billion (R$2 ~ US$1) in 2013, or 0.43 percent of the country's GDP, which is one of the world's 10 largest GDPs. According to Portocarrero (2008), capitalization bonds grant individuals with limited funds access to financial products, as they require small contributions. Since *Traditional* capitalization bonds have fixed maturities, usually 12 months, and regular drawings, they attract the savings of individuals who would not otherwise invest their money (FenaCap, 2015a, 2015b; Portocarrero, 2008).

Table 1. **Brazilian capitalization market across the time**

Year	Revenues (R$ thousand)	Share of GDP (%)
2001	4,789,563	0.37
2002	5,217,204	0.35
2003	6,022,577	0.35
2004	6,601,776	0.34
2005	6,910,339	0.32
2006	7,111,434	0.30
2007	7,828,951	0.29
2008	9,015,379	0.30
2009	10,104,143	0.31
2010	11,780,949	0.31
2011	14,081,268	0.34
2012	16,585,517	0.38
2013	20,979,849	0.43

Source: Relatório de Análise e Acompanhamento dos Mercados Supervisionado – SUSEP (2016).

As such, capitalization bonds are usually compared to savings accounts (commonly just called savings, or *poupança*). Savings are Brazil's most popular investment. These accounts are easy to use, have low risk, are exempt from taxes or bank fees for individuals, and require no minimum amounts for deposits or withdrawals. Before May 3, 2012, savings accounts had their monthly yield fixed at 0.5 percent, plus the daily Reference Rate (TR) for the period. Federal Provisional Measure no. 567, followed by Law no. 12703, determined new rules for savings accounts. Their yield would vary according to the risk-free interest rate (inflation adjustment through the TR was not changed), approximated by the rate offered to Brazilian treasury note investors. Thus, savings deposits after May 4, 2012 earned 70 percent of the monthly-adjusted annual risk free (called Selic) rate when the latter dropped to 8.5 percent a year or below.

If not, the yield of savings would follow the old rules. Despite the modified rules, the risk-free rate fell below the limit only in few months. Combined with the fact that the data in this study refer mostly to the year prior to this change and only to some months afterwards, the following comparisons use the old rules for savings accounts. However, savings accounts and capitalization bonds have one major difference. In the former, the interest rate and the TR apply to the total amount invested. Although capitalization bonds use the same interest and inflation rates, these are only applied to the share of investment actually capitalized, or the capitalization share.

The capitalization bond rationale

The possibility of compensation drives individuals' willingness to forgo interest on their capital and accept a series of restrictions. To further analyze this, we use an example of *Ourocap Torcida do Brasil*, a capitalization bond with a single payment and 36-month maturity.

These bonds cost between R$600 and R$5,000. After buyers make a single payment, for the following 36 months, they are eligible for a prize based on the drawings of Brazil's federal lottery, using a lucky number assigned to each bond, from 000.000 to 999,999. The drawings are divided into five types. Accordingly, each bond is eligible for a total of 199 drawings until maturity. Even if a bond wins a prize under one type of drawing, it is still eligible for a prize under the other drawings.

Assuming a total of n drawings of a same type, which gives a prize of αv, where v is the value (price) of the bond. The probability of the bond winning k times, with $k = 0,1,\ldots n$ is given by a binomial distribution of parameters n and p, where p represents the probability of winning one of the drawings. In this case, p is the ratio between the quantity of numbers drawn and the quantity of bonds available (one million). Thus, if r_i denotes the return of type i, the expected value of r_i can be calculated by:

$$r_i] = \frac{\sum_{k=0}^{n} k\alpha v \, P(being\ drawn\ k\ times)}{v} = \alpha \sum_{k=0^k}^{n} \binom{n}{k} p^k (1-p)^{n-k} = \alpha np \qquad (1.1)$$

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Under type I, there are drawings on the first four Saturdays of each month ($n = 36 * 4 = 144$) and the prize is 10 times the single payment ($\alpha = 10$). Based on the drawings of the federal lottery, 10 different lucky numbers are randomly selected in each drawing ($p = 10/1{,}000{,}000$). The value expected by r_1 can be calculated using the formula 1.1, which yields:

$$E[r_1] = 10 \cdot 144 \cdot 0.00001 = 1.44\% \quad (1.2)$$

Under type II, there are monthly drawings on the first Saturday of each month ($n = 36$) and the prize is 20 times the single payment $\alpha = 20$. Based on the federal lottery drawings, 15 different lucky numbers are selected in each drawing ($p = 15/1{,}000{,}000$). Using the formula 1.1, the expected value of r_2 is:

$$E[r_2] = 20 \cdot 36 \cdot 0.00015 = 1.08\% \quad (1.3)$$

Type III features quarterly drawings $n = 12$, and the prizes are equivalent to 200 times the single payment ($\alpha = 200$). Two different lucky numbers are selected in each drawing ($p = 2/1{,}000{,}000$). Using the formula 1.1, the expected value of r_3 is:

$$E[r_3] = 200 \cdot 12 \cdot 0.00002 = 0.48\% \quad (1.4)$$

Type IV drawings select only one number ($p = 1/1{,}000{,}000$), and the prize is equivalent to 1,000 times the single payment ($\alpha = 1{,}000$). The drawings happen twice a year ($n = 6$). Using the formula 1.1, we have:

$$E[r_4] = 1{,}000 \cdot 6 \cdot 000001 = 0.60\% \quad (1.5)$$

Finally, type V has only one drawing ($n = 1$) of six different lucky numbers ($p = 6/1{,}000{,}000$), and the prize is equivalent to 2,000 times the single payment ($\alpha = 2{,}000$). The expected value of r_5, calculated using the formula 1.1, is:

$$E[r_5] = 2{,}000 \cdot 1 \cdot 0.00006 = 1.20\% \quad (1.6)$$

Therefore, the expected return for the drawings in this bond is given by the sum of the values in equations 1.2 to 1.6:

$$E\left[\sum_{i=1}^{5} r_i\right] = \sum_{i=1}^{5} E[r_i] = 4.80\% \quad (1.7)$$

The Brazilian Tax Code imposes a 30 percent income tax rate on prizes obtained through capitalization bond drawings. Accordingly, the expected net amount is:

$$0.7 \cdot \sum_{i=1}^{5} E[r_i] = 0.7 \cdot 4.80\% = 3.36\% \quad (1.8)$$

In comparison with an amount invested in a savings account, and disregarding inflation adjustment which is common to both investments, considering only the monthly capitalization of 0.5 percent over 36 months, final earnings net of taxes and fees would result in a total interest of:

$$(1 + 0.5\%)^{36} = 19.67\% \quad (1.9)$$

Financial literacy and selecting alternatives

According to the expected utility theory (Neumann & Morgenstem, 1947), individuals select lotteries to maximize the expected value of the outcome. From this perspective, there is no reason for a rational being, even a risk-neutral one, to trade a lottery that certainly pays nearly 20 percent (equation 1.9) for another, with a higher risk and an expected return of 3.36 percent (equation 1.8). How then, can we explain the consumption of a product with a negative prize-risk ratio?

Ever since Allais (1952) demonstrated flaws in the assumption of a linear expected utility theory, many economists have investigated this matter. Lopes and Oden (1999) use theory SP/A to defend that risk choices are based on two criteria, a risk-return assessment (the SP criterion) and a comparison of probabilities, to achieve an aspiration level (the A criterion).

According to this approach, an individual could prefer foregoing a certain 20 percent he or she would earn in a savings account and buy this capitalization bond, if this individual's assessment of the probabilities enable him or her, in some way, to assume the chance of winning a prize above a given level. In other words, based on a personal aspiration and an assessment of the possibility of winning, an individual may behave like a "risk lover." The role of aspiration in selecting lotteries is assessed by experiments in which the respondents know the distributions of probability of these lotteries, numerically and/or graphically (Lopes, 2016; Lopes & Oden, 1999).

There seem to be no reasons to believe that the level of aspiration can satisfactorily explain the decision to choose the product described above. First, investors need to have advanced statistical knowledge to assess their probability distribution, a task complicated by the way prices are presented. This is illustrated by the contract that describes the drawing rules for type I bonds (Ourocap Torcida do Brasil):

Type I: Weekly drawings held on the first four (4) Saturdays of each month. This event will offer ten (10) prizes equivalent to ten (10) times the single payment ofto bonds whose lucky numbers printed on the bonds matches the following combinations:

- The first winning bond will be that, whose lucky number matches the number formed by the second-to-last algorism of the first prize of the Brazilian federal lottery, followed by the column comprised of the last algorism of the first to fifth prizes in the same drawing of the federal lottery, read vertically from top to bottom.

- The nine (9) other winning bonds will be those whose lucky numbers match the numbers formed by adding one (1) unit to the first algorism of the number formed in the prior step, and so on.

- Adding one (1) unit to the algorism nine (9) of the hundred thousandth position of the numbers formed in the prior steps will result in zero (0).

Second, several federal lotteries with explicitly reasonable prices (between R$1 and R$5) offering higher returns than capitalization bonds should be analyzed as direct competitors. By combining an investment in a savings account and federal lotteries, an individual could reap the same benefits at lower costs and with fewer penalties (e.g., waiting periods, fines, etc.).

Even if the aspiration level influences that choice, if the buyer cannot compare the chances of winning and the cost of the lottery (associated with the bond) across products, it would seem more reasonable that financial literacy is a key determinant. This may be explained by the way the product is structured and the way it is sold.

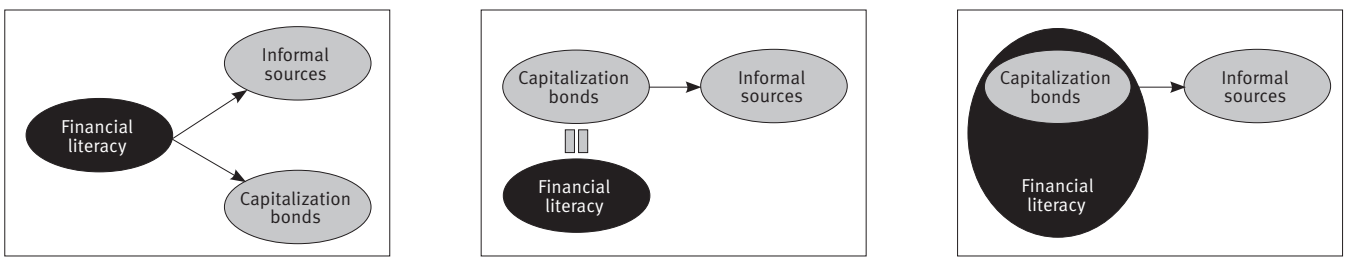
When capitalization bonds adopt a monthly interest rate (0.5%) and an Inflation-Adjustment Rate similar to that offered by savings accounts, this could confuse investors. Internal documents of large banks used to train sales managers of capitalization bonds warn that these bonds should not be marketed as investments or alternatives to savings accounts. Yet they recommend managers to emphasize that the return is comparable to savings accounts and that clients will receive their initial investment amount adjusted for inflation while still competing for prizes.

According to the OECD (2013), many factors, including available time to decide, the alternatives for which information and advice are available, and past experience, influence individuals' product choice. However, if investors make informed decisions, preferably consulting independent advisors, they will more likely choose products that meet their needs more feasibly and less likely buy inappropriate products or be deceived by poorly presented contracts (e.g., misselling). This report from OECD (2013) highlights the benefits financial literacy plays in comparing products, seeking unbiased opinions, and assessing the adequacy of financial products. As such, capitalization bond investors can be identified as individuals with low financial literacy. However, this proxy presents some limitations.

Limitations of a capitalization bond as a financial literacy proxy

Although the associations between financial literacy and financial results are potentially endogenous, several authors have tried to show the causal mechanism between them (Behrman, Mitchell, Soo, & Bravo, 2010; Bernheim & Garrett, 2001; Klapper, Lusardi, & Panos, 2013; Lusardi & Mitchell, 2009, 2011; Rooij, Lusardi, & Alessie, 2011b). However, financial literacy would affect both savings bonds and informal loans simultaneously, leading to possible endogeneity in the current study (Figure 1-a). On the other hand, we understand that the reasonableness of the proxy for financial literacy and methodological procedures can lessen such concerns (Figure 1-b).

Figure 1. **Relation between capitalization bonds, financial literacy, and informal sources**



a) Endogeneity (b) Proxy (c) Limitations

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First, it should be noted that financial literacy is not the only determinant of informal borrowing. Credit availability in the formal market, extraordinary expenses (e.g., health, marriage, accidents, etc.), and loss of job or income volatility are some important factors.

On the other hand, capitalization bond investment is not related to a lack of alternatives. On the contrary, as described previously, these securities are instruments for saving money; and at least one very widespread alternative in the Brazilian market, the savings account, presents less costly contractual conditions, lower acquisition cost, and superior profitability. Still in the list of alternative products, the Brazilian federal government offers several lotteries with very popular prices and higher premiums than the capitalization bonds.

Thus, the choice of the proxy seems reasonable. However, the main criticism that may arise regarding the adoption of this proxy is due to non-consumers of these securities, since the individual may have low financial literacy and not consume them because they do not have enough money to buy these securities, have the intention of saving, or want to be inserted in the financial market. However, this should not be a very big concern. One should keep in mind that any significant effect representing the propensity of financial illiterates in informal lending can and should be underestimated, after all, as some individuals who are financially illiterate have not been identified. The effect may be more relevant than that reported (figure 1-c).

Overall, we believe that in the scope of this study, the adopted proxy is suitable, provided that the different effects of capitalization bond consumption on financial market inclusion can be compared, as these securities are mainly traded in bank branches. To this end, individuals will be subdivided into three groups, (i) those who have not borrowed, (ii) those who have borrowed at banks, and (iii) those who have used informal loans. The details of this method are presented in the following method section.

METHOD

Data gathering and variables

We used data from Bankable Frontier Associates and the Bill & Melinda Gates Foundation's "National survey on financial inclusion and the use of banking correspondents in Brazil," conducted between August and December, 2012. Information was collected using a printed questionnaire, which would take about an hour to fill. Participation was voluntary. That survey set out to select a national representative sample of Brazilian households. As determined by Cull and Scott (2010), information about financial usage provided by the household head is more complete and accurate than information from an interview with a randomly selected individual. Therefore, a set of initial questions were addressed to the eldest member of the house, to ensure a financially aware respondent. As the sample selection was not random, results are only representative of the most financially knowledgeable Brazilians.

In Section 8 of the questionnaire, individuals answered about how they used loans from different sources, including the informal market. To build our database, we considered respondents, who in the prior 12 months did not use any type of credit or who got loans from at least one of the following sources: banks, moneylenders, or acquaintances, with or without interest charges. The term "acquaintances" means people of the individual's circle, such as friends, family, or even neighbors. Thus, our sample has 2,023 loan observations, originating from 1,853 different individuals. Table 2 shows the share of statements involving the use of loans in relation to the segments surveyed. Money obtained from acquaintances or moneylenders was placed in the *Informal* category.

The mean age of the interviewees is 48, ranging from 17 to 94. Out of this total, 52 percent are men and 27 percent are retirees. Additionally, 92 percent of the respondents claimed they took household budget decisions. This is not surprising because interviewers were recommended to visit households up to thrice, to interview such individuals. However, only 62 percent have a personal bank account (e.g., simple, current, or savings accounts).

Average reported monthly wage was R$912, which represents 1.47 monthly minimum wages in Brazil. Less than 6 percent of those interviewed had a college degree and only 20 percent graduated from middle (high) school. The average household has 3.4 individuals. There is an average of 0.9 individuals under 16 in each household. Brazil's North Region is home to 20 percent of the interviewees; the Northeast, 25 percent; the Center-West, 8 percent; the Southeast, 32 percent; and the South, 14 percent.

Regarding their financial behaviors, about 42 percent of the respondents admitted they had already made one late payment, while 9 percent said they had a poor credit history. Nearly 20 percent were capitalization bond holders or had been so in the past. Table 3 shows the percentage of consumption of capitalization bonds within the different credit segments. We see an increase in the percentage of the category of those claiming they had not used loans during the period for the *Bank loan* category.

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Table 2. **Use of credit in the prior 12 months**

	Whole sample		Capitalization bonds consumers	
Credit	Amount	Share	Amount	Share
Did not use	1,142	56.5%	138	12%
Bank	614	30.4%	173	28%
Informal	267	13.2%	101	38%
Acquaintances – WITHOUT	183	9.0%	66	36%
Acquaintances – WITH	64	3.2%	26	41%
Moneylenders	20	1.0%	9	45%
Total	**2,023**	**100%**	**412**	**20%**

Did not use: No type of credit in the past 12 months. Bank: loans or financing from a bank in the prior 12 months (includes face-to-face loan offered through the bank). Acquaintances – WITHOUT: a loan from a friend, neighbor, or relative without interest in the prior 12 months. Acquaintances – WITH: a loan from a friend, neighbor, or relative with interest in the prior 12 months. Moneylenders: a loan from a moneylender in the prior 12 months. Informal: credit from acquaintances, with or without interest, or from moneylenders in the prior 12 months. Consumption of capitalization bonds: Reported having, at the time of the interview or before, a capitalization bond. The percentages are in relation to the loan category.

This increase might be explained by financial inclusion. Individuals with bank accounts tend to use more bank loans and buy capitalization bonds, mostly sold through bank branches (Angst & de Abreu, 2007). This argument is supported by the fact that bank account holders comprised only 48 percent of those not using loans, but 89 percent of those taking bank loans. The second variation we see in Table 2, from the bank credit segment to the informal credit segment, matches the hypothesis we would like to test in this study: whether individuals with lower financial literacy levels (consumers of capitalization bonds) are more likely to use informal sources of loan. To confirm this hypothesis, we controlled co-variables that represent the financial and individual behaviors, financial inclusion, loan demand and restriction, and social and demographic variables. Table 3 describes the variables used in the model.

Specification of the model

The observations were classified into three categories of interest: 0 = No loan, 1 = Bank loan, 2 = Informal loan. We used a multinomial logistic regression to analyze the likelihood of these three types, which is ideal for non-ordinal and polytomic category dependent variables. The values attributed to each category (0 = No loan, 1 = Bank loan, 2 = Informal loan) are arbitrary (i.e., the model does not assume that 0 < 1 < 2). The probability of the y dependent variable assuming the value i is given by (2.1):

$$Pr(y=i)=\frac{e^{x\beta_i}}{e^{X\beta_i}+\sum_{j\neq i}e^{X\beta_j}}. \quad (2.1)$$

To uniquely identify vectors β_i, we considered some of them nil, which then became the base category. The estimated coefficients represent changes in relation to this base category. Where y assumes three values, such as when i = 0, 1, 2, and considering $i=0$ as the base category, the probabilities are given by (2.2):

$$Pr(y=0)=\frac{1}{1+e^{X\beta_1}+e^{X\beta_2}}, Pr(y=1)=\frac{e^{X\beta_1}}{1+e^{X\beta_1}+e^{X\beta_2}}, Pr(y=2)=\frac{e^{X\beta_2}}{1+e^{X\beta_1}+e^{X\beta_2}}. \quad (2.2)$$

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Table 3. **Independent variables considered in the model**

Variable	Description	Mean	Std. Dev.
Capitalization bond (D)	Do you have or did you have a capitalization bond?	0.197	0.398
Budget decision maker (D)	Do you make most family budget decisions?	0.921	0.270
Bank account (D)	Do you have any personal bank account (simple, current, or savings account)?	0.622	0.485
Late payment (D)	Have you ever made a late payment?	0.418	0.493
Poor credit history (D)	Do you have a poor credit history right now?	0.092	0.288
Age	Age of the respondent (in years)	48.33	15.77
Man (D)	Masculine gender?	0.525	0.499
Retiree (D)	Are you a retiree?	0.272	0.445
Income	Monthly income of the respondent (in reais) (a)	911.75	1,424.98
Expenses	Monthly expenses (in reais). (b)	332.89	1,275.77
Household members	Number of residents in the household.	3.41	1.70
Under 16	Number of residents under 16 in the household.	0.878	1.181
National region(D):			
NO	North	0.197	0.398
NE	Northeast	0.250	0.433
CO	Center-West	0.083	0.277
SE	Southeast	0.325	0.468
SU	South	0.144	0.352
Education (D): What was the highest school level you completed?			
Educ 0	Never went to school or never completed primary school.	0.241	0.428
Educ 1	Primary school	0.498	0.500
Educ 2	Middle (high) school	0.198	0.398
Educ 3	Higher education	0.059	0.236

Notes: (D) indicates *dummy* variables with value of 1 in case yes and 0 in case no. [a]The *Income* variable considers earnings of the respondent from work, social security, or pension fund, as well as other sources such as rent, the federal severance indemnity fund (Fundo de Garantia do Tempo de Serviço - FGTS), government scholarships, inheritances, donations, etc. The amount corresponds to the monthly average for the past 12 months. [b]The *Expenses* variable represents the average sum of expenses with utilities, condominium fees, rent, digital services packages, landline telephones, cell phones (prepaid and postpaid), subscription TV, internet, school tuitions, mortgage payments, consumer loan payments, and insurance payments.

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FINDINGS

Table 4 shows the estimates for the multinomial logistic regression coefficients, in which the dependent variable (loan category) assumes three possibilities: 0 = No loan, for the individuals who have not reported using any type of loan in the 12 months prior to the completing the questionnaire; 1 = Bank loan, for those who reported using bank loans or financing in- the 12 months prior to the questionnaire; and 2 = Informal loan, for those who reported loans from acquaintances – with or without interest – or from moneylenders in the 12 months prior to the questionnaire.

In the first two columns of Table 4, we see the coefficients of the model with the *No loan* (0) category used as the base. The last column shows the coefficients of the same model, only changing the base category to *Bank loan* (1). In the base 1 (*Bank credit*) category, the coefficients related to level 0 (No loan) are not reported, because they are precisely the same (in magnitude and significance) as those in the first column, but with inverted signs.

Table 4. **Multinomial logistic regression**

Base category:	**No credit (0)**	**No credit (0)**	**Bank credit (1)**
Dependent variable:	**Bank credit (1)**	**Informal credit (2)**	**Informal credit (2)**
Capitalization bond	0.614***	1.578***	0.963***
Budget decision maker	0.371	-0.509*	-0.879**
Bank account	1.432***	0.619***	-0.813***
Late payment	0.380***	0.859***	0.479**
Poor credit history	-0.048	0.439	0.487*
Age	0.105***	0.047	-0.057
Age²	-0.00115***	-0.00073*	0.00042
Man	-0.0336	-0.147	-0.113
Retiree	0.755***	-0.076	-0.831***
Household members	0.150**	-0.213**	-0.362***
Under 16	-0.130	0.347**	0.477***
NO	-0.822***	-0.233	1.054***
NE	-0.479**	0.866**	1.345***
CO	-0.610**	0.045	0.655
SE	-0.433**	0.799**	1 232***
Ln(Income)	0.185*	0.010	-0.175
Ln(Expenses)	0.245***	0.195**	-0.050
Educ 0	-0.00371	0.560	0.564
Educ 1	-0.248	0.191	0.439
Educ 2	-0.303	0.075	0.378
Constant	-6.658***	-3.983***	2.675*
N:	1,463		
Wald chi2(40):	369.90***		
Pseudo R2:	0.1740		

Notes: Multinomial logistic regression coefficients; standard errors adjusted to 1,326 *clusters* of individuals; p-value: *<0.10, **<0.05, ***<0.01.

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On the demand side of the loan market, age is one of the most important factors, according to the life-cycle theory (Modigliani & Brumberg, 1954). As this theory suggests, people accumulate wealth early in their lives to ease on consumption and maintain their standard of living after retirement. Accordingly, young individuals tend to get into debt because of their expectations of increased income and consumption in the future. As age advances, income increases and willingness to borrow decreases.

Consequently, the ratio between loan demand and age will have an inverted U shape. To capture this non-linear relation, we included the age quadratic and linear terms as independent variables. These estimates are consistent with the theory when we look at bank loan in comparison with those who have not gotten into debt. However, *Age* and Age^2 cannot explain loan taking from informal sources.

Even though studies suggest gender dependence in choosing financial products (Fonseca, Mullen, Zamarro, & Zissimopoulos, 2012; Lusardi & Mitchell, 2008; OECD, 2013), no significant effect was observed for the *Man* variable. The *Retiree* variable indicates the role of consigned credit in encouraging bank credit; it reduces interest rates and credit restrictions because it allows payments to be deducted directly from the paycheck. This variable's coefficient in the third column suggests that consigned credit reduces the chances of a retiree in need of credit resorting to informal sources. That is, although any employee can access payroll deductible loans, they are targeted at the elderly, since the default risk is practically zero, as the national pension system provides retirees' income.

The family structure is an important predictor to explain loan taking from informal sources. Larger families are less likely to use informal loans than bank loans. However, when these families have children under 16, this situation is inverted and they become more vulnerable to the informal market. Perhaps this behavior can be explained by household dwellers having a larger (or smaller) share of the family budget. Residents of Brazil's North, Northeast, and Southeast regions are more likely to resort to informal loans than those living in the South Region, who use more formal loans. The South region of Brazil stands out in terms of the penetration rate of credit unions, more often called cooperatives in Brazil (Lhacer, 2012; Garcia & Lhacer, 2012). As of 2015, around 90 percent of South municipalities have credit units, more than twice the average of Brazil as a whole, which was 44 percent in the same year (Banco Central do Brasil, 2016). Therefore, the higher presence of cooperatives seems to be the main reason for having more access to formal credit in the South.

The effect of income on loan taking is ambiguous. Individuals with lower income need more loans than those earning more. However, creditors tend to favor borrowers who can better pay their debts. The positive and significant ln*Income* coefficient for taking loans at banks in relation to those not taking loans suggests that income restricts credit more than it levels demand. This might make sense for lower-income individuals and is consistent with the mean reported salary, 1.47 minimum monthly wages.

The effect of Expenses is as expected, as families with more expenses more likely need loans (formal or informal). However, this variable is not able to explain the choice between these loan alternatives. Note that the estimated model used only 1,463 observations. This was because of an expressive flaw in the *Expenses* and *Variable Income* variables. Hence, we re-estimate the model by removing these variables. Indeed, education dummies also failed to present significant effects and were removed from the next regression (Table 5). According to Lusardi and Mitchell (2011b), education is far from being a good proxy for financial knowledge. The coefficients and their significance did not change in this re-estimation with the complete sample (2,021 observations).

Having a bank account is one of the most basic requirements for an individual to participate in the financial market and access a wide range of products and services (Banco Central do Brasil, 2011; Demirgüç-Kunt & Klapper, 2012). The *Bank Account* presented significant coefficients in both estimations (Tables 4 and 5). Individuals with bank accounts are more likely to incur debt, both from banks as well as from informal sources. But they are much less likely to obtain loans from the informal market than from banks. Individuals with a poor credit history are, as one would expect, more likely to resort to informal sources.

We wrap up this discussion with the three variables that can provide the most information regarding the impact of financial literacy. In addition to the main proxy used here, these are the *Late Payment* and *Budget Decision Maker* variables. We expect that the individual in charge of the household budget has greater financial expertise and access to or affinity with financial products and services. We should point out that the individual most familiar with finances in the household does not necessarily have good financial literacy. At any rate, the coefficients point to this individual as the one least likely to use informal sources of loan.

Individuals who have paid their bills late are more susceptible to requiring loans from either source, but they are more likely to resort to the informal market than to banks. Since this is controlled by the *Poor Credit History* variable, this result can be explained by a fragile financial behavior, where an individual cannot properly gauge the volume of debt or interest level, jeopardizing the household's finances. In line with these findings are the effects of the consumption of capitalization bonds. To support this analysis, we computed the mean marginal effects on the probability of observing the results for a dependent variable (Table 6).

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Table 5. **Multinomial logistic regression**

Base category:	**Non credit (0)**	**Non credit (0)**	**Bank credit (1)**
Dependent variable:	**Bank credit (1)**	**Informal credit (2)**	**Informal credit (2)**
Capitalization bond	0.666***	1.302***	0.637***
Budget decision maker	0.347	-0.401	-0.748**
Bank account	1 833***	0.668***	-1.165***
Late payment	0.493***	1.007***	0.514***
Poor credit history	-0.013	0.534**	0.547**
Age	0.083***	0.020	-0.063*
Age²	-0.00098***	-0.00040	0.00058
Man	-0.056	-0.127	-0.183
Retiree	0.846***	-0.075	-0.921***
Household members	0.143***	-0.017	-0.160**
Under 16	-0,161**	0.105	0,266**
NO	-1.118***	0.015	1.133***
NE	-0.797***	0.683*	1.480***
CO	-0.554**	0.274	0.829**
SE	-0.644***	0.625*	1.269***
Constant	-4.065***	-2.790***	1.275
N: Wald chi2(40): Pseudo R2:	2,021 444.81*** 0.1664		

Notes: Multinomial logistic regression coefficients; standard errors adjusted to 1,851 *clusters* of individuals; p-value: *‹0.10, **‹0.05, ***‹0.01.

We can see that individuals who buy capitalization bonds are, on average, 16.3 percentage points more likely to resort to the informal loan market. The other estimates are in line with prior discussions. We also calculated the probability of buyers and non-buyers of capitalization bonds using informal sources of loan, maintaining the other variables in their means. The result was 26% ± 6.6%, with 95% of confidence, for capitalization bond consumers, against 8.8% ± 2.6%, also with 95% of confidence, for non-consumers.

The marginal effect of each child under the age of 16 is 4 percentage points. To examine family structure's role in the probability of using informal sources, we re-estimate the confidence intervals (for consumers and non-consumers of capitalization bonds) considering a family of five members, with three children under 16. The result was 35% ± 12%, with 95% confidence, for capitalization bond consumers, against 13% ± 6%, also with 95% confidence, for non-consumers. Figure 2 shows the evolution of these confidence intervals as the family structure changes.

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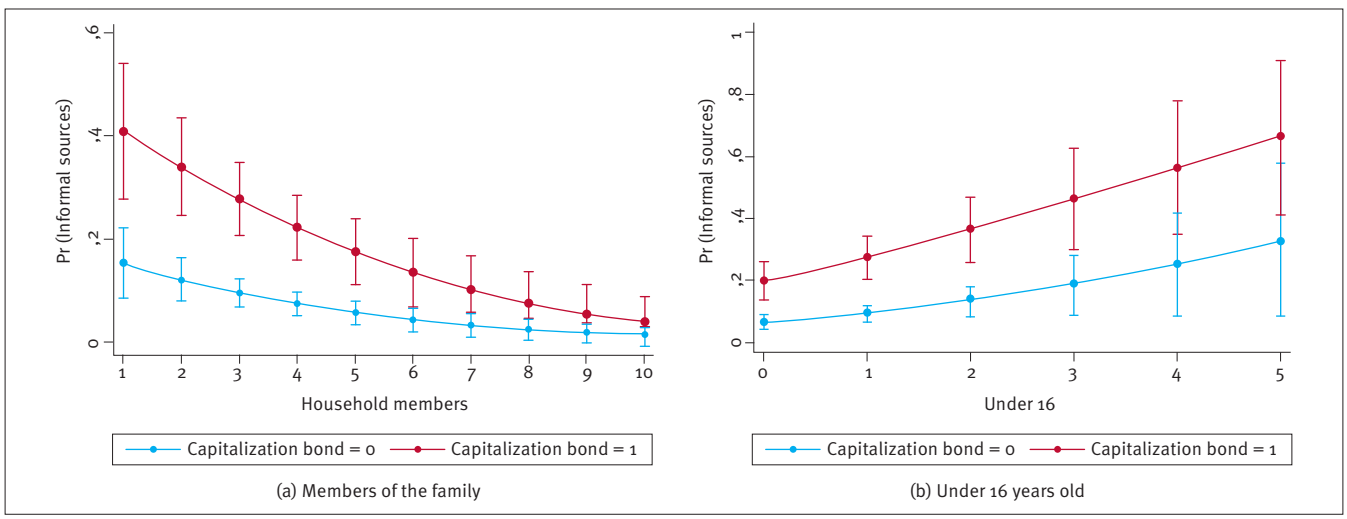
Table 6. **Marginal effects**

Dependent variable:	No credit (0)	Bank credit (1)	Informal credit (2)
Capitalization bond	**-0.193*** **	**0.029**	**0.163*** **
Budget decision maker	-0.012	0.089*	-0.077**
Bank account	-0.245***	0.235***	0.010
Late payment	-0.105***	0.034	0.071***
Poor credit history	-0.021	-0.029	0.051*
Age	0.0029**	-0.0012	-0.0017*
Man	0.013	0.0002	-0.013
Retiree	-0.104**	0.145***	-0.041*
Household members	-0.009	0.037***	-0.028***
Under 16	0.0014	-0.039**	0.041***
NO	0.090*	-0.151***	0.061
NE	0.002	-0.125***	0.123***
CO	0.077	-0.107**	0.030
SE	0.007	-0.112***	0.105***
Ln(Income)	-0.026	0.034*	-0.007
Ln(Expenses)	-0.045***	0.037***	0.009
Educ 0	-0.034	-0.027	0.062
Educ 1	0.024	-0.054	0.030
Educ 2	0.037	-0.058	0.020
N:	1,463		

Notes: Mean marginal effects on the probability of observing a result in the dependent variable; p-value: *‹0.10, **‹0.05, ***‹0.01.º

Figure 2. **Probability of using informal credit sources**



Notes: Prediction of the probability of consumers (1) and non-consumers (0) of capitalization bonds using informal financing. The chart range shows a confidence interval of 95 percent.

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CONCLUDING REMARKS

The standard literature on the informal loan market considers that information asymmetry is the main driver behind informal loans. The idea is that information asymmetry results in the requirement of collateral, thereby restricting loans and encouraging informality, which is at an advantage in terms of information and collection techniques. In this study, the authors emphasized the role financial literacy can perform in this process.

Using variables that represent loan demand and restrictions, we see that low financial literacy is responsible for increasing the probability of individuals using informal loans. For example, we find a greater effect on the tendency of individuals with low financial literacy to use informal loan sources than of individuals with a poor credit history.

Our findings are in line with those of OECD (2013), which say that individuals with lower levels of financial literacy are less aware of alternatives and more susceptible to misselling, suggesting that for these reasons, they tend to rely more on friends and families for their loans. The weight of financial literacy as an important predictor of credit behavior (Cole et al., 2011; Lusardi & Tufano, 2009) is, once more, reinforced by our study. Additionally, it emphasizes public policies designed to improve financial literacy, leading to the wellbeing of society.

To identify individuals with little financial literacy, we used a typical Brazilian financial product, capitalization bonds, as a proxy. Capitalization bonds are mainly sold in bank branches, and managers, who advice clients, undergo training and have goals to promote investment in these bonds.

The product is designed to appear as a sort of savings account, with the added benefit of offering prizes through drawings during the term of the bond. In practice, however, the product should not be considered as an investment option because it only offers a return if the bond wins a prize. The product's contract does not describe the cost or the chances of the buyer winning the prize, something that requires statistical and financial calculations. Moreover, a series of restrictions and penalties are imposed in case the buyer interrupts payment or redeems soon. Since the proxy variable does not identify individuals with lower levels of financial literacy, the effects attributed to financial literacy may be underestimated.

According to Willis (2008), for some consumers, financial literacy seems to increase confidence without improving ability, leading to worse decisions. The OECD (2013) advocates that financial products should be designed to provide users with safe and effective solutions for their needs. Regulations should be as transparent as possible and consumer defense authorities should protect consumers from any unfair practices.

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