

Mortgage Contracts and Underwater Default by Yerkin Kitapbayev and Scott Robertson

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10th Economic Workshop, Moscow
November 9, 2023

Summary

The paper compares borrowers' incentives to default and prepay (pay early) mortgages under three types of contracts:

- ▶ FRM fixed rate mortgage,
- ▶ ABM adjustable balance mortgages: amount owned adjusts with the house price,
- ▶ APRM adjustable payment rate mortgages with prepayment penalties: payments adjust with the house price and early repayment is penalized

The paper uses a very nice and tractable theoretical model to derive the results.

Main results

1. FRM lead to strategic default when house prices are low (underwater) and cause prepayments when prices are high.
2. ABM eliminate defaults, but can lead to strategic prepayment when house prices are low and when they are high.
3. APRM eliminate defaults, but can lead to strategic prepayment when house prices are low and when they are moderately.

Intuition for Result 2: in ABM mortgage balance follows house prices \rightarrow the amount owned is always less than the house price \rightarrow no incentive to default.

When prices are low, the amount owned is also low \rightarrow the borrower has an incentive to prepay (close the mortgage contract early), this happens if the mortgage payments are high relative to the utility derived from owning the house.

Comment 1: Outside option of the borrower, rental prices

The behaviour of the borrowers is modeled in a reduced form.

On the one hand they are assumed to take automatic actions like default, continue, prepay depending on the house price and amount owned. On the other hand they are implicitly assumed to actually calculate very complicated value functions. As authors write:

“in the absence of frictions (e.g. foreclosure costs, refinancing costs, moving costs), there is a direct connection between the bank applying a worst case analysis, and assuming the borrower is a financial optimizer.”

Outside option of the borrower might be important and can affect some results. In case of default the borrower might need to **rent a house**, and rental prices might be important (currently they are not considered).

Why outside options (rental prices) can be important

ABM contracts eliminate strategic defaults for underwater mortgages (considered in the paper).

APRM contracts can eliminate strategic defaults due to drop in rental prices (not considered in the paper).

This could make APRM contracts more attractive, and affect some of the results/conclusions.

Also, as authors mentioned other frictions/features of borrowers behaviour might make current analysis from the bank's worst case scenario not exactly equivalent to actual optimization by borrowers.

Comment 2: Endogenous (optimal) contracts

In the main analysis contract features, such as payment rate m are exogenous.

Only in numerical simulations some “equivalent” contracts under different regimes are considered.

In principle, many different contracts can be offered to borrowers, and borrowers would choose among them. So that contract features would be a choice of the bank in an attempt to attract borrowers.

Solution to this problem could generate the optimal contract, which might have features similar to ABM or APRM contracts.

Comment 3: Interest rates and house prices

In the main analysis house prices are stochastic while the interest rate is fixed.

In reality they are related, interest rates affect house prices and potentially other parameters of the model.

Probably, introducing a relation between interest rates and house prices would make the model intractable (but maybe one could do numerical simulations).

Similarly, the basic default risk of a borrower is an independent Poisson process, yet in reality layoffs (economic problems) are correlated with macro conditions, house prices, etc.

Basically, many independence assumptions in the model might not hold in reality, and it is worth discussing how results could change if one were to consider possible correlations between variables.

Comment 4: Correlation between mortgages

A problem with underwater mortgages are simultaneous fire sales, and self-fulfilling downward price spirals. This is mentioned in the introduction but not addressed in the paper.

Currently, a bank considers a single mortgage in isolation, as they are independent, except the fact that house prices might affect any mortgage.

Even from a bank perspective having many mortgages defaulting (prepaying) at the same time is problematic, and the bank may want to take this into account. The bank might even use different contracts for different borrowers precisely to avoid simultaneous defaults.

An alternative way is look at the mortgage market from the regulator perspective, and for instance prevent banks from using contracts that might lead to simultaneous defaults.

Conclusion

Very nice and insightful paper.

Elegant and tractable model.

Interesting and not obvious results.