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Reading the Fine Print: Information Disclosure in the Brazilian Credit Card Market

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Consumer credit regulations usually require that lenders disclose interest rates. However, in the absence of specific prominence requirements, lenders can conceal the interest rate in the fine print while still complying with the law. I examine the effect of such a strategy using a field experiment in Brazil in which a credit card company offered their clients payment plans to pay off their balances. Using randomized contract interest rates and the degree of rate disclosure, I show that most clients are rate sensitive, whether or not rates are prominently disclosed. The elasticity of payment plan enrollment with respect to the interest rate ranges from -0.711 to -0.880 . High-risk clients are an exception; these clients are rate sensitive only when disclosure is prominent. I also show that clients are influenced by nudges that favor longer-term contracts. Conditional on enrollment, the proportion of clients who choose a longer-term contract is 40 percentage points higher when a longer-term contract is featured in the advertisement layout. This effect, however, is weaker when stakes are higher.

Data, as supplemental material, are available at <https://doi.org/10.1287/mnsc.2015.2281>.

Keywords: consumer finance; information disclosure; credit markets

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1. Introduction

High-cost consumer credit attracts significant academic and regulatory attention. Claims that lenders conceal or misrepresent interest rates intensify the debate, making interest rate disclosure a major focus for regulators.¹ However, despite the popularity and purported goals of disclosure policies, the effectiveness and efficiency of such policies is still under debate (Ben-Shahar and Schneider 2014). As argued by Barr et al. (2008), in the absence of specific prominence requirements, lenders can conceal the interest rate information in the fine print and use more salient terms (for example, “low monthly payments”) to compete for borrowers’ attention while still complying with disclosure regulations. These concerns are becoming more relevant in emerging markets, where consumer credit is novel and interest rates can be particularly high.² In Brazil, the volume of credit card borrowing increased by a factor of 12 over the last 10 years, despite the fact that credit card revolving interest rates are usually higher than 10% *per month*.³

In a setting where interest rate disclosure regulations do not provide specific prominence requirements, I test how advertising that conceals the interest rate influences clients’ behavior. In a randomized field experiment in Brazil, a large credit card company offered a sample of 19,690 clients a menu of payment plans that would allow them to pay down their balances in fixed installments. The credit card company randomly varied, at the client level, three features of the offer: (i) the offered interest rate, which ranged from 3.99% to 11.89% per month; (ii) the degree of interest rate disclosure, whether buried in a footnote or prominently disclosed; and (iii) the featured payment plan, where offers consisted of a menu of four payment plans with varying maturities (6, 8, 10, or 12 months), with one of these plans more prominently featured in the advertisement layout.

The experimental results show that most clients are able take the terms of their offers into account. Clients are sensitive to the interest rate when deciding to enroll in a payment plan, even when rates are not prominently disclosed. In addition, it is not possible to reject the hypothesis that, on average, prominent rate disclosure has no effect on take-up rates and enrollment interest rate elasticities.⁴ However, the

¹ The National Commission on Consumer Finance (1972) describes typical practices before the Truth in Lending Act.

² From 2000 to 2008, household debt as a proportion of gross domestic product increased in Brazil, Russia, India, and China (Roxburgh et al. 2010).

³ From 2005 to 2014, annual inflation in Brazil was always lower than 7%.

⁴ Given that it was not possible to have a control group with no interest rate information, I am unable to determine whether the lack of an average effect of information disclosure on interest rate

degree of rate disclosure is relevant for an important subpopulation. High-risk clients are not rate sensitive when lenders conceal the interest rate in the fine print, although they become sensitive to the interest rate when lenders disclose this information more prominently.⁵ These results suggest that high-risk clients are less attentive to the details of the contract, so that prominent rate disclosure affects their enrollment decisions.

Also, clients are no more likely to enroll in a payment plan when a longer-term plan (with lower monthly payments) is featured. This suggests that clients consider all available options. However, conditional on enrollment, I find evidence that featuring a particular maturity has a strong effect in determining which plans clients choose. Although clients revealed preferences for short-term plans, they can be nudged into enrolling in longer-term plans when a longer-term plan appears more prominently. However, clients are less influenced by the featured plan when interest rates are higher and when lenders feature longer-term plans.

One important limitation I face in interpreting the results of this experiment is that the credit card company only provided information on payment plan enrollment. Therefore, I am unable to estimate the effects of payment plan interest rates and prominent disclosure on overall borrowing, and not even on credit card balances with the implementing credit card company. However, these results are still meaningful, because they provide evidence on whether clients take loan terms into account when they evaluate credit offers and on whether prominent disclosure of interest rates affects these evaluations. In addition, I found evidence that nudges that favor longer-term contracts significantly affect clients' probability of default, which suggests that the changes to payment plan enrollment analyzed in this experiment can have material consequences on financial outcomes.⁶

elasticity arises because clients make their decisions based on the streams of payments or based on the information displayed in the fine print.

⁵ The credit card company classifies clients based on information supplied by credit bureaus and on its own data. The company is more likely to classify clients as high risk when they have a lower credit score on credit bureaus, when they use the revolving credit line more often, when they make late payments, and when they use a higher proportion of their credit limit. According to this classification system, the company classifies 10% of its clients as high risk.

⁶ In §B of the online appendix (available as supplemental material at <https://doi.org/10.1287/mnsc.2015.2281>), I present results from a larger-scale experiment conducted by the same credit card company. The credit card company designed this experiment to measure the impact of enrolling in a payment plan on default. In this larger-scale experiment, the firm randomly selected a sample of clients to receive a payment plan offer. Using payment plan offer

Another important issue regards the external validity of the findings. First, I analyze the demand for a particular credit product in a specific country: payment plans for credit card clients in Brazil. In particular, take-up rates for this product are relatively low, so the identification of the effects of information disclosure comes from a small fraction of clients who opt in to an installment plan.⁷ It should be noted, however, that credit card borrowing is much less prevalent in Brazil than in the United States, so one should expect low payment plan enrollment rates. Also, the credit card company presented the offer as part of the monthly statement. This increases the likelihood that clients read the offer, implying that estimates are probably close to true take-up rates and enrollment elasticities. Another external validity concern is that the information disclosure treatment applies to current clients. Although the effects could be different for prospective clients, important information disclosure regulations refer to postacquisition behavior. For example, the Credit Card Accountability Responsibility and Disclosure (CARD) Act of 2009 includes disclosure requirements for credit card statements, whereas the Consumer Financial Protection Bureau (CFPB) recently put an extra emphasis on credit card "add-on" products.⁸ Finally, the analyzed information disclosure treatment is only a one-off and off-equilibrium intervention. If the government imposed such an intervention on all lenders over the long term, the effects of more prominent disclosure could be stronger. Still, one can see the results from this experiment as a lower bound for the case where the treatment is implemented broadly. In particular, the conclusion that high-risk clients are affected by the way interest rate information is presented should remain valid.

The results reported here add to a recent body of experimental and quasi-experimental evidence in both developed and developing countries that suggests that consumers are responsive to prices in credit

as an instrumental variable for payment plan enrollment, I estimate that enrolling in a payment plan with a high interest rate significantly increases the probability of default in the following 12 months. These results also suggest that the changes in payment plan enrollment induced by the information treatment can have material consequences on clients' financial outcomes. I also combine the results from both experiments to measure the effect of information disclosure on default rates for high-risk clients. Since the informational treatment affects only a small proportion of consumers, the aggregate effect of this intervention is small, even though it has significant effects for the population affected by the information treatment.

⁷ Karlan and Zinman (2014) have a discussion on potential external validity concerns when one estimates demand price sensitivity based on financial products with low take-up rates.

⁸ CFPB Bulletin 2012-06, July 18. Consumer Financial Protection Bureau, Washington, DC.

markets (for example, Karlan and Zinman 2008, 2013; Gross and Souleles 2002; Huang and Tan 2009). In particular, my finding that interest rate elasticity is heterogeneous when information is concealed is consistent with Alan and Loranth (2013), who find that only low-risk credit card clients in Turkey lower their credit demand significantly when faced with an increase in interest rates.

These results also fit into a small but growing literature on how information disclosure affects household finance decisions. In recent randomized experiments, Bertrand et al. (2010), Bertrand and Morse (2011), and Seira and Elizondo (2014) found that presenting the interest rate of loan contracts has no effect on credit demand.⁹ Unlike designs in previous research, the experimental design in this paper allows the estimation of the effects of interest rate disclosure not only on average take-up rates, but also on the payment plan interest rate sensitivity. Although my results also provide evidence that, on average, interest rate disclosure has limited effect on take-up rates, I show that prominent rate disclosure matters for an important group of clients, namely, high-risk clients who are rate sensitive only if the interest rate information is prominently disclosed. These results are consistent with the work by Stango and Zinman (2011), who studied the effect of weakening enforcement of annual percentage rate disclosure in the Truth in Lending Act and found that weak enforcement increased the disparity between interest rates paid by more and less sophisticated clients. In an experiment with participants in Mexico's privatized social security system, Hastings and Tejada-Ashton (2008) examined how simplifying information on funds management fees affected price elasticity of demand. They also found heterogeneous effects, where only financially illiterate workers were affected by the way information was disclosed.

Finally, the results in this paper add to a literature on nudges and default options in financial decisions. Using a similar nudge as the one used in this experiment, Karlan and Zinman (2008) show that randomly assigned (nonbinding) example maturity presented in direct mailers strongly predicts actual maturity chosen. Agarwal et al. (2015) study a disclosure regulation in the Credit CARD Act aimed to nudge credit card clients toward paying off a larger fraction of their balances, and they find small but significant effects. Also, the estimated effects of the featured plan on the probability of choosing a specific plan are at the same order of magnitude as the effects of default options in 401(k) decisions in the United States and other countries (Madrian and Shea 2001, Choi et al. 2004,

Cronqvist and Thaler 2004, Beshears et al. 2009). This paper also provides novel evidence that the effectiveness of nudges is weaker when the stakes are higher.

This paper proceeds as follows: §2 describes the consumer credit market in Brazil, emphasizing the details of the payment plans offered by credit card companies; §3 describes the experimental design and the empirical strategy; §4 presents the results of the experiment; and §5 concludes.

2. Economic Environment

2.1. Consumer Credit in Brazil

Between 2000 and 2010, consumer credit in Brazil doubled. This consumer credit expansion was particularly pronounced for credit card borrowing, which increased 12-fold during this period despite the fact that credit card interest rates in Brazil are particularly high. In January 2010, the average revolving credit card monthly interest rate was 10.66% (from 2005 to 2014, *annual* inflation in Brazil was always lower than 7%).¹⁰ Increased access to credit cards among lower- and middle-income consumers, especially through credit card companies associated with retail stores, partly explains this increase. In some cases, consumers may only use these credit cards at the originating retail store; in other cases they may use them elsewhere.

I carried out this field experiment with a large credit card company in Brazil. The credit cards, issued by a major Brazilian retailer, are regular credit cards, accepted in most retail locations throughout the country. At the time of the experiment, this company had more than 5 million active clients, most of them lower and middle income. Therefore, the conclusions based on the sample analyzed in this study should be relevant for understanding an important group of consumers: lower- and middle-income consumers who are starting to gain access to credit in Brazil and other emerging markets.

2.2. Products Details: Revolving Credit and Payment Plans

Credit card companies in Brazil usually offer two borrowing alternatives if clients do not pay their balance in full. The most common alternative is to use the credit card's revolving line of credit: clients pay an amount equal to or greater than the minimum required payment, but smaller than the credit card balance. Clients carry over the remaining balance plus interest accrued to the next billing period. For the

⁹ Bertrand and Morse (2011) found that information that helps consumers aggregate the costs of payday loans over time has a significant effect in reducing take-up rates.

¹⁰ According to Central Bank of Brazil (2010), 28.74% of the interest rate spread (lending rate minus deposit rate) was due to consumer default, whereas around one-third of the interest rate spread was due to banks' profits.

clients in this study, the revolving rate ranges from 11.89% to 15.99% *per month*, and the minimum payment is equal to 15% of the credit card balance. For the consumer, the main advantage of this source of credit is that it is preapproved, and clients have the flexibility to choose how much they want to pay, as long as they meet at least the minimum payment.

Many credit card companies also offer a menu of payment plans to clients. From this menu, clients can choose a fixed period over which they can repay their entire balance with constant monthly payments. This type of credit is also preapproved and easily accessible. To enroll in a payment plan, clients simply have to pay the exact amount of the monthly payment of the plan they have chosen. In doing so, they automatically enroll in the chosen plan, and they are charged the remaining installments on their credit card statements for the $m - 1$ following months. For example, if the credit card statement presents a payment plan offer of six installments with a monthly payment of \$183.38, the client simply has to pay \$183.38, and then \$183.38 will be charged on his credit card balance every month for five months. Firms offer these contracts in hopes of attracting clients who would not use the revolving credit line, and to lead clients to carry a larger outstanding balance.

Given a balance (B), the number of installments (m), and the monthly interest rate (r_m), the monthly payment (M_m) is¹¹

$$M_m = B \times \frac{(1 + r_m)^{m-1} \times r_m}{(1 + r_m)^m - 1}.$$

The number of installments usually ranges from 4 to 24 months, and payment plans' interest rates may be equal to or lower than the revolving rate. Clients in this study received payment plan offers with monthly interest rates ranging from 3.99% to 11.89%. The majority of clients received an offer with an interest rate strictly lower than their revolving rate, whereas around 3% of the clients had a revolving rate of 11.89% and received a payment plan offer with the same interest rate. Because of a technical constraint, the credit card company that carried out this experiment had to offer a given client the same interest rate across all plans offered in the menu.¹² This constraint prevented the company, for example, from offering longer-term contracts with higher interest rates.

Under a payment plan contract, clients can continue to use their credit cards for new purchases. One important point is that, under this contract, clients

need to pay the monthly installments in full to stay current. The credit card minimum payment will be equal to the monthly installment of the chosen payment plan, plus 15% of any new purchases made with the credit card.¹³ Thus, clients might face higher minimum payments when they enroll in a payment plan than if they used the revolving credit line only, even if the revolving credit line has a higher interest rate.

Although there is no penalty for canceling a payment plan (if a client cancels the plan, then the present value of the unpaid installments is charged on his next billing cycle), many clients may not be aware that they may cancel, and may be afraid of additional fees and the hassle of dealing with the credit card company. If clients believe it is impossible or costly to cancel a payment plan, then a payment plan would imply a commitment to carry a balance for a longer period.¹⁴

Other borrowing alternatives for consumers include personal loans from banks (average monthly interest rate of 4.79%), checking account overdrafts (average monthly interest rate of 7.40%), personal loans from finance houses (average monthly interest rate of 9.87%), and informal loans. However, these alternatives might not be available for some clients and, even if available, may require additional applications, paperwork, and delays.

2.3. Borrowing Decisions, Disclosure Requirement, and Product Presentation

When deciding whether to enroll in a payment plan or to use a revolving line of credit, clients face a trade-off between lower interest rates and flexibility in the stream of payments: interest rates on payment plans are usually lower than revolving credit card rates, but payment plans have less flexibility in terms of the stream of payments clients must make. Clients are required to pay exactly the first monthly payment to enroll in a payment plan. In addition, because clients might be unaware that they can cancel these contracts, they may believe they have an obligation to carry a balance over a longer period. This inflexibility of payment plans can be relevant, because most clients usually pay off a high fraction of their balances and do not recurrently use the revolving credit line.¹⁵

¹³ Therefore, clients would not be able to revolve the payment plan installments, although they would still be able to use the revolving line of credit for the new purchases.

¹⁴ None of the 662 clients who enrolled in a payment plan in the main experiment cancelled the payment plan. This suggests that clients do not enroll in a payment plan with the intention of canceling it.

¹⁵ Past data reveal that in the absence of payment plan offers, clients pay more than 30% of their balances 93% of the time. Also, fewer than 10% of clients used the revolving line of credit for six consecutive months.

¹¹ The amount of the monthly payments is defined such that, given the contract interest rate (r_m), the present value of the stream of payments is equal to the credit card balance (B).

¹² The company was able, however, to offer different interest rates for different clients, as explained in §3.1.

The interest rate is an important variable for clients deciding whether to enroll in a payment plan. However, figuring out whether a payment plan has an attractive interest rate may not be a straightforward task. Since 2007, the Central Bank of Brazil has required lenders to disclose the interest rate information on credit offers.¹⁶ Although this resolution states that the interest rate information should be “readable,” it does not provide specific requirements on how this information must be displayed. This differs from other disclosure regulations that have specific prominence requirements, such as the Schumer box for U.S. credit cards.¹⁷ Given the lack of specific prominence requirements, firms in Brazil usually advertise these payment plans highlighting low monthly payments, and conceal the interest rate in the fine print.

Although a “rational” consumer would be able to calculate the interest rate on payment plans given the number of installments and monthly payments, limited financial literacy and/or cognitive biases may prevent clients from correctly evaluating contract interest rates. There is a consistent body of evidence showing that consumers make mistakes when assessing interest rates,¹⁸ and Stango and Zinman (2009) provide evidence that consumers systematically underestimate interest rates when given the other terms of the contract.

The maturity choice of the payment plan is another important decision in this setting. Loan maturity is a crucial variable in determining credit demand if agents are liquidity constrained, because longer maturity implies lower monthly payments (Attanasio et al. 2008, Karlan and Zinman 2008). This is one reason why credit card companies in Brazil usually highlight plans with long maturities. When selecting from a menu of payment plans with different maturities, clients must balance the size of their monthly payments with the duration of the contract, taking into account that longer maturities imply larger total interest costs.

¹⁶ The Central Bank of Brazil resolution no. 3517, from 2007, states that the interest rate should be calculated such that the credit amount is equal to the present value of the stream of payments. In addition to presenting this information in monthly terms (which is how interest rates are commonly discussed in Brazil), the regulation states that lenders must present this information in annual terms as well.

¹⁷ In addition to stipulating which information must be displayed, the Schumer box stipulates that the interest rate should be presented in large font (18 point) and the remaining terms in normal font (12 point).

¹⁸ For example, see Juster and Shay (1964), National Commission on Consumer Finance (1972), Day and Brandt (1974), and Parker and Shay (1974).

3. Experimental Design and Implementation

3.1. Treatments

In this experiment, the credit card company offered credit card clients a one-off menu of payment plan offers. The firm presented the offer as part of the client’s monthly statement. This tactic increases the likelihood that clients will read the offer relative to stand-alone direct marketing. The contract terms and presentation of the offer varied as described next.

To understand the elasticity of payment plan enrollment with respect to the interest rate, in a first treatment dimension, the credit card company randomly assigned clients to groups in which the *monthly* interest rate of the payment plans was 3.99%, 7.49%, or 11.89%. Given the payment plan’s interest rate, clients had four different payment plan options, with the number of installments varying between 6, 8, 10, and 12 months. Table 1 displays the monthly payments for each contract, assuming a balance of \$1,000.00. A client with an assigned interest rate of r would be able to choose among any of the contracts in the corresponding column.

To estimate how prominence of the interest rate disclosure affects payment plan enrollment, the company created a second treatment dimension in which clients were randomly chosen to receive one of two different advertisement layouts. The standard advertisement states that the client could pay off his balance using payment plans with a *special interest rate*. The advertisement then displays an example of one of the payment plan options, saying, “you can pay off your balance of B in m installments of M_m .” Figure 1 presents the one-page advertisement for the payment plans, along with the credit card statement. In that advertisement layout, the interest rate of the contract is not prominently disclosed and is only present in a footnote, which would be sufficient to satisfy the regulation that this information should be “readable.” Clients were also shown a table with all four payment plan options at the top of their credit card statements. In this table, one of the payment plans (the same as in the one-page advertisement) appears more prominently, and the interest rate of the payment plans is

Table 1 Example of Payment Plan Offers for a Client with a \$1,000 Balance

Assigned $r = 3.99\%$ Available choices:	Assigned $r = 7.49\%$ Available choices:	Assigned $r = 11.89\%$ Available choices:
6 × \$183.38	6 × \$198.14	6 × \$216.70
8 × \$142.77	8 × \$158.77	8 × \$179.22
10 × \$118.50	10 × \$135.47	10 × \$157.47
12 × \$102.40	12 × \$120.21	12 × \$143.55

Figure 1 (Color online) Standard Layout (Interest Rate Concealed in the Fine Print)



Notes. At the top of the page on the left, the advertisement says that the client can have more time to pay off his balance. The text below the pictures says that, with this contract, the client could finance his credit card balance in fixed monthly payments with a special interest rate. The orange box features the 12-month plan, saying that the client could pay off his balance of R\$900.00 in 12 installments of R\$129.19. The footnote states that the interest rate of this contract is 11.89% per month. The page on the right is the credit card statement. On the top of this page, there is a red box stating that the client can pay off his balance in up to 12 fixed installments. In this box, the client is presented with all four payment plan options, although one plan is featured (in this example, the 12-month plan). The interest rate of the contract is presented in a smaller font size relative to the font size used to present the monthly installments. In the actual credit card statement, each page is printed on A4 paper (8.3 in × 11.7 in). Figures A.1 and A.2 in the online appendix present a larger-scale version of the left and right pages.

presented in a small font size next to the table. Therefore, this particular layout encourages clients to focus on the monthly payments (M_m) of the featured plan rather than on the interest rate.

The alternative layout for the one-page advertisement is exactly the same as the standard ad, except that the interest rate information is more prominently disclosed (Figure 2). A client assigned an interest rate of 11.89% would see that he could pay off his balance using payment plans with a special interest rate of 11.89% (in large font size). The same applies for clients assigned interest rates of 3.99% and 7.49%. This layout prominently discloses the interest rate information in monthly terms, which is how interest rates are commonly discussed in Brazil. Clients who received this layout also had the same table at the top of their credit card statements as those who received the standard layout. Even though both layouts present the same information, the different

layouts could affect clients' decisions because of limited attention, since the value of the interest rate was more salient in the alternative layout (DellaVigna 2009). Since the variation in the information disclosure is orthogonal to the changes in the interest rates, I am able to estimate not only how information disclosure affects average take-up rates, but also how it affects the elasticity of payment plan enrollment with respect to the interest rate.

Finally, to test the hypothesis that consumers are more attracted to low monthly payments, the company randomly assigned clients a featured plan that was more prominently presented in the advertisement. The 12-month contract is the standard plan featured by the firm, which expects clients to focus on the plan's monthly payments and thus be more attracted when a lower monthly payment is prominent. The featured plan can also be relevant in determining which plan clients actually choose among the menu of options.

Figure 2 (Color online) Alternative Layout (Interest Rate Prominently Disclosed)

Notes. The one-page advertisement is the same as the one in Figure 1, except that the main text says that the client could finance his credit card balance in fixed monthly payments with a special interest rate of 11.89%. The interest rate is also present in the orange box, which displays the featured payment plan. In the actual credit card statement, each page is printed on A4 paper (8.3 in \times 11.7 in). Figure A.2 in the online appendix presents a larger-scale version of the right page, whereas Figure A.3 presents a larger-scale version of the left page.

Having many options may create feelings of conflict and indecision (for example, Shafir et al. 1993, Bertrand et al. 2010, Iyengar et al. 2004). In this case, the featured plan can work as a nudge if clients use it as a “default option” to avoid making a decision about which payment plan to choose.

3.2. Description of Experimental Sample

The credit card company offered a sample of 19,690 clients a menu of payment plans, in either July or September 2010.¹⁹ Using a risk classification system (based on credit bureaus and on the credit card company’s own data), the firm oversampled medium- and high-risk clients to provide more precision on the estimates for these groups. Medium- and high-risk clients comprise, respectively, 7% and 10% of the population. I use the inverse of the probabilities that clients were selected as sampling weights, so that all summary

¹⁹ The credit card company selected a total of 22,786 clients for the experiment. However, the credit card company only offers payment plans to clients with credit card balances greater than R\$100.00 who are not in default, leading to 19,690 clients in the final sample.

statistics and estimates represent the original population. All results are similar if sampling weights are not used.

Table 2 presents the baseline characteristics of the final sample. The average credit card balance when clients were offered a menu of payment plans was R\$661 (during the experiment, the exchange rate was US\$1 \approx R\$1.75). In the previous credit card statement, around 30% of the clients used the revolving credit line. Therefore, for around 70% of the clients, their credit card balances consisted of only new purchases when they received the payment plan offer. Also, even conditional on using the revolving credit line, clients paid on average 60% of their balances. This is an important difference of the Brazilian credit card market relative to the U.S. market. For example, based on the 1995 Survey of Consumer Finance, Angeletos et al. (2001) report that 70% of households with credit cards did not fully pay their credit card bill the last time they mailed in a payment. This lower proportion of revolvers in Brazil might be a consequence of the fact that revolving interest rates are much higher in Brazil.

Table 2 Sample Characteristics

	Full sample (1)	Risk categories		
		Low risk (2)	Medium risk (3)	High risk (4)
Credit card limit (R\$)	1,514.0 [2,184.8]	1,668.2 [2,305.9]	766.3 [1,189.4]	675.9 [1,009.6]
Credit card balance (R\$)	661.0 [964.4]	678.0 [993.4]	603.0 [872.0]	551.5 [729.4]
Probability of using the revolving credit line	0.304 [0.460]	0.264 [0.441]	0.432 [0.495]	0.572 [0.495]
Average revolving balance (proportion of current balance)	0.123 [0.241]	0.097 [0.213]	0.192 [0.286]	0.306 [0.332]
Average monthly interest and fee charges (R\$)	23.1 [73.7]	19.4 [66.4]	35.5 [96.5]	47.1 [104.3]
Probability of making a late payment	0.188 [0.390]	0.168 [0.374]	0.249 [0.433]	0.316 [0.465]
Time with the credit card (years)	4.65 [4.02]	4.82 [4.15]	3.81 [3.14]	3.72 [3.16]
12-month probability of default	0.078 [0.268]	0.051 [0.220]	0.136 [0.343]	0.220 [0.414]
Revolving interest rate	14.88 [1.46]	14.78 [1.46]	15.36 [1.33]	15.48 [1.28]
Proportion of population	—	0.839	0.067	0.095
Sample size	19,690	13,304	3,207	3,179

Notes. This table presents summary statistics for the final sample of 19,690 clients offered payment plans with the standard or alternative layout. Summary statistics for the full sample (column (1)) are weighted by the inverse of the probability that the client was selected so that they represent the original population. Standard deviations are in brackets. During the experiment, the exchange rate was US\$1 ≈ R\$1.75. Information on credit card limit, credit card balance, and revolving interest rate refers to the credit card statement when the payment plan was offered. Information on probability of using the revolving line, revolving balance, interest and fee charges, and late payment refers to the previous credit card statement. Probability of default is the probability that, conditional on being current in the base month, a client does not make the minimum payment for 70 days at some point within the following 12 months. These calculations are based on an outside sample.

Columns (2)–(4) of Table 2 show baseline characteristics separately for each risk category group. According to this classification, the firm defined around 10% of the clients as high risk. Using the revolving line of credit, making late payments, and using a higher proportion of the credit limit enter negatively in the risk assessment of the firm. Not surprisingly, these variables are all higher for high-risk clients. Table 2 also reports the 12-month probability of default for each category group.²⁰ As expected, low-risk clients have a lower probability of default (5%) than high-risk clients (22%). Finally, the average revolving interest rate increases with the risk profile of the clients. Whereas approximately 55.78% of the low-risk clients have a revolving interest rate of 15.99%, 79.89% of the medium-risk and 85.25% of the high-risk clients face a revolving interest rate of 15.99%.²¹

²⁰ This is the probability that, conditional on being current in the base month, a client does not make the minimum payment for 70 days at some point within the following 12 months. These calculations are based on an outside sample.

²¹ The revolving rate ranges from 11.89% to 15.99%. Even conditional on having the highest revolving rate, low-risk clients exhibit

For each treatment dimension, the company assigned clients into each treatment group with equal probability.²² Table 3 presents regressions of each treatment variable (prominent disclosure, interest rate, and maturity of the featured plan) on client characteristics at baseline. Since the company randomly assigned clients to each treatment group, these characteristics should be uncorrelated with the treatments. In all three regressions, the *F*-test of the restriction that all coefficients are jointly zero fails to reject at the usual significance levels. The number of significant coefficients is consistent with what one would expect to happen by chance (3 out of 30 coefficients). The variable that presents more statistically significant coefficients is the revolving interest rate. It is reassuring that all results presented below still hold after restricting the sample to clients with the 15.99% revolving rate, and also that results are not sensitive

higher credit limit, lower revolving probability, lower probability of making late payments, and lower credit limit usage compared to high-risk clients. Results are available upon request.

²² Assignment into the treatment groups was conducted independently of risk categories.

Table 3 Test of Randomization Balance

	Prominent disclosure (1)	Interest rate (2)	Maturity of the featured plan (3)
Credit card limit	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Credit card balance	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)
Probability of using the revolving credit line	-0.010 (0.013)	0.001 (0.001)	-0.026 (0.058)
Average revolved balance	0.002 (0.026)	-0.001 (0.002)	0.135 (0.117)
Average monthly interest and fee charges	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Probability of making a late payment	-0.002 (0.010)	0.001 (0.001)	-0.013 (0.044)
Time with the credit card (years)	0.002 (0.001)	0.000 (0.000)	0.009 (0.005)
Revolving interest rate	-0.005* (0.003)	0.000 (0.000)	-0.022* (0.012)
Medium risk	0.008 (0.011)	0.000 (0.001)	-0.023 (0.048)
High risk	0.014 (0.010)	-0.001 (0.001)	0.023 (0.046)
<i>F</i> (10,19679)	0.816	1.273	0.799
<i>p</i> -value	0.613	0.240	0.630
Sample size	19,690	19,690	19,690
Sample size by treatment group	Prominently disclosed? No: 9,927 Yes: 9,763	Interest rate: <i>i</i> = 3.99%: 6,486 <i>i</i> = 7.49%: 6,541 <i>i</i> = 11.89%: 6,663	Featured plan: 6-month: 4,928 8-month: 4,936 10-month: 4,919 12-month: 4,907

Notes. Each column represents a separate ordinary least squares regression where the left-hand side variable is the corresponding treatment variable. The *F*-test corresponds to a test that the coefficients on all variables are jointly equal to zero. Observations are weighted by the inverse of the probability that the client was sampled. Robust standard errors are in parentheses.

*Significant at 10%.

to including all baseline characteristics as controls. Tables A.1–A.3 in the online appendix present the same information when low-, middle-, and high-risk clients are analyzed separately.

3.3. Empirical Strategy

Given the fact that payment plan offers had randomly assigned interest rates and advertisement layouts, I can estimate the effect of the interest rate and information disclosure on enrollment simply by comparing the mean take-up rate across cells. I also use the following linear probability model (or logit) to estimate the interest rate sensitivity of demand:

$$E_i = \alpha + \beta_0 \cdot D_i + \beta_1 \cdot r_i + \beta_2 \cdot r_i \cdot D_i + \varepsilon_i, \quad (1)$$

where E_i is equal to one if client i enrolled in a payment plan, r_i is the interest rate offered, and D_i is a dummy variable equal to one if client i received the alternative advertisement with the interest rate prominently disclosed. The omitted group is clients who received the standard advertisement layout (where

the interest rate is not prominently disclosed). Random assignment of interest rates implies that $\hat{\beta}_1$ yields a consistent estimate of the interest rate sensitivity of the demand for payment plans when the lender conceals the interest rate information and encourages clients to focus on low monthly payments. Random assignment of advertisement layout implies that $\hat{\beta}_2$ yields a consistent estimate of the effect of information disclosure on the interest rate sensitivity.

I then calculate the interest rate elasticities under the two different advertisement layouts as²³

$$\hat{\eta}_{r, standard} = \hat{\beta}_1 \times \frac{\bar{r}_{standard}}{\bar{E}_{standard}} \quad \text{and} \quad (2)$$

$$\hat{\eta}_{r, alternative} = (\hat{\beta}_1 + \hat{\beta}_2) \times \frac{\bar{r}_{alternative}}{\bar{E}_{alternative}},$$

²³ The elasticities presented in this paper are based on regression 1 without covariates. All results are qualitatively the same if the covariates described in Table 2 are included in the regressions. Results are available upon request.

where \bar{r}_x and \bar{E}_x are, respectively, the average interest rate and average take-up rate under each advertisement layout $x \in \{standard, alternative\}$. I take into account the fact that average take-up rates are also estimated by bootstrapping the standard errors of $\hat{\eta}_{r,standard}$ and $\hat{\eta}_{r,alternative}$. Again, because of the random assignment of advertisement layouts, the differences between $\hat{\eta}_{r,alternative}$ and $\hat{\eta}_{r,standard}$ reveal the effect of prominent interest rate disclosure on interest rate elasticities.

Similarly, I can estimate the importance of the featured plan by comparing the mean take-up rate across the featured plan cells. Furthermore, I estimate the following linear probability model (or logit) to test the hypothesis that take-up rate is higher when a payment plan with lower monthly payments is more prominently presented (while holding the menu of options constant):

$$E_i = \alpha + \gamma \times m_i + \varepsilon_i, \quad (3)$$

where m_i is the maturity of the featured plan offered to client i . I then calculate the elasticity with respect to the maturity of the featured plan as

$$\hat{\eta}_m = \hat{\gamma} \times \frac{\bar{m}}{\bar{E}}, \quad (4)$$

where \bar{m} is the average maturity of the featured plan.

4. Results

4.1. Interest Rate Elasticity and Information Disclosure

The first set of results shows the sensitivity of the demand for the payment plans with respect to the interest rates when the interest rate is concealed in a footnote (as in the standard advertisement layout). Figure 3(a) presents the payment plans' take-up rates for each interest rate offer. The results show that the demand for the payment plans responds to interest rate changes even when the interest rate is concealed in the fine print. The average take-up rate is 2% when the payment plan's interest rate is 11.89%, and it doubles when the interest rate falls to 3.99%.²⁴ I strongly reject that take-up rates are equal for all interest rate values (p -value < 0.001). Table 4 presents the implied enrollment interest rate elasticity when the interest rate is not prominently disclosed in the first column of panel a. When the interest rate information is not prominently disclosed, the interest rate elasticity is

²⁴ Although take-up rates are relatively low in absolute terms, it should be noted that, in a given month, only 30% of the clients revolve. This number suggests that a smaller proportion of credit card clients in Brazil consider borrowing from their credit cards relative to credit card clients in the United States.

Table 4 Elasticities of Payment Plan Enrollment with Respect to the Interest Rate and to the Featured Maturity

	Risk categories			
	Full sample (1)	Low risk (2)	Medium risk (3)	High risk (4)
Panel a: Interest rate elasticity by advertisement layout				
Prominent rate disclosure?				
No	-0.711*** (0.138)	-0.884*** (0.172)	-0.514* (0.271)	-0.161 (0.242)
Yes	-0.880*** (0.132)	-0.928*** (0.170)	-0.508* (0.293)	-0.906*** (0.204)
p -value (elasticities are equal)	0.377	0.855	0.989	0.019
Panel b: Featured plan maturity elasticity				
Maturity elasticity	-0.132 (0.165)	-0.139 (0.217)	-0.100 (0.323)	-0.110 (0.284)
Sample size	19,690	13,304	3,207	3,179

Notes. Panel a reports interest rate elasticities when the interest rate is concealed and when it is prominently disclosed, along with the p -value of a test that these two elasticities are equal. Interest rate elasticities are calculated based on a linear probability model, using Equation (2). Panel b reports elasticities with respect to the maturity of the featured payment plan. These elasticities are calculated based on a linear probability model, using Equation (4). Column (1) reports elasticities for the full sample, whereas columns (2)–(4) report elasticities for each risk category separately. Estimates in column (1) are weighted by the inverse of the probability that the client was selected so that they represent the original population. Robust standard errors are in parentheses.

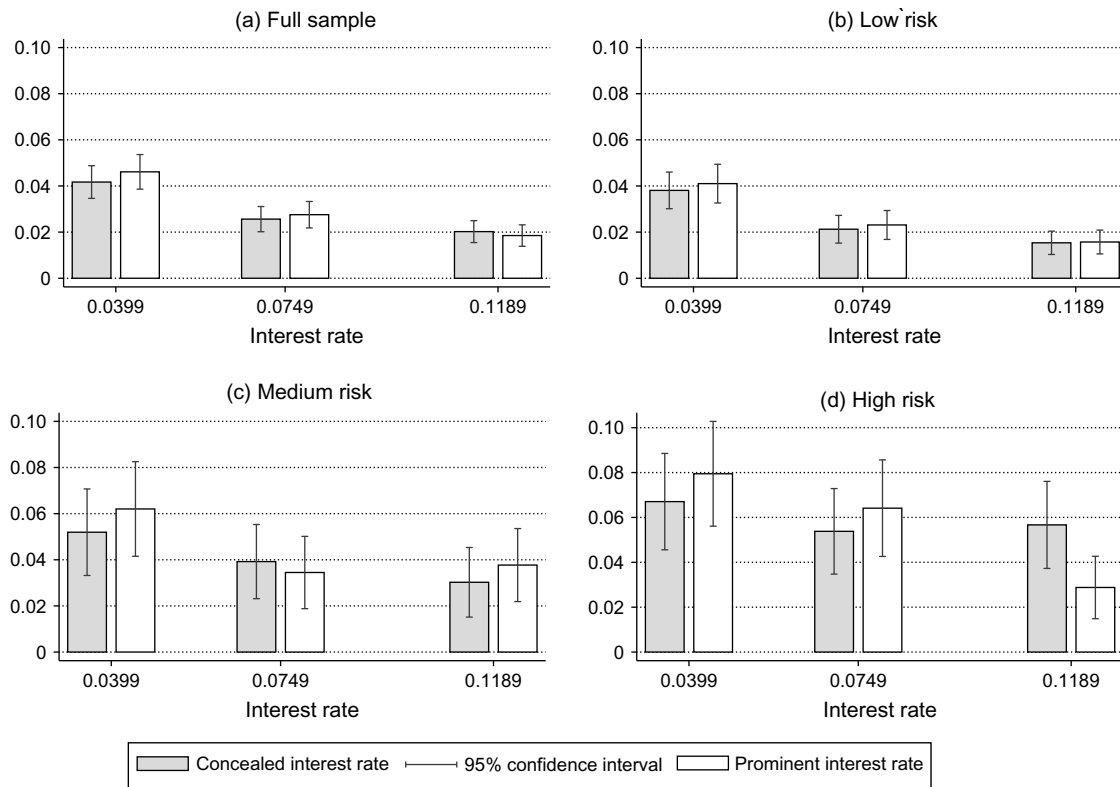
*Significant at 10%; ***significant at 1%.

–0.711 (s.e., 0.138), negative and statistically different from zero.²⁵

The fact that clients are sensitive to the interest rate even when the most salient information is the monthly payments is not surprising, since payment plans with higher interest rates have higher monthly payments. However, given the difficulties in assessing the interest rate of a payment plan based on the number of installments and the monthly payments, it is harder for consumers to compare the payment plan to other borrowing alternatives based only on this information. Comparing the demand for payment plans across the two different advertisements will provide evidence on whether clients are able to assess the cost of credit based on the monthly payments (or able to look for the interest rate in the fine print). Figure 3(a) also presents payment plan take-up rates when the interest rate is prominently disclosed.

Displaying the interest rate prominently results in an increase in take-up rates when the interest rate is 3.99%, and a decrease in take-up rates when the

²⁵ I present in this paper elasticities based on regression 1 without covariates and on Equation (2). All results are qualitatively the same if I include the covariates described in Table 2 in the regressions. Results are available upon request. The estimated coefficients from regression 1 using both a linear probability model and logit are presented in Table A5.

Figure 3 Take-Up Rates by Interest Rate \times Advertisement Layout

Notes. These graphs present the average take-up rates (and 95% confidence intervals) by each interest rate \times advertisement layout group. The information is presented for the full sample, and separately for each risk category group.

interest rate is 11.89%. However, these differences are small and not statistically different from zero. Table 4 presents the interest rate elasticity when rates are prominently disclosed in the first column of panel a. Clients are slightly more sensitive to the interest rate when the interest rate information is more prominent (the elasticity goes from -0.711 to -0.880), but it is not possible to reject that the elasticities are equal under the two layouts. The standard error of the difference between the estimators of the prominently disclosed and not prominently disclosed elasticities is 0.19. This implies that, at a 10% significance level, I would have 80% power to detect effect sizes of 0.47 and 50% power to detect effect sizes of 0.30. Therefore, if clients were perfectly inelastic when the information was not prominently disclosed, then I would have been able to detect this effect. Alternatively, if it were the case that the elasticity exceeded -1 in absolute value when the information was prominently disclosed, then I would also have been able to detect this effect. However, the experiment would not have enough power to detect moderate effects of prominent disclosure on the interest rate elasticity.²⁶

²⁶ For example, if the true difference in elasticities were equal to 0.19, then this test would only reject the null with probability 17%.

These results suggest that, on average, clients are able to assess the cost of credit even when the credit card company conceals the interest rate information in the fine print, leading clients to focus on the monthly payments of the contracts. One important caveat is that, given the experimental design, I am unable to distinguish whether clients are able to assess the cost of credit based on the stream of payments (even if there is no information in the fine print) or if they are able to glean this information from the fine print.²⁷ Still, I can conclude from these results that as long as regulation requires lenders to disclose interest rates, there is no evidence that specific prominence requirements that prevent lenders from concealing rates in the fine print would have, on average, large effects on consumers decisions.

4.2. Interest Rate Elasticity and Information Disclosure—Heterogeneity

The results for the full sample suggest that clients are sensitive to interest rate changes and that changing the salience of the contract interest rate has only

²⁷ To distinguish between these two explanations, it would be necessary to have a third treatment group with no information in the fine print. However, it was not possible to include such a group in the experimental design.

a limited effect on clients' behavior. However, these results hide an important heterogeneity when clients are classified according to their default risk.

Figures 3(b)–3(d) present payment plan take-up rates separately for low-, medium-, and high-risk clients, whereas columns (2)–(4) of Table 4 present payment plan interest rate elasticities separately for these groups. When the interest rate is not prominently disclosed, the demand for payment plans increases with the risk profile of the clients. More importantly, take-up rates are fairly constant across different interest rates for high-risk clients. A joint test fails to reject the hypothesis that take-up rates are equal for all interest rates for these clients when rates are concealed, with a p -value of 0.645. Interest rate elasticity is equal to -0.884 (s.e., 0.172) for the low-risk clients and -0.514 (s.e., 0.271) for medium-risk clients. For the high-risk clients, though, the estimated interest rate elasticity is equal to -0.161 (s.e., 0.242), which is both small and statistically not different from zero.

Comparing take-up rates and interest rate elasticities under the two advertisement layouts for low- and medium-risk clients, I find that more prominent interest rate disclosure has no impact on the behavior of these clients. For high-risk clients, though, prominent disclosure strongly reduces demand for the payment plans when the interest rate is equal to 11.89% (from 5.7% to 2.9%), and increases demand for the payment plans when the interest rate is equal to 3.99% or 7.49% (though these differences are not statistically significant).²⁸ The interest rate elasticity for this high-risk group changes from -0.161 (s.e., 0.242) when the interest rate is concealed to -0.906 (s.e., 0.204) when it is prominently disclosed. I can reject the hypothesis that the interest rate elasticities are invariant to the advertisement layout for this group of clients at the 1.9% level.

Table A.5 in the online appendix shows that the same heterogeneity pattern applies when the sample is restricted to clients who face a revolving interest rate of 15.99%, indicating that these results are not driven by the fact that the revolving interest rate is correlated with risk profile. In Table A.6 in the online appendix, I also look at the heterogeneity of the information treatment with respect to each of the risk profile determinants: (i) recurrence in late payments, (ii) average revolving balance, and (iii) average credit limit usage.²⁹ Of these, recurrence in late payments

appears to be most relevant in determining risk profile heterogeneity. One interpretation of these results is that more inattentive clients would incur late payments more frequently. However, it is not possible to rule out that recurrence in late payments is capturing other characteristics of the clients.

The heterogeneous effect of information disclosure is consistent with a majority of clients being careful when choosing among different borrowing options. These results also suggest, however, that there is a set of clients who are inattentive to the details of a contract, so that the salience of the interest rate actually impacts their borrowing decisions. Also, the set of clients who are affected by the information treatment can be identified by their past behavior. Finally, the behavior of high-risk clients also suggests that the experimental manipulation produced a meaningful difference in the available information, although the more sophisticated clients were able to work around that.

4.3. Featured Plan and Maturity Choice

Similar to the interest rate disclosure treatment, changing which plan appears more prominently has no effect on the clients' choice set. This variation also has no effect on the information content that is provided in the advertisement layout. One hypothesis in the firm, however, is that clients focus mainly on the monthly payments of the featured plan. In this case, take-up rates should be higher when a payment plan with lower monthly payments/longer maturity is featured.

Panel b of Table 4 shows the elasticities of payment plan enrollment with respect to the maturity of the featured plan. It is not possible to reject that this elasticity is equal to zero, which suggests that clients are no more likely to enroll in a payment plan when a longer-term plan is more prominently presented.³⁰ When I analyze clients separately by risk category group, I also find no evidence that the changes in the featured plan affect take-up rates.

The lack of payment plan demand response to changes in the featured plan does not imply, however, that clients are indifferent with respect to the maturity of their payment plans, nor that the plan that is selected to appear more prominently has no effect on clients' decisions. Table 5 presents the distribution of payment plan choices by featured plan for clients

²⁸ Given that the effects of prominent disclosure on take-up are negative for higher interest rates and positive for lower interest rates, there is no statistically significant difference between average take-up rates with and without prominent disclosure.

²⁹ I construct these variables based on information prior to the experiment. The dataset provides information for up to 19 months prior to the experiment.

³⁰ The p -value of a test that take-up rates are equal for all four featured payment plans is 0.667. The result that clients are no more likely to enroll in a payment plan when a longer-term plan is more prominently presented also holds under each advertisement layouts separately. When rates are prominently disclosed, the elasticity with respect to the maturity of the featured plan is -0.30 (s.e., 0.24), whereas this elasticity is equal to 0.05 (s.e., 0.23) when the interest rate information is not prominently disclosed.

Table 5 Payment Plan Choice by Featured Payment Plan

	All	Featured payment plan				Sample size	
		6	8	10	12		
Payment plan choice	6	0.525 (0.021)	0.835 (0.031)	0.374 (0.039)	0.418 (0.041)	0.479 (0.044)	359
	8	0.199 (0.017)	0.049 (0.018)	0.503 (0.041)	0.122 (0.029)	0.090 (0.025)	122
	10	0.144 (0.015)	0.052 (0.019)	0.062 (0.020)	0.376 (0.041)	0.087 (0.024)	93
	12	0.133 (0.014)	0.065 (0.020)	0.060 (0.018)	0.084 (0.023)	0.343 (0.042)	88
Sample size	662	168	173	167	154		

Notes. The first column presents the distribution of payment plan choices for the 662 clients who enrolled in a payment plan. The subsequent columns present the same information by featured plan group. Robust standard errors are in parentheses.

that enrolled in a payment plan. Clients appear to have strong preferences for short-term contracts. Of the clients who choose a payment plan, more than half choose the six-month plan (the shortest available maturity choice), and when the six-month plan is featured, more than 80% of these clients choose this plan. When the advertisement prominently features a longer-term plan, many clients continue to choose the six-month plan, but a large fraction of them simply follow the featured plan. Enrollment in a longer-term contract goes from 16% when the six-month plan is featured to 56% when a longer-term plan is featured.

These results suggest that even when the advertisement layout prominently features a single option, clients are able to consider other alternatives if this option is not attractive. However, the payment plan that appears more prominently has a strong influence in determining which payment plan a client chooses. These results are consistent with those of Karlan and Zinman (2008), who also find that randomly assigned (nonbinding) example maturity presented in direct mailers has no effect on take-up rates, but strong effects in determining maturity choices conditional on take-up.

However, clients are less likely to follow the featured plan when the cost of doing so is higher. The cost of following the featured plan relative to choosing the six-month plan increases with the maturity of the featured plan and with the interest rate. Table 6 presents the probability of following the featured plan by featured plan and interest rate for clients who enrolled in a payment plan. The sample is also restricted to clients that received an offer with maturity of the featured plan longer than six months.³¹

³¹ Since the sample is conditional on payment plan enrollment, the random assignment of offered interest rate and featured plan does not guarantee that these groups are comparable. This selection

Table 6 Probability of Following the Featured Plan by Interest Rate and Featured Plan

	All	Interest rate %			Sample size	
		3.99	7.49	11.89		
Featured payment plan	All	0.447 (0.036)	0.406 (0.043)	0.343 (0.049)	494	
	8	0.503 (0.041)	0.555 (0.062)	0.429 (0.068)	0.516 (0.091)	173
	10	0.376 (0.041)	0.428 (0.059)	0.341 (0.087)	0.297 (0.075)	167
	12	0.343 (0.042)	0.346 (0.062)	0.423 (0.074)	0.201 (0.082)	154
Sample size	494	225	156	113		

Notes. This table presents the probability that a client followed the featured plan by interest rate and featured plan. The sample is conditioned on clients who enrolled in a payment plan and received an offer with a featured plan with a maturity longer than six months. Robust standard errors are in parentheses.

Results presented in the first column of Table 6 indicate that clients that received an offer featuring the 12-month plan are 16 percentage points less likely to follow the featured plan compared to those who received an offer featuring the 8-month plan. Results presented in the first row of Table 6 indicate that clients that received an offer with 11.89% interest rate are 10 percentage points less likely to follow the featured plan than those who received an offer with 3.99% interest rate. Combining these two dimensions, when the interest rate is high and the layout features the 12-month plan, only 20% of the clients who enroll in a payment plan choose the featured plan, whereas when the interest rate is low and the layout features the 8-month, around 55% of the clients choose the featured plan. Therefore, although an advertisement can nudge clients into choosing a longer-term payment plan, this effect is less relevant (though still significant) when the relative cost of following the featured plan is higher.³²

problem should be less relevant for comparing clients that received different featured plans, because the featured plan has no effect on average take-up rates. Also, there is no evidence that, conditional on payment plan take-up, baseline variables help predict the maturity of the featured plan (column (3) of Table A.7 in the online appendix). This problem can be more relevant for comparing clients offered different interest rates. Since clients are interest rate elastic, clients who enroll in a payment plan when the interest rate is high are different from clients who enroll when the interest rate is low. In fact, the p -value of a joint test that all coefficients in a regression of baseline variables on interest rate are equal to zero is 0.049 (column (2) of Table A.7 in the online appendix). It is reassuring that differences in the proportion of clients who followed the featured plan across interest rate cells are not sensitive to controlling for baseline covariates. However, it is not possible to guarantee that there are relevant differences in unobservable variables.

³² Given a client's discount rate, he could not be indifferent to the different maturity options at different interest rates. Since the effects

Table 7 Effects of Maturity of Chosen Payment Plan on Probability of Default—Two-Stage Least Squares Results

	First stage (1)	Reduced form (2)	2SLS (3)
Featured plan = 8	0.788*** (0.189)	−0.012 (0.042)	
Featured plan = 10	1.490*** (0.212)	0.094** (0.046)	
Featured plan = 12	1.900*** (0.268)	0.052 (0.045)	
Maturity of payment plan chosen			0.043* (0.022)
Mean (featured plan = 6)		0.160 (0.031)	
Sample size		662	

Notes. This table presents two-stage least squares (2SLS) estimates of the effects of enrolling in a longer-term payment plan on the 12-month probability of default. The sample is restricted to clients that enrolled in a payment plan. Observations are weighted by the inverse of the probability that the client was sampled. Robust standard errors are in parentheses.

*Significant at 10%; **significant at 5%; ***significant at 1%.

Finally, assuming that the featured plan affected which payment plan the clients chose, but that it had no effect on their decision to enroll or not in a payment plan, I can also test whether clients were more likely to default when they were induced to choose a longer-term payment plan. Given that the featured plan had no effect on take-up rates, and also that, conditional on enrollment, baseline variables have no power in predicting maturity of the featured plan (see Table A.7 in the online appendix), this seems to be a reasonable assumption. I estimate the following model:

$$Y_i = \alpha + \lambda \times m_i + \varepsilon_i, \quad (5)$$

where m_i is maturity of the payment plan chosen by client i . I use a set of dummy variables indicating whether the 8-, 10-, or 12-month plan was featured (the 6-month plan category was omitted) as instrumental variables for maturity of the chosen plan. The default variable (Y_i) is equal to 1 if the client does not meet the minimum payment for three consecutive months in the 12 months after the payment plan offer, and is defined for the credit card account as a whole, and not for the payment plan in particular.³³ The results in Table 7 indicate that clients induced to enroll in a longer-term payment plan were more likely to default. Therefore, the featured plan not only

of nudges are significant at all interest rates, this suggests that the nudge effects are not simply capturing the fact that clients are basically indifferent to different plans.

³³ This is how the credit card company defines that a client is on default. When this happens, the company cancels the account, and the client will never be able to apply for this credit card again. The company also reports the client's name to credit bureaus, making it harder for him to access other lines of credit.

affects which plan clients choose, but it also has real effects on clients' financial outcomes.

5. Conclusion

In a setting where regulation requires lenders to disclose interest rate information, but does not provide specific prominence requirements, I test whether lenders are in fact able to exploit clients' limited attention through advertising strategies that conceal the interest rate and encourage clients to focus on low monthly payments. In a randomized field experiment in Brazil, a large credit card company offered a sample of 19,690 clients a menu of payment plans to pay down their balances, with offers varying with respect to (i) the contract interest rate, (ii) the degree of interest rate disclosure, and (iii) the maturity of the featured payment plan.

On average, demand for payment plans is sensitive to the interest rate even when the advertisement layout conceals the interest rate information. In addition, it is not possible to reject that, on average, prominent disclosure has no effect on payment plan take-up rates and enrollment interest rate elasticities. However, the results in this paper also demonstrate the importance of considering the possibilities of heterogeneous effects of information disclosure by client's risk classification. High-risk clients are not sensitive to the interest rate when the layout conceals the interest rate in the fine print, but they become sensitive to the interest rate when it is prominently disclosed. I also find that featuring a payment plan with shorter or longer maturity has no effect on take-up rates, but strong effects in determining maturity choices conditional on take-up, although consumers are less influenced by such nudges when the decision involves higher stakes.

This work should be extended in several directions. Most fundamentally, it is important to determine its external validity. One might be interested in whether these findings extend to different financial products, and also to other countries, with different regulatory settings. In addition, this paper analyzes the effects of a one-off and off-equilibrium prominent disclosure treatment. Future research is needed to have a more complete understanding of the general equilibrium effects that would happen if the government were to impose such restrictions on all lenders over the long term. Finally, the results in this paper focus on enrollment rates, which are a limited measure of demand. Future research is necessary to provide a deeper understanding on the effects of these policies on overall borrowing and, more generally, on consumer welfare.

Supplemental Material

Supplemental material to this paper is available at <https://doi.org/10.1287/mnsc.2015.2281>.

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References

- Agarwal S, Chomsisengphet S, Mahoney N, Stroebel J (2015) Regulating consumer financial products: Evidence from credit cards. *Quart. J. Econom.* 130(1):111–164.
- Alan S, Loranth G (2013) Subprime consumer credit demand: Evidence from a lender's pricing experiment. *Rev. Financial Stud.* 26(9):2353–2374.
- Angeletos GM, Laibson D, Repetto A, Tobacman J, Weinberg S (2001) The hyperbolic consumption model: Calibration, simulation, and empirical evaluation. *J. Econom. Perspect.* 15(3):47–68.
- Attanasio OP, Goldberg PK, Kyriazidou E (2008) Credit constraints in the market for consumer durables: Evidence from micro data on car loans. *Internat. Econom. Rev.* 49(2):401–436.
- Barr MS, Mullainathan S, Shafir E (2008) Behaviorally informed financial services regulation. White paper, New America Foundation, Washington, DC.
- Ben-Shahar O, Schneider CE (2014) *More Than You Wanted to Know: The Failure of Mandated Disclosure* (Princeton University Press, Princeton, NJ).
- Bertrand M, Morse A (2011) Information disclosure, cognitive biases, and payday borrowing. *J. Finance* 66(6):1865–1893.
- Bertrand M, Karlan D, Mullainathan S, Shafir E, Zinman J (2010) What's advertising content worth? Evidence from a consumer credit marketing field experiment. *Quart. J. Econom.* 125(1):263–305.
- Beshears J, Choi JJ, Laibson D, Madrian BC (2009) The importance of default options for retirement saving outcomes: Evidence from the United States. *Social Security Policy in a Changing Environment* (University of Chicago Press, Chicago), 167–195.
- Central Bank of Brazil (2010) Relatório de Economia Bancária e Crédito. Report, Central Bank of Brazil, Brasília. <https://www.bcb.gov.br/Pec/Depep/Spread/REBC2010.pdf>.
- Choi J, Laibson D, Madrian B, Metrick A (2004) For better or for worse: Default effects and 401(k) savings behavior. Wise DA, ed. *Perspectives in the Economics of Aging* (University of Chicago Press, Chicago), 81–121.
- Cronqvist H, Thaler RH (2004) Design choices in privatized social-security systems: Learning from the Swedish experience. *Amer. Econom. Rev.* 94(2):424–428.
- Day GS, Brandt WK (1974) Consumer research and the evaluation of information disclosure requirements: The case of truth in lending. *J. Consumer Res.* 1(1):21–32.
- DellaVigna S (2009) Psychology and economics: Evidence from the field. *J. Econom. Literature* 47(2):315–372.
- Gross DB, Souleles NS (2002) Do liquidity constraints and interest rates matter for consumer behavior? Evidence from credit card data. *Quart. J. Econom.* 117(1):149–185.
- Hastings JS, Tejeda-Ashton L (2008) Financial literacy, information, and demand elasticity: Survey and experimental evidence from Mexico. Working Paper 14538, National Bureau of Economic Research, Cambridge, MA.
- Huang D, Tan W (2009) Estimating the demand for credit card: A regression discontinuity approach. Available at SSRN: <http://ssrn.com/abstract=1466449>.
- Iyengar S, Huberman G, Jiang W (2004) How much choice is too much? Contributions to 401(k) retirement plans. *Pension Design and Structure* (Oxford University Press, Oxford, UK).
- Juster FT, Shay RP (1964) *Consumer Sensitivity to Finance Rates: An Empirical and Analytical Investigation*. (National Bureau of Economic Research, New York).
- Karlan D, Zinman J (2008) Credit elasticities in less-developed economies: Implications for microfinance. *Amer. Econom. Rev.* 98(3):1040–1068.
- Karlan D, Zinman J (2013) Long-run price elasticities of demand for credit: Evidence from a countrywide field experiment in Mexico. Working Paper 19106, National Bureau of Economic Research, Cambridge, MA.
- Karlan D, Zinman J (2014) Price and control elasticities of demand for savings. Working paper, Yale University, New Haven, CT.
- Madrian B, Shea D (2001) The power of suggestion: Inertia in 401(k) participation and savings behavior. *Quart. J. Econom.* 116(4):1149–1187.
- National Commission on Consumer Finance (1972) Consumer credit in the United States. Report, Government Printing Office, Washington, DC.
- Parker GGC, Shay RP (1974) Some factors affecting awareness of annual percentage rates in consumer installment credit transactions. *J. Finance* 29(1):217–225.
- Roxburgh C, Lund S, Wimmer T, Amar E, Atkins C, Kwek J-H, Dobbs R, Manyika J (2010) Debt and deleveraging: The global credit bubble and its economic consequences. Report, McKinsey Global Institute.
- Seira E, Elizondo A (2014) Are information disclosure mandates effective? Evidence from the credit card market. Working Paper 2014-18, Banco de México, Mexico.
- Shafir E, Simonson I, Tversky A (1993) Reason-based choice. *Cognition* 49(1–2):11–36.
- Stango V, Zinman J (2009) Exponential growth bias and household finance. *J. Finance* 64(6):2807–2849.
- Stango V, Zinman J (2011) Fuzzy math, disclosure regulation, and market outcomes: Evidence from truth-in-lending reform. *Rev. Financial Stud.* 24(2):506–534.