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Reducing leverage while increasing delinquency risk

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Abstract
We study a Chilean regulation that raised required loan-loss provisions for high loan-to-value (LTV) residential mortgages. Young married borrowers, who had previously made frequent use of these mortgages, were more likely to be affected by the policy shift, and they responded by reducing their LTVs. First-time and lower-income young married borrowers were much less likely to enter the market post-regulation. Short-term delinquency rates, however, increased for young married borrowers after the policy shift, as they liquidated their term deposits to make larger equity investments and took out multiple mortgages.

Resumen
El trabajo analiza la regulación chilena que elevó las provisiones para riesgo de crédito de préstamos hipotecarios residenciales con altos LTV (loan-to-value). Deudores jóvenes casados, que previamente recurrían frecuentemente a este financiamiento, tenían más probabilidades de verse afectados por el cambio normativo, y respondieron reduciendo sus LTV. Deudores jóvenes casados, de bajos ingresos, que no tenían hipotecas previas, registraron menos probabilidades de entrar en el mercado después de la regulación. La tasa de morosidad a corto plazo, sin embargo, aumentó para los deudores jóvenes casados después del cambio normativo, quienes habrían liquidado depósitos a plazo para realizar las compras inmobiliarias, y obtuvieron múltiples hipotecas.

1 Introduction

Macroprudential policies to limit housing market risk have become a commonplace feature of international mortgage markets. One standard approach is to restrict the maximum loan-to-value (LTV) ratio that home purchasers are permitted to assume; this regulation has been adopted in a wide variety of jurisdictions (Cerutti et al. 2017 and Acharya et al. 2020). Proponents argue that this measure restrains housing price increases and reduces risks to the banking sector. Previous research has found that these restrictions lead to a decrease in mortgage lending (DeFusco et al. 2020) and limit the ability of constrained borrowers to purchase expensive housing (Benetton 2021). In this paper we analyze the announcement of a regulatory change in Chile at the end of 2014 that increased required mortgage loan-loss provisions for banks, especially for high-LTV loans. We argue that this regulation not only hampered access to finance for affected borrowers but led to higher, not lower, rates of delinquency. That is, discouraging high-LTV loans can both restrict debt and increase delinquency risk.

The primary argument that an LTV restriction will reduce delinquencies is that the policy will have little impact on consumers' planned equity investments in housing and that borrowers will instead respond to the regulation by purchasing less expensive homes with less debt. If this occurs, both the monthly debt service and the property LTV will decline, which should lead to decreased mortgage risk. Borrowers, however, may respond in a different way to decreased mortgage access. For example, constrained borrowers could liquidate more of their savings and provide larger equity investments so as to avoid a dramatic decline in the quality of housing they are able to purchase. These borrowers would then have reduced access to liquidity to accommodate possible future income shocks, which could lead to higher delinquency rates. It has also been observed by Crowe et al. (2013) that LTV regulations are often sidestepped by lenders and borrowers. Limiting mortgage LTVs may encourage borrowers to pursue consumer loans, which has been argued to have occurred in China (Braggion et al. 2021) and Israel (Tzur-Ilan 2018). Borrowers may also seek

multiple mortgages, hoping for favorable regulatory treatment of at least the first. All of these potential responses can lead to higher delinquency risk.

The Chilean LTV regulation, which introduced a standard loan-loss provisioning model, imposed higher provisioning costs on banks that supplied mortgages with LTVs above 80%. The aim of the regulation was for banks to more accurately reflect the true credit mortgage credit risk in their portfolios. We show that the regulation had a direct effect in reducing the frequency of these mortgages by 11.5 percentage points (the pre-regulation mean was 41.8%). Our main empirical analysis considers the impact of the policy on young married borrowers. Borrowers with low incomes and high housing demand make small down payments and borrow at high LTVs (Piskorski and Tchistyi 2010). Young married couples with children typically seek relatively large housing relative to their income level (Dynarski 1986, Rapaport 1997 and Skaburskis 1997) and should therefore frequently borrow at a high LTV. We demonstrate that before 2015 these borrowers were 7 percentage points more likely to have high-LTV mortgages, likely because family size considerations induced them to seek costly housing. We therefore view young married borrowers as a class of consumers who were strongly affected by the policy shift (i.e., we regard them as individuals who were more likely to be treated by the change). Post-regulation these borrowers experienced a drop in the use of high-LTV mortgages.

We find that the regulation had a dramatic effect on the types of young married borrowers who received mortgage finance. Starting in 2015, the frequency of first-time borrowers decreased by 6.6 percentage points for young married consumers relative to others. This is evidence of reduced financial access for constrained treated borrowers. We also find that the incomes and term deposit holdings of young married borrowers rose compared to other borrowers, which is further evidence of a selection effect in which only treated borrowers with high resources were able to purchase housing post-regulation.

While these effects may perhaps have been anticipated, and may even have been regarded as a necessary cost of a policy to reduce risk, we find 30-day delinquency rates of

young married borrowers rose after the regulation. Relative to others, the 30-day delinquency of young married borrowers increased by 15% relative to the mean rate. There is no evidence of a pre-trend of increasing young married delinquency prior to 2015, so we interpret the increased delinquency risk as a causal impact of the regulation. We do not find a statistically significant effect on 90-day delinquencies. We do not find any effect of the regulation on the delinquency risk of consumer loans, and we also find no change in mortgage loan terms. Lenders appear not to have incorporated the post-regulation higher 30-day delinquency risk of young married borrowers into mortgage pricing.

We investigate the mechanisms driving the heightened risk of delinquency. First, we show that young married borrowers increased their equity investments in new housing. They were also more likely to liquidate their term deposits in advance of making a home purchase. This suggests that treated borrowers exchanged their liquid cash investments for illiquid housing equity holdings, which may have inhibited their ability to absorb later income shocks. Limited borrower access to cash reserves can lead to higher delinquency risks. We do not observe lender recovery rates, and it is possible that higher borrower home equity investments allowed lenders to preserve more of their capital in the event of default. Nonetheless, managing borrower delinquencies is time-consuming and expensive.

Second, we find no evidence that young married borrowers increased their consumer borrowing. This contrasts with previous findings in China and Israel (Braggion et al. 2021 and Tzur-Ilan 2018). Borrowers in Chile instead substituted on other margins for reduced access to mortgage financing.

Third, we demonstrate that after the regulation young married borrowers were significantly more likely to hold multiple mortgages. In some cases these multiple mortgages were issued by the same financial institution, which raises the possibility that lenders and borrowers may have cooperated to avoid the effects of the regulation. Conditional on the presence of multiple mortgages, however, the likelihood that both of them were originated by the lender declines post-regulation. We also do not find any increase in the probability

that the multiple mortgages are granted in quick succession (i.e., within six months of each other). The findings suggest that regulatory arbitrage did not have meaningful impact on this market.

Nonetheless, carrying multiple mortgages can represent a significant burden on borrowers. Piskorski et al. (2015) and Griffin and Maturana (2016) document the negative impact of multiple liens on loan performance in the U.S. While the main focus of these authors is on concealed second liens, they show clearly that properly reported second liens also have dramatically higher delinquency rates and that multiple liens are often issued by the same bank. Second mortgages can lead to higher delinquency rates due to selection of borrowers (perhaps only high-risk borrowers seek multiple mortgages), gaming between lenders (when there is more than one creditor) or higher risks than the initial lender expected. The increased use of multiple mortgages by treated borrowers after the announcement of the Chilean LTV regulation likely contributed to the higher 30-day delinquency risks we observe.

Our data do not include information on total loan recoveries. We find that the regulation reduced LTVs, so it is possible that losses given default were reduced by the policy change. Nonetheless, increased delinquencies introduce heightened uncertainty into the banking system and additional stress on the personal finances of mortgage borrowers. In these two ways the Chilean LTV rules added delinquency risk.

In contrast to our findings, de Araujo et al. (2020) find that strict LTV limits reduced delinquency in the subsidized mortgage sector in Brazil. The divergent results may be due to differing institutional features of the overall mortgage market in Chile versus the subsidized loan sector in Brazil. In particular, the access to multiple mortgages and the ready availability of term deposits that we describe for the Chilean borrowers in our samples may be less common for the borrowers in the Araujo et al. (2020) study. Without those avenues for adjusting their response to an LTV regulation, borrowers will be forced to purchase less-expensive housing, as Araujo et al. (2020) show, which can lead to reduced delinquency.

In a study of the Indian market, Campbell et al. (2015) show that increased risk

weights for high-LTV mortgage are associated with relatively lower delinquencies for those loans. This analysis contrasts outcomes for high- and low-LTV mortgages and provides insights into the trade-offs made by individual lenders, while our emphasis is on considering outcomes for treated borrowers as a group. A regulation that encourages borrowers to liquidate savings and to seek multiple mortgages can increase risks for the banking sector as a whole, even if the delinquency rate of high-LTV loans is reduced relative to that of low-LTV loans under the regulation. This could occur, for example, if the regulation results in higher delinquency risks for all borrowers or if it discourages safer borrowers from participating in the market.

There is evidence that LTV restrictions can reduce house price growth (Igan et al. 2011), and their effect in constricting access to finance that we and others have found may be regarded by some as the necessary price of the policies. Our findings, based on an analysis of outcomes for young married couples, suggest, however, that when borrowers respond to LTV regulations by drawing down savings and hence lowering their capacity to deal with liquidity shocks, the delinquency-reducing purpose of these rules may not only be undermined but may be completely overturned.

2   Data and Regulatory Change

2.1   Data

We consider all mortgage loans originated in Chile between January 2013 and December 2017. For each mortgage borrower, we consider each installment consumer loan obtained in the window of sixty days before or sixty days after the date of the mortgage loan origination. This pool of mortgage and consumer loans is analyzed in a cross-sectional manner at the loan level by considering outcomes 12 and 24 months after origination. The mean interest rate on mortgage loans is 3.94%, and the mean interest rate on consumer loans is 15.43%. The interest rate on mortgage loans is a real rate, unlike the consumer rate which is nominal.

We also observe monthly balances on each mortgage and installment consumer loan (regardless of origination date) between January 2013 and December 2017. Information on the amount borrowed and the delinquency or deteriorated status of the loan in a given month is available. Summary statistics on financial variables and borrower demographic characteristics are supplied in Table 1 Panel I. High-LTV loans, defined as mortgages with an LTV above 80%, comprise 35% of the originations. Chile is divided into approximately 350 comunas (which have a resemblance to U.S. counties), and the comuna of each borrower is identified in the data.[1] Twenty percent of borrowers are young (i.e., below median age for their comunas) and married.

Information on the monthly individual balances of term deposits from most (though not all) financial institutions and details on the priority and specificity of the guarantees behind all mortgage loans complete our data set.

2.2 Regulation

On December 30, 2014, the Chilean banking authority issued a regulation—announced to all financial institutions as *Circular Bancos No 3.573*—that increased required loan-loss provisions for mortgage loans starting in 2016. Loan-loss provisions are reserves that banks create to account for expected loan defaults. Prior to the regulatory change, banks in Chile used their own internal models to determine the level of provisioning. The regulation introduced a standard model of mortgage provisioning, in which the provision is equal to the product between the probability of default (i.e., delinquency risk) and the loss given default. The provision is determined by two parameters, the LTV ratio of the loan and the number of days the loan is delinquent, which were calibrated by the regulator using historical default data.

Importantly, the standard model increased sharply the loan-loss provisions that banks

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[1]The records of borrowers with foreign addresses are assigned foreign comuna codes; hence the total number of comunas in our models exceeds Chile's comunas.

must make when granting mortgage loans with LTVs above 80% (and also loans with LTVs above 90%).[2] The purpose of the regulation was to make banks reflect more accurately the true credit risk in their mortgage loan portfolios. Because the loan-loss provision is an income statement expense, the regulation increased the cost for banks to offer loans with high LTVs. The effective date for the implementation of these provision costs was January 1, 2016, one year after the announcement.

We define the "Post" period after the regulation to begin on January 1, 2015, right after the announcement was made, as financial institutions became aware by that date of what the costs of carrying high-LTV mortgages were shortly to be. As shown in Table 2 column one, there was a significant decline of 2.9 percentage points (t-statistic=-6.24) in LTV ratios after the announcement of the new regulation, relative to a pre-regulation average of 79.4%. The fraction of mortgages with LTV ratios exceeding 80% (i.e., high-LTV mortgages) declined by 11.5 percentage points (t-statistic=-6.34), relative to a proportion of 41.8% in the pre-regulation period, as displayed in Table 2 column two. We show in Figure 1 that after the announcement of the regulation, the distribution of LTVs shifted to the left, with a marked decrease in the overall frequency of high-LTV mortgages.

3   Predictions

The Chilean LTV regulation was designed to limit mortgage risk by discouraging banks from offering LTV ratios above 80%. It is natural to expect that a reduction in debt loads should make mortgage delinquency less frequent. If consumers, for example, were to respond to the regulation by investing the same amount of equity into a less expensive house, then for each given borrower debt loads would decline, making the mortgages more affordable, and the relative collateral value of the house relative to the mortgage would increase. Lower LTVs

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[2]The provision for a loan with an LTV above 80% is 13 times larger than for a loan with an LTV equal or below 80%. For more details on the regulation, see: https://www.sbif.cl/sbifweb/servlet/Noticia?indice=2.1&idContenido=10636.

typically reduce mortgage delinquency risk (Agarwal, Ben-David and Yao 2015 and Kruger and Maturana 2021) and reduced payments have a similar effects, thereby yielding our first hypothesis.

Hypothesis 1. The LTV regulation reduced mortgage delinquency by encouraging borrowers to purchase less expensive homes with the same equity investment and a lower debt to value ratio.

It was not clear, however, that borrowers would respond to the regulation by scaling back the amount of housing they would purchase and maintaining the same equity investment. For example, if pre-regulation a borrower intended to borrow at an LTV of 85% and to invest the remaining 15% in equity, then maintaining this equity investment in pesos at a reduced LTV of 80% would reduce the value of the purchased home by 25%. That is a significant reduction in the proposed housing to be consumed that may not be palatable to borrowers. As a result, the borrower may instead respond in three ways designed to restore the purchased housing at least partially to its expected pre-regulation level. First, the borrower may liquidate her cash holdings and increase the housing equity investment. This converts part of the borrower's holdings from liquid to illiquid status, which may negatively impinge on her ability to service the loan due to cash constraints. Second, the borrower may expand her overall debt capacity by seeking additional non-mortgage financing. If this non-mortgage financing carries a higher rate than mortgage financing, the net result may be an increased interest payment burden for the borrower. Third, the borrower may seek multiple mortgages. This may be due to an effort on the borrower's part to split her mortgage into several components in an attempt to evade the regulation. Alternatively, perhaps the regulation will discourage new borrowers from entering the mortgage market, which may lead seasoned owners who possess multiple properties secured with different mortgages to make up a larger fraction of all borrowers. Under either mechanism multiple mortgages may appeal to riskier borrowers, lead to conflicts amongst lenders or cause lenders to underestimate the total amount of financing. In all these respects, the third approach may also lead to a

greater delinquency risk (and greater overall borrowing). These three arguments suggest that borrowers may respond to the regulation by taking actions that increase risk, as summarized in our second hypothesis.

Hypothesis 2. The LTV regulation increased mortgage delinquency by encouraging borrowers to

> *a. liquidate cash holdings and invest in illiquid housing equity*

> *b. borrow using expensive non-mortgage sources of credit*

> *c. seek out multiple mortgages, including costly low-priority mortgages*

From a theoretical perspective it is thus unclear whether the LTV regulation should be expected to decrease or increase delinquency risk. We therefore assess this question using an empirical evaluation.

4 Empirical Methodology

It is clear from the general trends described in Section 2 that LTV ratios in Chile dropped following the implementation of the LTV regulation and that the decrease in the frequency of LTVs above 80% was especially marked. A direct comparison of delinquency rates before and after the regulation would likely be influenced by many external factors including shifting macroeconomic conditions. In order to test the contrasting Hypotheses 1 and 2 of Section 3, we therefore seek a treatment group: a group of borrowers who would be more likely to be affected by LTV regulation. Identifying this treatment group enables us to implement a difference-in-difference approach in which we contrast the changes in outcomes for treated and control borrowers after the regulation and attribute the relative effects on treated borrowers to the regulation.

The regulation was most likely to have an impact on borrowers with a predisposition to borrowing at an LTV of above 80%. Borrowers with high housing demand relative to their

incomes are likely to make small down payments and to borrow at high LTVs (Piskorski and Tchistyi 2010). Couples with children are likely to seek more housing relative to their income level (Dynarski 1986, Rapaport 1997 and Skaburskis 1997) and should therefore be expected to borrow at a high LTV. This is especially true for young couples. From a conceptual standpoint, young married borrowers are therefore distinguished from other classes of borrowers (especially older unmarried borrowers) in their expected propensity to desire a mortgage with an LTV greater than 80%. We test this prediction in our data. Prior to the regulation, young married borrowers in Chile were more likely to initiate high-LTV loans. We show in Table 1 Panel II that they had LTVs that were higher than those of other borrowers by 3 percentage points (t-statistic=28.60). This difference was particularly pronounced for high-LTV originations. Young married borrowers were 7 percentage points (t-statistic=19.96) more likely to have high-LTV mortgages, relative to an average frequency of 40% for non-young married borrowers. We therefore propose that young married status can serve as a proxy for whether a borrower was treated by the LTV regulation.

We evaluate the impact of the LTV regulation by estimating for each borrower i who initiated a mortgage in period t

$$loan\ characteristic_{i,t} = \tag{1}$$

$$\alpha + \beta\,(young\ married_i)\,(Post\text{-}regulation_t) + \lambda\,(young\ married_i)$$

$$+\,comuna\text{-}year_{i,t} + \epsilon_{i,t},$$

where $young\ married_i$ is an indicator for a young married borrower, $Post\text{-}regulation_t$ is an indicator for a mortgage provided after the announcement of the regulation on Jan. 1, 2015, $comuna\text{-}year_{i,t}$ are fixed effects at the comuna-year level and $\epsilon_{i,t}$ is an error term. The

coefficient of interest is β which describes the differential impact of the regulation on the young married borrowers whom we have shown to have had an elevated propensity to take out mortgages with an LTV exceeding 80% in the pre-regulation period. The *Post-regulation* indicator is subsumed by the comuna-year fixed effects. We cluster errors at the comuna level.

5 Results

5.1 Impact of the regulation on LTV ratios

We begin by testing whether the regulation had a direct effect in reducing LTV ratios for young married borrowers. We regress the LTV ratio of the loan on an indicator for young married borrower status, the interaction of this indicator with a post-regulation dummy and comuna-year fixed effects, as described in equation (1). We find that young married borrowers experienced a 0.5 percentage point drop in LTV ratios (t-statistic=-2.11) after the regulation was announced, as displayed in the first column of Table 3. We show in the second column of Table 3 that the regulation reduced the probability that a young married borrower originated a mortgage with an LTV of above 80% by 2.0 percentage points (t-statistic=-2.55).

Table 3 columns three and four reports the year-by-year changes in LTV outcomes for young married borrowers. There is no evidence of a declining pre-trend in the LTVs of young married borrowers in the pre-regulation period of 2013-2014. The regulation had relatively little impact on these borrowers in the announcement year of 2015 (relative to 2014), but after implementation in 2016 there was a significant decrease in both the LTV and the probability of an above 80% LTV mortgage for young married borrowers. Table 2 establishes that LTV ratios and the likelihood of high-LTV loans declined after the regulation and Table 3 shows that these effects were especially pronounced for young married borrowers, which is consistent with the argument that these borrowers were more affected by the regulation.

5.2 Selection of borrowers

Table 3 describes the intensive margin effects of the regulation in reducing LTVs for young married borrowers. The LTV regulation was designed to reduce high-LTV borrowing, and Tables 2 and 3 indicate that it was successful in doing so. In achieving this aim, however, it might have particularly discouraged certain subsets of potential borrowers from seeking mortgages. In other words, it may have had an impact on the extensive margin of who sought a mortgage. We examine whether the composition of treated (i.e., young married) borrowers changed after the implementation of the regulation.

We regress an indicator for whether a borrower originates a mortgage for the first time on the interaction between post-regulation and young married and the standard set of controls. We find, as displayed in the first column of Table 4, that young married borrowers were 6.6 percentage points less likely (t-statistic=-9.86) to be originating a mortgage for the first time in the post-regulation period. In the pre-regulation period young married borrowers were 6.6 percentage points more likely than other borrowers to originate a first-time mortgage, but in the post-regulation years this difference was effectively erased. One would expect young married borrowers, in general, to have a higher likelihood of seeking a mortgage for the first time than other borrowers, but this was no longer true in post-regulation period. The LTV regulation appears to have had a very strong effect in discouraging mortgages for constrained first-time borrowers.

Consistent with that finding, we show in the second column of Table 4 that young married borrowers were 4.0 percentage points less likely (t-statistic=-9.61) to be new to the financial system (i.e., to have had no prior form of either mortgage or consumer debt) in the post-regulation period. The regulation led to a significant decrease in new borrowers. These borrowers may have been forced to postpone their initial purchase of a home until they accumulated more savings.

Less-wealthy young married borrowers might be expected to be the most influenced by

the regulation, as they would have the greatest need for a high-LTV mortgage. We test that hypothesis by regressing the log of one plus borrower income on the interaction between the young married and post-regulation indicators and the standard controls. We find, as detailed in the third column of Table 4, that the income of young married mortgage borrowers rose by approximately 5.8 percent (t-statistic=2.57) after the regulation was announced. We further show in the fourth column of Table 4 that the deposits held by young married borrowers twelve months before the mortgage was granted were approximately 10.9 percent higher (t-statistic=2.96) after the regulation. All of the results in Table 4 support the claim that the regulation had a strong selection effect: it reduced the fraction of treated new borrowers and shifted the composition of treated borrowers towards those with greater income and deposits.

5.3   Mortgage performance

We show in Table 3 that the LTV regulation had its intended effect in reducing the frequency of high LTV mortgages. Further, the evidence in Table 4 shows that post-regulation young married borrowers were more established and held higher liquid assets. The conflicting predictions of Hypotheses 1 and 2 concern the regulation's impact on delinquency risk. Did the regulation reduce delinquency risk by encouraging treated borrowers to borrow less or did it increase delinquency risk by inducing them to liquidate cash holdings, borrow using costly non-mortgage forms of finance or make use of multiple mortgages? We assess these competing hypotheses by regressing an indicator for whether a mortgage subsequently experienced any period of delinquency in the 12 months following origination on the interaction between the young married indicator and the post-regulation dummy and the standard controls as described in equation (1).

We find that treated borrowers experienced a 0.6 percentage point higher (t-statistic=2.88) probability of delinquency after the regulation, as displayed in the first column of Table 5. The average rate of delinquency is 4%, so this an economically meaningful effect

of a roughly 15% increase in delinquency risk. In support of Hypothesis 2, this result demonstrates that the regulation, which was designed to reduce risk, actually increased the hazard of delinquency. In the second and third columns of Table 5, we show that the treated borrowers experienced more delinquencies of thirty days or more, but did not experience an increase in delinquencies of 90 days or more. This pattern of results, namely an increase in all delinquencies and delinquencies of 30 days or more but not an increase in delinquencies of 90 days or more, also holds in the 24 months following origination, as displayed in columns four through six of Table 5. We do not observe loan recoveries but, given the reduced post-regulation LTVs, it is possible that losses given default declined after the policy change. It is clear, however, that 30-day delinquencies increased.

The result that a regulation designed to reduce risk led to a higher rate of 30-day delinquencies is perhaps surprising. The finding may be especially unexpected in light of the results in Table 4 showing that treated borrowers were more likely to have prior experience in borrowing, had higher incomes and higher greater term deposits. Despite all these positive changes in the pool of treated borrowers, their 30-day delinquency rate increased. We discuss the mechanisms underlying the increase in delinquency risk in subsequent sections.

The results in the first six columns of Table 5 raise the question of whether there was a pre-trend of increasing delinquencies for young married borrowers that pre-dated the regulation. In other words, perhaps the regulation simply coincided with a long-term increase in delinquencies for these borrowers and did not itself cause heightened delinquencies. We investigate this possibility by assessing the delinquency rates of young married borrowers in each of the individual years surrounding the announcement of the regulation. As detailed in Table 5 columns seven through twelve, there was no pre-trend of increasing delinquency for young married borrowers before the regulation was announced at the end of 2014; if anything, delinquencies were unusually low in 2014. In the period subsequent to the announcement, delinquencies rose. Overall, we find that in the 12 and 24 months after mortgage origination, treated borrowers experienced higher mortgage delinquency rates. These findings represent

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strong and clear evidence in favor of Hypothesis 2.[3]

5.4 Consumer loan performance and mortgage loan terms

The results in Table 5 make clear that the LTV regulation increased mortgage delinquency. We further consider the impact of the regulation on the risk of the consumer loan portfolios of borrowers. Did the heightened mortgage delinquencies spill over into worse performance of consumer loans? Or did treated borrowers perhaps shift risk from their consumer loan accounts to their mortgages? We consider this issue by examining the consumer loan performance of all mortgage borrowers during our sample period.

For each mortgage borrower, we regress an indicator for whether any of her consumer loans experienced any period of delinquency after the mortgage's initiation on the interaction between the young married indicator and the post-regulation dummy and the standard controls. As displayed in Table 6 there is no evidence at either the 12- or 24-month horizons of any change in the consumer loan delinquency rates of treated borrowers. The effects of the regulation were confined to the mortgage loans that were its direct subject. Why did consumer loans not also experience higher delinquency rates? Perhaps because these loans have low balances, so a strategy of responding to a negative income shock by deferring consumer loan payments would likely have little impact on the borrower's ability to service her mortgage.

Did lenders respond to heightened mortgage delinquency risk by increasing interest rates or shifting loan maturities? In Table 7, we show that young married borrowers did not pay higher mortgage interest rates or experience any change in the duration of their mortgages after the advent of the regulation. Lenders appear not to have incorporated the

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[3]We found in Table 4 that the LTV regulation induced an increase in the income of young married borrowers. In general, higher income is associated with lower delinquency, so this income change should not have been expected to drive a higher delinquency risk for treated borrowers. Nonetheless, as a robustness test, we include income-decile fixed effects in the delinquency regressions of Table 5. We show in Table A.1 in the Appendix that the delinquency effects are quite similar in this specification.

higher risk into the loan terms provided to treated borrowers. Our results on mortgage interest rates are consistent with Calani and Paillacar (2020), who study the same LTV regulation that we do and find that the pass-through of a higher expected provisioning cost to lending rates was not economically meaningful.

5.5 Mechanism- higher equity investment and liquidation of term deposits

The LTV regulation was designed to reduce mortgage risk, but we find it increased 30-day delinquency hazards. In order to understand this finding, we investigate several potential mechanisms outlined in Hypothesis 2. We begin by analyzing the impact of the regulation on the types of homes purchased by borrowers. In the first column of Table 8 we show that post-regulation young married borrowers took out mortgages guaranteed by houses that were appraised at 5.6% higher (t-statistic=7.21) values. This increase in the value of houses secured by treated borrowers is not consistent with Hypothesis 1; we do not see that young married borrowers scaled back their housing consumption after the regulation. In Table 4, however, we found that treated borrowed had 5.8% higher incomes in the post-regulation period. These two results suggest that the LTV regulation caused more resource-constrained young married borrowers to not enter the housing market, while wealthier treated borrowers continued to purchase housing commensurate with their income. We show in the second column of Table 8 that the regulation led to mortgage balances that were 5.4% higher (t-statistic=6.66). Mortgage borrowing grew slightly less than appraisal values, which is consistent with the small drop in LTV ratios that we documented in Table 3.

The equity invested in housing, which we define as the difference between the appraisal value and the mortgage balance, increased by 7.9% (t-statistic=6.04), as displayed in the third column of Table 8. This indicates that treated borrowers tied up more of their investment in illiquid housing equity after the regulation, even relative to their higher post-2014 incomes. Reduced access to liquidity constrains borrowers and can lead to the increased

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probability of mortgage delinquency that we observe in Table 5.

Where did this additional equity come from? We consider this question by analyzing data on the term deposits of borrowers. While these data do not describe all the deposits held by borrowers, they do provide information on borrowers' semi-liquid savings. We view a borrower as liquidating a portion of her term deposits if her term deposit balance in the month of mortgage initiation is lower than her term deposit twelve months before. We find that post-regulation young married borrowers were more likely (coefficient=0.4% and t-statistic=2.17) to reduce their term deposit holdings over the year preceding the beginning of the mortgage, as detailed in the fourth column of Table 8.

These results indicate that post-regulation young married borrowers were more likely to reduce their holdings of semi-liquid assets in order to invest more in home equity. Home equity is a highly illiquid asset, and the reduced ability of these borrowers to call on their term deposits should need arise to service their mortgage debt likely increased delinquency risk.

We investigate whether treated borrowers were less able to smooth their debt exposure by analyzing the coefficient of variation of their overall debt. We label the mortgage origination month as month t and then calculate the coefficient of variation for each consumer's total debt over the two periods $[t-14, t-2]$ and $[t+2, t+14]$. We subtract the first of these numbers from the second and denote the difference as the change in the consumer's coefficient of variation after mortgage initiation. We show in the fifth column of Table 8 that post-regulation young married borrowers experienced a 4.1 percentage point higher (t-statistic=5.75) change in their coefficient of variation. This observed increased volatility of post-mortgage initiation debt balances is consistent with the argument that the LTV regulation induced borrowers to make larger equity investments by liquidating their term deposit, which left them without the slack to absorb short-term changes in their economic circumstances. Negative shocks therefore led to higher overall debt balances and, in some cases, to mortgage delinquency.

5.6 Mechanism- increased borrowing in consumer loans

The LTV regulation, in addition to encouraging borrowers to liquidate deposits, may have induced them to seek out additional non-mortgage sources of debt financing. The personal consumer loan market in Chile is large and important. In this section we explore whether treated borrowers substituted personal consumer loans for mortgages. In particular, we consider whether borrowers took out additional consumer loans before initiating the mortgage in order to have funds ready to invest as equity in their homes. The presence of the consumer loan funding option may have attracted treated borrowers who found it difficult to raise a suitably large mortgage. Some regulators were specifically concerned that this might occur (e.g., Oda and Sepúlveda 2014)

We calculate the change in a borrower's consumer loan balance in the year preceding mortgage initiation as the difference between the balance in the month the mortgage began and the balance one year earlier, all scaled by the appraised value of the property purchased. This variable measures the size of any change in the borrower's use of consumer loans relative to the total housing investment. We regress the scaled change in the mortgage balance on the interaction between an indicator for young married borrowers and a post-regulation dummy and the standard controls. We find that treated borrowers had an insignificant decrease (coefficient=-0.6% and t-statistic=-1.27) in their overall consumer loan balance in the year leading up to the start of the mortgage, as displayed in the first column of Table 9. There is clearly no evidence that post-regulation young married borrowers began seeking large consumer loans to cover their house down payments.

As a second test, we examine whether the LTV regulation caused borrowers to build up their consumer loan borrowing in anticipation of a future mortgage by calculating their average consumer debt balance in the three-to-nine months before the mortgage began and dividing this average by the subsequent mortgage loan balance. We show in the second column of Table 9 that this scaled average consumer loan balance was effectively unchanged (coefficient=0.2% and t-statistic=1.40) for treated borrowers. There is no evidence of a

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substitution effect: borrowers did not increase their personal loans.

Last, we show in the third column of Table 9 that borrowers also did not increase their personal loan balances in the three-to-nine months following mortgage initiation. Consumer loans thus did not become an important source of housing finance after the implementation of the regulation. Perhaps due to the higher cost of consumer loans documented in Section 2, treated borrowers were unwilling to make heavier use this type of credit, even when mortgage lending became constrained.

5.7 Mechanism- Multiple Mortgages

The third potential response to the LTV regulation that we examine is whether borrowers shifted to a strategy of utilizing multiple mortgages. As described in Section 2, the regulation applied a very high percentage provision cost to mortgages with LTV of above 80%. Rather than having that cost apply to one large mortgage with LTV above 80%, it may have been in the interest of lenders to instead offer borrowers one large loan with LTV of 80% or lower and a second small mortgage that was subject to the high provision penalties for mortgages with LTV exceeding 80% (Cunningham, Gerardi and Shen 2021). It is also possible that the LTV restrictions discouraged some borrowers from seeking a large mortgage on one house while encouraging others to seek multiple loans at below-threshold LTVs secured by more than one property.

We define an indicator for whether at the moment of mortgage origination the borrower had a previous mortgage loan that survives for at least six additional months. We analyze whether borrowers adopted a policy of multiple mortgage originations by regressing this indicator on the post-regulation and young married interaction and the standard controls. We find that the interaction is positive and significant (coefficient=2.6% and t-statistic=5.09), as detailed in the first column of Table 10. Treated borrowers were substantially more likely to originate a new mortgage while still servicing an existing

mortgage. This increase is quite large relative to the overall frequency of multiple mortgages of 10%.

We are not able to identify the specific collateral guaranteeing each mortgage, so we cannot state definitively if these multiple mortgages are secured by the same property. We do, however, observe the priority of each mortgage, and we define a mortgage to be low priority if it does not have first claim on an asset. We regress an indicator for a low priority mortgage on the interaction of the post-regulation and young married indicators, and we find, as described in the second column of Table 10, an insignificant effect (coefficient=-0.4% and t-statistic=-0.47). Treated borrowers are not more likely to originate low-priority mortgages after the regulation.

In Chile mortgages may have a specific claim on an asset (similar to a secured claim in the U.S.) or a general claim shared with all current and future debts of the borrower. An asset may also offer both a specific guarantee to some debts and a general guarantee to others. We show in the third column of Table 10 that treated borrowers were more likely to initiate mortgages secured with general claims (coefficient=2.4% and t-statistic=7.11). Treated borrowers were less likely to initiate mortgages secured with specific claims (coefficient=-2.6% and t-statistic=-3.70), as displayed in the fourth column of Table 10. These results demonstrate that post-regulation young married borrowers provided as collateral for their mortgages assets that were also being used to guarantee other loans.

These findings are consistent with two potential strategies on the part of post-regulation young married borrowers. First, they may be adding additional mortgages to their current properties that surpass or match the priority of the earlier surviving mortgages. These new mortgages are not low-priority, as shown in column two of Table 10, so they are not second liens. The presence of an existing mortgage on the property, however, may make it impossible for the house to serve as specific collateral for the new mortgage, which results in the higher frequency of general guarantees that we document in columns three and four of Table 10.

Second, young married borrowers may be originating new mortgages to purchase

additional properties. They could be holdings these other properties for investment purposes. The new mortgages on the new properties are top priority claims, consistent with the finding in column two of Table 10. If the bank originating the new loan requires the second property to serve as collateral for pre-existing debts of the borrower to that lender, then the collateral for the new loans would be general and not specific, as shown in columns three and four of Table 10. In either case, it is clear that treated borrowers had multiple mortgages and that these mortgages offered less security to lenders.

We consider whether lenders and borrowers engaged in cooperative behavior to circumvent the LTV regulation by analyzing whether the bank that supplied the earlier mortgage also provides the later loan. After the regulation, there is an increased probability that young married borrowers initiate a second mortgage with the same lender that supplied their ongoing first mortgage (coefficient=0.7% and t-statistic=2.19), as detailed in the fifth column of Table 10. In the sixth column of Table 10, however, we show that, conditioning on the presence of multiple mortgages, treated borrowers are much less likely after the policy shift to be granted a second mortgage by their first lender (coefficient=-4.7% and t-statistic=-5.75). In other words, after the regulation treated borrowers more often sought multiple mortgages, and some of these mortgages were provided by their earlier lender. The fraction of multiple mortgages supplied by the earlier lender, though, experienced a meaningful decline. This second result weighs against the argument that lenders and borrowers engaged in joint regulatory arbitrage.

Another possibility is that borrowers split large mortgages into two below-threshold components. It is not clear from the language of the regulation whether either of these mortgages should be regarded as a high-LTV loan. We investigate this issue by regressing an indicator for having a recent (i.e., originated within the previous six months) prior surviving mortgage on the post-regulation and young married interaction and the usual controls. We find, as displayed in the seventh column of Table 10, that there is no evidence (coefficient=-0.2% and t-statistic=-0.50) that treated borrowers are more likely to originate

multiple mortgages in rapid succession after the regulation. This further suggests an absence of regulatory arbitrage. We define the two simultaneously surviving mortgages to be of asymmetric size if one is at least twice as large as the other. In the eighth column of Table 10, we show that post-regulation treated borrowers are more likely (coefficient=2.7% and t-statistic=5.79) to have multiple mortgages of asymmetric size. This result is consistent with specific implementations of the two strategies discussed above. Under the first, borrowers may be adding a new mortgage to an existing property that is either large or small compared to the existing mortgage. Under the second, borrowers may be purchasing a second property that is quite different in size from their first property.

The presence of multiple mortgages can lead to worsened loan performance as discussed by Piskorski et al. (2015) and Griffin and Maturana (2016). There are three reasons for this. First, the choice to seek multiple mortgages may be more attractive to riskier borrowers. In other words, the policy may discourage more conservative borrowers from getting a mortgage at all, thereby increasing the risk of the overall borrower pool. Second, although we find that in some cases the first and second mortgages are supplied by the same lender (as do Piskorski et al. 2015 and Griffin and Maturana 2016), in many circumstances there are two distinct creditors. Tensions between multiple creditors, or efforts on the part of the borrower to manipulate them, could lead to higher delinquency risk. Third, if the first lender does not anticipate that the borrower may seek a later mortgage, then that lender could be underestimating the risk to which it is subjecting itself.

6   Conclusion

We study the effects of a Chilean regulation that imposed higher provisioning costs on banks that supply high-LTV residential mortgages. As expected, the regulation led to a significant drop in the frequency of high-LTV loans. Young married borrowers, who had previously commonly used these mortgages, were more likely to be affected by the policy shift, and

they reduced their LTVs. The LTV restrictions led to reduced credit access for constrained borrowers: young married consumers who had never had a mortgage before and who had lower incomes became relatively less likely to initiate mortgages. Despite this, the regulation led to higher, rather than lower, mortgage delinquency rates for the young married borrowers whom we show to have been most directly treated by the policy change.

We find that post-regulation treated borrowers did not reduce the cost of the housing they purchased. Instead, they made larger equity investments in their homes and liquidated term deposits to do so. They thus exchanged bank savings for illiquid home equity, which may have limited their ability to respond to future negative income shocks. We do not find that the regulation led to an increase in consumer borrowing. We do show, however, that affected borrowers were more likely to take out multiple mortgages, which may reflect a post-regulation selection favoring those who seek more risk. The higher home equity investments and greater propensities to take on multiple mortgages that were prompted by the regulation likely led to the heightened delinquency risks we observe for young married borrowers. We do not have data on loan recoveries, but we find that the regulation led to reduced LTVs, so it may be that losses given default declined after the policy change. Whether or not this was the case, we show clearly that delinquency risks increased.

Housing is a good of great interest to many consumers. LTV limitations designed to reduce housing market risk are most likely to be effective when they cause borrowers to maintain the same amount of equity investment while purchasing less expensive homes. Consumers, however, will be reluctant to dramatically reduce the quality of housing they acquire. Given the variety of types of financing available to borrowers in modern economies and their strong desire for homes, LTV restrictions will often be sidestepped in one manner or another. As we show in our study, this can lead to greater delinquency rates for the banking system.

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Figure 1: Density of LTVs Pre- and Post-Regulation
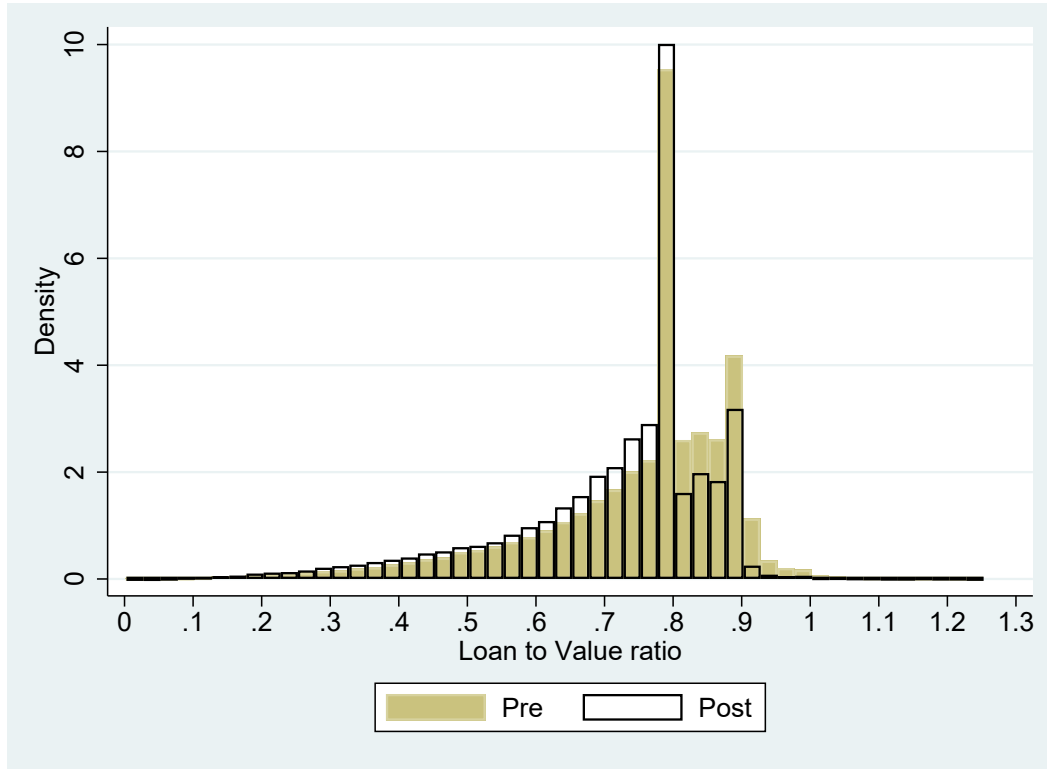
This graph displays the density of LTVs of Chilean residential mortgages in the periods prior to and following the announcement of the regulation on Dec. 31, 2014.

Table 1: Summary Statistics

Panel I: Main variables

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Young married	332553	0.20	0.40	0.00	1.00
LTV	297669	0.73	0.15	0.00	1.24
Fraction of loans with LTV>0.8	297669	0.35	0.48	0.00	1.00
Borrower had a previous mortgage	332553	0.46	0.50	0.00	1.00
New to the financial system	332553	0.27	0.45	0.00	1.00
Logged income	332553	16.00	3.50	0.00	23.51
Logged deposits 12m before	332553	1.30	4.52	0.00	29.91
Any delinquency mortgage loan next 12m	332553	0.04	0.20	0.00	1.00
Any delinquency consumer loan next 12m	332553	0.06	0.23	0.00	1.00
Logged appraised value	302080	18.03	0.65	16.12	22.67
Logged mortgage value	330768	17.71	0.62	12.07	19.60
Interest rate	332553	3.94	0.65	0.00	9.20
Loan maturity	332553	261.99	70.64	1.00	427.00
Had a previous surviving mortgage at orig.	332553	0.32	0.47	0.00	1.00

Panel II: Mean values before regulation

	Young married	Not young married	Difference	t-stat.
LTV	0.77	0.74	0.03	28.60
Fraction of loans with LTV>0.8	0.47	0.40	0.07	19.96

Table 2: Description

	Dependent variable:	
	LTV	Fraction of loans with LTV>0.8
	(2.1)	(2.2)
Post	−0.029***	−0.115***
	(−6.24)	(−6.34)
Constant	0.749***	0.418***
	(235.97)	(43.52)
R^2	0.01	0.01
N. observations	297669	297669
N. clusters (comunas)	367	367

Table 3: Impact of Regulation on LTV of Young Married Borrowers

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:	
	LTV	Fraction of loans with LTV>0.8
	(3.1)	(3.2)
Post × young married	−0.005**	−0.020**
	(−2.11)	(−2.55)
Young married	0.029***	0.067***
	(12.48)	(10.53)
Comuna-year f.e.	Yes	Yes
R^2	0.05	0.05
N. observations	297488	297488
N. clusters (comunas)	340	340

	LTV	Fraction of loans with LTV>0.8
	(3.3)	(3.4)
In 2013 × young married	0.026***	0.053***
	(8.40)	(5.44)
In 2014 × young married	0.031***	0.078***
	(15.40)	(15.83)
In 2015 × young married	0.030***	0.071***
	(12.92)	(15.90)
In 2016 × young married	0.021***	0.038***
	(7.95)	(5.99)
In 2017 × young married	0.018***	0.026***
	(6.11)	(4.32)
Comuna-year f.e.	Yes	Yes
R^2	0.05	0.05
N. observations	297488	297488
N. clusters (comunas)	340	340

Table 4: Selection of Borrowers

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:			
	Borrower originates mortg. for the first time	New to the financial system	Log (1+income)	Log (1+ deposits 12m before)
	(4.1)	(4.2)	(4.3)	(4.4)
Post × young married	−0.066***	−0.040***	0.058**	0.109***
	(−9.86)	(−9.61)	(2.57)	(2.96)
Young married	0.066***	0.020***	0.022	−0.276***
	(10.85)	(3.02)	(1.05)	(−6.72)
Comuna-year f.e.	Yes	Yes	Yes	Yes
R^2	0.06	0.05	0.04	0.01
N. observations	332376	332376	332376	332376
N. clusters (comunas)	344	344	344	344

Table 5: Delinquency Outcomes- Mortgages

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; *t*-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:					
	Any delinq.	Delinq.≥ 30d	Delinq.≥ 90d	Any delinq.	Delinq.≥ 30d	Delinq.≥ 90d
Period:	Next 12 months			Next 24 months		
	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)
Post × young married	0.006***	0.004***	0.000	0.006**	0.004**	0.002
	(2.88)	(3.10)	(0.04)	(2.47)	(2.10)	(1.42)
Young married	−0.004**	−0.004***	−0.000	0.000	−0.000	−0.001
	(−2.39)	(−3.29)	(−0.20)	(0.02)	(−0.26)	(−0.69)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.02	0.01	0.03	0.03	0.01
N. observations	332376	332376	332376	332376	332376	332376
N. clusters (comunas)	344	344	344	344	344	344

	Any delinq.	Delinq.≥ 30d	Delinq.≥ 90d	Any delinq.	Delinq.≥ 30d	Delinq.≥ 90d
Period:	Next 12 months			Next 24 months		
	(5.7)	(5.8)	(5.9)	(5.10)	(5.11)	(5.12)
In 2013 × young married	−0.001	−0.000	0.002**	0.008**	0.005	0.003
	(−0.29)	(−0.15)	(2.03)	(2.30)	(1.46)	(1.20)
In 2014 × young married	−0.006***	−0.007***	−0.002**	−0.006**	−0.005***	−0.003**
	(−3.36)	(−4.27)	(−2.39)	(−2.44)	(−2.74)	(−2.18)
In 2015 × young married	0.003	0.001	−0.000	0.008*	0.005*	0.001
	(1.02)	(0.29)	(−0.13)	(1.82)	(1.72)	(0.54)
In 2016 × young married	0.002	−0.000	0.000	0.009**	0.004	0.002
	(0.99)	(−0.26)	(0.03)	(2.27)	(1.39)	(1.14)
In 2017 × young married	0.000	0.000	−0.000	0.001	0.000	0.000
	(0.65)	(0.55)	(−1.41)	(1.36)	(0.92)	(0.65)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.02	0.01	0.03	0.03	0.01
N. observations	332376	332376	332376	332376	332376	332376
N. clusters (comunas)	344	344	344	344	344	344

Table 6: Delinquency Outcomes- Consumer Loans

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Any delinq.	Delinq.$\geq$ 30d	Delinq.$\geq$ 90d	Any delinq.	Delinq.$\geq$ 30d	Delinq.$\geq$ 90d
		Dependent variable:				
Period:		Next 12 months			Next 24 months	
	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)	(6.6)
Post $\times$ young married	−0.000	−0.000	0.001	−0.002	−0.002	−0.001
	(−0.10)	(−0.07)	(0.83)	(−0.71)	(−0.83)	(−0.74)
Young married	0.008***	0.006***	0.003*	0.014***	0.011***	0.008***
	(3.16)	(2.89)	(1.86)	(5.79)	(4.21)	(3.35)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.03	0.02	0.01	0.04	0.03	0.02
N. observations	349177	349177	349177	349177	349177	349177
N. clusters (comunas)	345	345	345	345	345	345

	Any delinq.	Delinq.$\geq$ 30d	Delinq.$\geq$ 90d	Any delinq.	Delinq.$\geq$ 30d	Delinq.$\geq$ 90d
Period:		Next 12 months			Next 24 months	
	(6.7)	(6.8)	(6.9)	(6.10)	(6.11)	(6.12)
In 2013 $\times$ young married	0.016***	0.012***	0.006***	0.017***	0.016***	0.012***
	(4.25)	(3.80)	(2.74)	(3.47)	(4.30)	(3.56)
In 2014 $\times$ young married	0.003	0.002	0.001	0.013***	0.007**	0.005*
	(0.72)	(0.73)	(0.31)	(2.70)	(2.16)	(1.80)
In 2015 $\times$ young married	0.013***	0.011***	0.006***	0.018***	0.016***	0.011***
	(3.53)	(4.03)	(3.48)	(4.13)	(4.02)	(3.11)
In 2016 $\times$ young married	0.010***	0.007**	0.006**	0.017***	0.008**	0.009***
	(2.71)	(2.57)	(2.48)	(3.67)	(2.25)	(3.11)
In 2017 $\times$ young married	0.001	0.000	−0.000	0.001	0.000	−0.000
	(0.96)	(0.31)	(−0.37)	(0.85)	(0.32)	(−0.89)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.03	0.02	0.01	0.04	0.03	0.02
N. observations	349177	349177	349177	349177	349177	349177
N. clusters (comunas)	345	345	345	345	345	345

Table 7: Mortgage Loan Terms

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:	
	Interest rate	Loan maturity
	(7.1)	(7.2)
Post × young married	−0.003	0.054
	(−0.56)	(0.07)
Young married	0.011**	22.398***
	(2.15)	(21.83)
Comuna-year f.e.	Yes	Yes
R^2	0.38	0.05
N. observations	332376	332376
N. clusters (comunas)	344	344

Table 8: Mechanism- Higher Equity Investment and Liquidation of Term Deposits

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:				
	Log. (1+appraised) value)	Log mortgage amount	Log. appraised value minus mortgage	Deposits at t=0 are smaller than deposits at t=-12	Δ Overall debt coeff.var.
	(8.1)	(8.2)	(8.3)	(8.4)	(8.5)
Post × young married	0.056***	0.054***	0.079***	0.004**	0.041***
	(7.21)	(6.66)	(6.04)	(2.17)	(5.75)
Young married	−0.011	0.042***	−0.110***	−0.008***	−0.032***
	(−1.50)	(5.19)	(−10.02)	(−4.09)	(−5.68)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes
R^2	0.25	0.20	0.20	0.01	0.03
N. observations	301899	330591	296118	332376	229312
N. clusters (comunas)	340	344	340	344	315

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Table 9: Mechanism- Increased Borrowing in Consumer Loans

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:		
	Cons.balance at t=0 minus cons.balance at t=-12, scaled by appraised value	Av. cons. debt prev. 3m to 9m over total mortgage debt	Av. cons. debt next 3m to 9m over total mortgage debt
	(9.1)	(9.2)	(9.3)
Post × young married	−0.006	0.002	0.001
	(−1.27)	(1.40)	(0.75)
Young married	0.009*	−0.014***	−0.003*
	(1.78)	(−11.34)	(−1.78)
Comuna-year f.e.	Yes	Yes	Yes
R^2	0.01	0.01	0.01
N. observations	245547	241719	332126
N. clusters (comunas)	330	319	344

Table 10: Mechanism- Multiple Mortgages

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:			
	Has a previous surviving mortg. loan at the moment of origination	Originates a low-priority loan	Originates a general claim	Originates a specific claim
	(10.1)	(10.2)	(10.3)	(10.4)
Post × young married	0.026***	−0.004	0.024***	−0.026***
	(5.09)	(−0.47)	(7.11)	(−3.70)
Young married	−0.044***	0.015***	−0.009**	0.021***
	(−10.16)	(3.28)	(−2.23)	(4.63)
Comuna-year f.e.	Yes	Yes	Yes	Yes
R^2	0.04	0.06	0.06	0.15
N. observations	332376	217645	217645	217645
N. clusters (comunas)	344	332	332	332

	Has a previous surviving mortg. loan at moment of orig. with same bank	Has a previous surviving mortg. loan at moment of orig. with same bank conditional on having a surv. mortg.loan	Has a recent surviving mortg. loan at moment of origin.	Has a previous surviving mortg. loan of asymmetric origin. amount
	(10.5)	(10.6)	(10.7)	(10.8)
Post × young married	0.007**	−0.047***	−0.002	0.027***
	(2.19)	(−5.75)	(−0.50)	(5.79)
Young married	−0.034***	−0.01*	0.001	−0.044***
	(−8.62)	(−1.69)	(0.22)	(−9.76)
Comuna-year f.e.	Yes	Yes	Yes	Yes
R^2	0.05	0.06	0.07	0.05
N. observations	332376	106705	332376	332376
N. clusters (comunas)	344	249	344	344

Appendix

Table A.1: Robustness: Delinquency models with income decile fixed effects

***,**,* stand for 1%, 5%, or 10% statistical significance, respectively; t-statistics are shown in parentheses based on standard errors clustered as indicated.

	Dependent variable:					
Mortgage loans						
	Any delinq.	Delinq.$\geq$ 30d	Delina.$\geq$ 90d	Any delinq.	Delinq.$\geq$ 30d	Delinq.$\geq$ 90d
Period:		Next 12 months			Next 24 months	
	(A.1.1)	(A.1.2)	(A.1.3)	(A.1.4)	(A.1.5)	(A.1.6)
Post × young married	0.006***	0.004***	0.000	0.006***	0.004**	0.002
	(2.99)	(3.28)	(0.19)	(2.70)	(2.39)	(1.63)
Young married	−0.004**	−0.004***	−0.000	−0.000	−0.001	−0.001
	(−2.36)	(−3.35)	(−0.31)	(−0.11)	(−0.53)	(−0.86)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Income decile f.e.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.02	0.01	0.04	0.03	0.02
N. observations	332376	332376	332376	332376	332376	332376
N. clusters (comunas)	344	344	344	344	344	344

	Any delinq.	Delinq.$\geq$ 30d	Delina.$\geq$ 90d	Any delinq.	Delinq.$\geq$ 30d	Delinq.$\geq$ 90d
Period:		Next 12 months			Next 24 months	
	(A.1.7)	(A.1.8)	(A.1.9)	(A.1.10)	(A.1.11)	(A.1.12)
In 2013 × young married	−0.001	−0.000	0.002**	0.007**	0.004	0.002
	(−0.26)	(−0.21)	(1.97)	(2.27)	(1.33)	(1.11)
In 2014 × young married	−0.006***	−0.007***	−0.002**	−0.006**	−0.005***	−0.004**
	(−3.31)	(−4.28)	(−2.48)	(−2.56)	(−2.99)	(−2.29)
In 2015 × young married	0.003	0.000	−0.000	0.007*	0.005	0.001
	(1.04)	(0.24)	(−0.18)	(1.81)	(1.63)	(0.44)
In 2016 × young married	0.003	−0.000	0.000	0.010**	0.004	0.002
	(1.14)	(−0.18)	(0.08)	(2.38)	(1.43)	(1.19)
In 2017 × young married	0.001*	0.001*	−0.000	0.002***	0.001**	0.001
	(1.81)	(1.82)	(−0.32)	(2.78)	(2.38)	(1.64)
Comuna-year f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Income decile f.e.	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.02	0.02	0.01	0.04	0.03	0.02
N. observations	332376	332376	332376	332376	332376	332376
N. clusters (comunas)	344	344	344	344	344	344

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