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## Journal of Housing Economics

journal homepage: [www.elsevier.com/locate/jhec](http://www.elsevier.com/locate/jhec)

# The credit-risk implications of home ownership promotion: The effects of public subsidies and adjustable-rate loans <sup>☆</sup>

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## ARTICLE INFO

## Article history:

Received 3 January 2013

Revised 18 March 2015

Accepted 22 March 2015

Available online 30 March 2015

## JEL Codes:

R31

R38

G21

G32

## Keywords:

Housing finance

Downside subsidies

Interest rate subsidies

Credit risk

Economic capital

## ABSTRACT

This study analyzes the credit risk of housing loans with a particular focus on mechanisms that may help disentangling the financial constraints of low-income borrowers: public support and access to adjustable-rate loans. Using a large database of French housing loans covering the years 2000–2010, we show the following: supplying loans with financial assistance helps financially constrained borrowers to absorb income shocks, adjustable-rate loans are riskier on average, and the combination of public support and adjustable rates can lead to a concentration of risk in the lender's portfolio. The risk measurement methodology used in this paper extends the one-factor economic capital model underlying the Basel 2 regulatory credit-risk formulas. This portfolio approach leads to the credit risk of housing loans being handled as a portfolio management issue for the lender. From this perspective, our results also illustrate that the ability to promote access to homeownership to low-income borrowers may be determined by the lender's capacity to identify diversification benefits at the portfolio level. Thus, risky borrowers may have a limited credit-risk level from the lender's perspective, which facilitates the supply of housing finance.

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## 1. Introduction

Access to homeownership is widely considered a desirable goal. However, during the last several decades, a considerable increase in housing debt has been observed in most developed countries, exerting a noticeable pressure on households' budgets. *Ceteris paribus*, one expects low-income borrowers to be more exposed to borrowing constraints. Indeed, low-income borrowers are constrained in both their ability to provide a down-payment at the origination of a loan and their repayment capacity once

the loan is granted. To overcome these constraints at least somewhat, low-income households can access several mechanisms, of which two have received a particular attention in the theoretical and empirical literature on household finance and economics: public financial support and adjustable-rate loans. If these mechanisms contribute to relaxing the borrowing constraints faced by low-income households, they would likely increase their probability of accessing homeownership.

Thus, for policymakers as well as for lenders, understanding the effects of these mechanisms on the access of low-income borrowers to homeownership is crucial. Theoretical arguments and numerous empirical observations suggest that the choice of adjustable-rate loans may raise problems because borrowers choosing adjustable-rate mortgages (ARM) are riskier than those choosing

<sup>☆</sup> This paper reflects the opinions of its authors but does not necessarily represent the opinions of the authors' institutions.

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fixed-rate mortgages (FRM). This primarily occurs because ARM borrowers experience increases in repayment amounts as interest rates rise (Ambrose et al., 2005). Moreover, relative to FRM borrowers, ARM borrowers appear to be less sophisticated and less informed (Moulton, 2010), and they experience greater difficulty in evaluating the implications of their choices (Bucks and Pence, 2008). However, although previous research has focused on the choice of adjustable-rate loans, too little is known about the ability of public assistance mechanisms to help households stay solvent and avoid delinquency on loans. Empirical research has suggested that down-payment assistance could be more effective than interest rate subsidies with respect to purchase decisions (Hegedüs et al., 2004; Quercia et al., 2003). However, existing studies have not necessarily investigated how these assistance schemes impact credit risk for low-income borrowers. Recently, Ergungor (2010) has showed that relative to interest rate subsidies, down-payment assistance is more effective at lowering this credit risk, as measured by the delinquency rate.

This article compares the credit risk of borrowers relying upon publicly supported loans and/or choosing adjustable rates to the credit risk of other borrowers. If the mechanisms relaxing the borrowing constraints of low income borrowers are not associated to higher credit risk levels (from the lender's point of view), they can contribute to promote homeownership by facilitating the access to credit. Thus, we contribute to the literature by providing new empirical evidence on the risk level of adjustable-rate and publicly supported loans by considering these features jointly. Moreover, to evaluate the credit risk of low-income borrowers, we do not rely on standard credit risk measures at the individual level such as credit scores or default probabilities. Instead, we consider credit risk at the portfolio level as a risk management issue for the lender. Indeed, what matters for the lender are not only the expected losses, reflected in default probabilities and the loss rates for defaulting exposures, but also (and mainly) the unexpected losses the lender suffers under any stressed conditions. These unexpected losses are determined by the sensitivity of the borrowers to systematic risk factors, such as macroeconomic conditions. The realization of these factors may imply numerous correlated defaults if there is a concentration of borrowers strongly sensitive to these common factors in the portfolio. Capturing this specific feature calls for no longer considering credit risk at the borrower level, but instead to model risk at the aggregate level of the complete portfolio of loans. Therefore, in this study, we measure credit risk using measures based on economic capital. According to BCBS (2009), economic capital can be defined "as the methods or practices that allow financial institutions to attribute capital to cover the economic effects of risk-taking activities". This generally implies the computation of potential losses over some time horizon. At the institution level, this refers to some assessment of its global solvency. This approach can also be applied to specific portfolios or activities in order to assess the potential losses they expose the institution to. More specifically, we compute percentile-based measures of potential losses at the portfolio and sub-portfolio levels,

i.e., groups of borrowers sharing common characteristics, such as the type of loan and/or the type of interest rate. Indeed, these borrowers might not be exposed to the same risk factors or might be exposed with different intensities to common risk factors. In a sense, borrowers are heterogeneous, and this heterogeneity could potentially create a concentration of credit risk at the portfolio level or, on the contrary, be a source of portfolio diversification. Precisely, economic capital allows measuring the credit risk of specific borrowers taking into account both the benefits of diversification and the risk of highly correlated losses. From the lender's perspective, the credit risk is sustainable if holding exposures on groups of low-income borrowers and/or choosing adjustable-rate mortgages does not generate excessive portfolio losses. That is, in this study, we adopt a structural multifactor portfolio credit risk model that extends the standard asymptotic single risk factor model (Gordy, 2000), which also underlies Pillar 1 of the Basel 2 framework for credit risk. The flexibility provided by the multifactor framework developed in this article allows precisely to measure credit risk of different types of borrowers taking into account their different levels of exposure to systematic risk. Moreover, the structural default framework (Merton, 1974) which underlies this approach reflects in a both parsimonious and precise fashion the potential fluctuations in default rates.

To address these questions, the paper uses a unique French housing loan database provided by a bank specialized in housing loans. While covering a wide range of borrowers, this bank is also the major supplier in the market of regulated loans supplied to low-income borrowers in France. This database also includes a significant proportion of adjustable-rate loans. The database was compiled quarterly over the course of the 2000–2010 time periods. It contains more than 450,000 borrowers, representing a accrued total exposure of more than 90 billion Euros. The size of the database allows the computation of specific credit risk levels of borrowers holding regulated (publicly supported loans) and/or adjustable-rate loans and the comparison with the credit risk levels of borrowers who are not eligible for public assistance and/or hold fixed-rate loans.

Our results show that supplying loans with public financial support to low-income borrowers helps to disentangle their borrowing constraints and maintain their average credit risk in the lender's portfolio at a level close to that of borrowers who are using regular market loans. Our results also confirm a frequent result of the literature, namely, that adjustable-rate loans are generally riskier than fixed rate loans. Moreover, borrowers combining public support and adjustable rate loans appear to be the riskiest, which possibly reflects their stronger financial constraints. However, the sustainability of using different lending mechanisms to support financially constrained borrowers also depends on the diversification benefits the lender may gain from his portfolio. Our results then show that diversification effects allow the lender to expand credit with moderate risk-taking to specific borrowers with high individual risk. More generally, they also highlight the significance of diversification effects in a large retail loan portfolio.

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