



# The role of prepayment penalties in mortgage loans<sup>☆</sup>



Andrea Beltratti<sup>a</sup>, Matteo Benetton<sup>b,c</sup>, Alessandro Gavazza<sup>b,\*</sup>

<sup>a</sup> Department of Finance, Università Commerciale Luigi Bocconi and SDA Bocconi School of Management, Italy

<sup>b</sup> Department of Economics, London School of Economics, United Kingdom

<sup>c</sup> Bank of England, United Kingdom

## ARTICLE INFO

### Article history:

Received 27 April 2016

Accepted 5 June 2017

Available online 9 June 2017

### JEL Classification:

G20

G21

G28

### Keywords:

Mortgages

Prepayment penalties

Refinancing

Default

## ABSTRACT

We study the effect of mortgage prepayment penalties on borrowers' prepayments and delinquencies by exploiting a 2007 reform in Italy that reduced penalties on outstanding mortgages and banned penalties on newly-issued mortgages. Using a unique dataset of mortgages issued by a large Italian lender, we provide evidence that: 1) before the reform, mortgages issued to riskier borrowers included larger penalties; 2) higher prepayment penalties decreased borrowers' prepayments; and 3) higher prepayment penalties did not affect borrowers' delinquencies. Moreover, we find suggestive evidence that prepayment penalties affected mortgage pricing, as well as prepayments and delinquencies through borrowers' mortgage selection at origination, most notably for riskier borrowers.

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## 1. Introduction

For most households, housing represents their major asset and a mortgage represents their largest liability. Hence, the choice of a mortgage contract is one of households' most important financial decisions, and its management has important aggregate implications (Mian et al., 2013). Mortgages vary in several important characteristics (interest rate, maturity, etc.), and in this paper, we focus on the role of one key contractual feature: the prepayment penalty. More specifically, we exploit a 2007 reform in Italy that reduced prepayment penalties on outstanding mortgages and eliminated them on newly-issued ones. Our analysis shows that prepayment penalties have a direct effect on borrowers' prepayment behavior, but no direct effect on borrowers' delinquencies. Furthermore, we find suggestive evidence that prepayment penalties affect the cost of mortgage credit, and that they have an indirect effect on prepayments and delinquencies through borrowers' selection of mortgage type at the time of contracting, particularly for borrowers who face greater uncertainty.

Different incentives spur borrowers to prepay their mortgages: some depend on borrowers' characteristics, such as positive income shocks, while some depend on mortgage market characteristics, such as changes in interest rates. In particular, when interest rates fall, borrowers may choose to refinance their higher-interest-rate mortgages with lower-interest-rate ones. Hence, when interest rates fall, mortgages' cash flows may be lower than expected for lenders, thereby generating a risk for them. Overall, prepayment penalties allow lenders to reduce this interest rate risk because they reduce borrowers' incentives to prepay their mortgages. Therefore, prior to the recent financial crisis, many mortgages included these penalties, most notably those offered to riskier borrowers (Mayer et al., 2013; Rose, 2012).

The crisis spurred a heated debate over the usefulness and fairness of prepayment penalties. One argument against them is that they raise the cost of repaying a loan through a refinancing or sale. Thus, borrowers unable to pay their mortgages may find prepayment expensive, potentially increasing delinquencies if these borrowers receive negative shocks in the future.<sup>1</sup> For example, Goldstein and Son (2003) argue: "Prepayment penalties can be abusive because they trap subprime borrowers in high-interest rate loans, forcing families to continue to pay more each month than available alternatives, and frequently leading to foreclosure."

<sup>☆</sup> We are grateful to Davide Alfonsi and Anna Cornaglia for help with the data and useful suggestions; to Raffaella Pico, Roberto Felici and Elisabetta Manzoli for sharing the data displayed in Figure 1 with us; and to the Editor, the Associate Editor, and an anonymous reviewer for helpful comments that improved the paper.

\* Corresponding author.

E-mail addresses: [andrea.beltratti@unibocconi.it](mailto:andrea.beltratti@unibocconi.it) (A. Beltratti), [m.benetton1@lse.ac.uk](mailto:m.benetton1@lse.ac.uk) (M. Benetton), [a.gavazza@lse.ac.uk](mailto:a.gavazza@lse.ac.uk) (A. Gavazza).

<sup>1</sup> We use the terms default and delinquency interchangeably, as our data do not allow us to distinguish between them.

Moreover, because a prepayment penalty raises the cost of refinancing with other lenders, it may reduce competition at the refinancing stage, potentially increasing “predatory” practices: the initial lender could offer refinancing on terms that ultimately harm borrowers (Bond et al., 2009). As a result of this debate, legislators in several countries imposed new rules restricting the use of these penalties; Title XIV of the Dodd-Frank Act in the United States is one example.<sup>2</sup> Nonetheless, they are still prevalent in many countries: for example, 98% of mortgages originated in the United Kingdom in 2015 include penalties, which generally vary between two and five percent of the prepaid balance.

This paper exploits a 2007 reform in Italy that reduced penalties on outstanding mortgages and banned them on newly-issued ones. Borrowers and lenders who signed a contract before the reform did not anticipate this reduction of penalties. Therefore, the reform provides a quasi-natural experiment to investigate how penalties affect households’ decisions to prepay or to default. More generally, the reform is well-suited to investigating how prepayment penalties affect mortgage pricing and borrowers’ selection in mortgage markets. Toward this goal, we collect a unique dataset that reports all mortgages issued by a large Italian lender in 2005 and 2009, along with their performance (i.e., prepayment and default) until 2012.

The reform triggered variations that allow us to understand the effects of penalties on households’ prepayment and default behavior, as well as on households’ mortgage choice. Our empirical analysis proceeds in three steps, establishing several results. In the first step, we consider only mortgages issued before the reform. We show that fixed-rate mortgages (FRMs) always include penalties, whereas most adjustable-rate mortgages (ARMs) do not, with the exception of the riskiest ARMs. Moreover, penalties on more-risky loans are larger than those on less-risky ones.

These initial findings motivate our subsequent analyses. In the second step of our study, we seek to understand the direct effect of penalties on borrowers’ behavior (i.e., prepayments and delinquencies) using mortgages issued in 2005 only. We document that prepayments and delinquencies are higher for mortgages with lower penalties. However, these correlations lump together two effects: 1) penalties directly affect borrowers’ cost-benefit analysis when deciding to prepay or to default; and 2) at the time of contracting, borrowers who expect that they are less likely to prepay or to default on their mortgage can select higher-penalty mortgages with, perhaps, other, more-favorable terms. Thus, to identify the causal effect of penalties, we isolate the exogenous variation in penalties due exclusively to the reform. Using a Cox model with two competing risks—i.e., prepayment and delinquency—we find that a one-percentage-point increase in penalties decreases prepayment by 27%—a sizable effect. This estimate implies that a household borrowing € 100,000 increases its annual prepayment to approximately € 2,500 from the pre-reform annual average of € 2,000 as the prepayment penalty decreases from one percentage point to zero. Moreover, the point-estimates indicate that a one-percentage-point increase in penalties decreases default by 19 percent; however, these estimates are imprecise and, thus, we cannot rule out that penalties have no direct effect on delinquencies.

In the third step of our empirical study, we compare mortgages issued in 2005 and 2009. We show that the difference in the spreads on FRMs and on ARMs increased by approximately 80

basis points after the reform, thus suggesting that penalties (and, hence, their abolition) have non-trivial effects on mortgage pricing. Moreover, we further seek to understand whether the abolition of penalties affected borrowers’ mortgage selection between FRMs and ARMs. Aggregate shocks may confound the interpretation of these comparisons over time: our lender merged with another bank in 2007, and the financial crisis affected housing and credit markets.<sup>3</sup> With these important caveats in mind, we deal with these concerns by comparing the performances of FRMs and ARMs within three groups of mortgages: 1) mortgages issued in 2005, comparing their performances from issuance until the reform; 2) mortgages issued in 2005, comparing their performances from the reform until 2012; and 3) mortgages issued in 2009, comparing their performances from issuance until 2012. We argue that, by reducing penalties, the reform made mortgages in the last two groups relatively similar in terms of their incentives to prepay and to default; thus, comparing their performance within the same time period may reduce the concerns that aggregate shocks between 2005 and 2009 account for all observed differences and could be suggestive, instead, of borrowers’ selection at the time of contracting. We document that the differences in prepayment and delinquency rates between FRMs and ARMs have increased by 59 and 97%, respectively, when we compare mortgages issued in 2009 with mortgages issued in 2005 but after the reform reduced penalties on them. Overall, this last step of our analysis suggests that borrowers’ selection of FRMs versus ARMs is substantially different after the reform, most notably for riskier borrowers—i.e., borrowers who faced greater overall uncertainty and who were more likely to be subject to penalties before the reform.

The paper proceeds as follows. Section 2 reviews the literature, highlighting our contributions. Section 3 provides some background information on mortgage markets in Italy and explains the provisions of the 2007 Reform in detail. Section 4 presents the data. Section 5 presents our empirical analysis, and Section 6 concludes. The Appendix describes the current regulation of penalties in selected countries.

## 2. Related literature

Our paper contributes to several strands of the literature. First, a few papers investigate how penalties affect borrowers’ behavior, sometimes obtaining different results: for example, Rose (2013) finds a negative correlation between penalties and both prepayments and delinquencies, whereas Steinbuks (2015) finds that subprime mortgages issued in U.S. states that have introduced laws limiting prepayment penalties exhibit higher prepayment rates but no significantly different default rates from those issued in states with no such laws. However, the interpretation of some these correlations may not be straightforward; for example, borrowers who know that they are less likely to prepay may prefer mortgages with penalties since they are less likely to pay them. Hence, our main contribution to this strand of the literature is our use of a novel (and, in our view, more compelling) identification strategy that exploits a policy change (within a country) in the level of prepayment penalties to infer their causal effect on borrowers’ behavior. A more precise identification seems quite valuable, as the option to prepay makes mortgages different from other loans and, as our

<sup>2</sup> Title XIV of the Dodd-Frank Act (Mortgage Reform and Anti-Predatory Lending Act) prohibits prepayment penalties on all adjustable-rate mortgages and certain high-priced fixed-rate mortgages. On all other mortgages, the amount of the penalty in the first, second, and third year after origination is limited to three, two, and one percent, respectively, of the outstanding loan balance, and the penalty is prohibited three years after origination. The Appendix describes the current regulation of penalties in selected countries.

<sup>3</sup> We should point out that the main crisis in Europe was the sovereign-debt crisis, which started in late 2009 in Greece and spread to other European countries in 2010 and 2011. The Italian sovereign bond market did not receive major shocks until the summer of 2011: the ten-year bond spread over German bonds was quite stable at a value below 100 basis points until May 2010, when it rose to around 150 basis points; in July 2011, it started to rise and reached over 500 basis points at the end of 2011.

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