

Mortgage-Backed Securities: the prepayment risk pricing

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Mortgages prepayment presents both a pricing challenge for operators in the mortgage backed securities (MBS) market and more generally a risk management one in the banking industry. Prepayment risk is essentially the risk that a mortgage will be repaid earlier than the originally agreed termination date, with a consequential loss of earnings for the lender (interests paid from the borrower). Nowadays, the assessment of prepayment risk is not only of fundamental importance for players in the MBS market that need to price these instruments and hedge their risk, but also for commercial banks that do not deal with such trades but nevertheless must comply with the regulation on interest rate risk in the banking book (IRRBB).

In this project we will firstly investigate what macroeconomics factors beyond interest rates are responsible for the prepayment risk premium. In particular, we will refer to two macroeconomic factors: turnover and rate response. Starting from [1] and [2], where the USA mortgages market is analysed, we will use MBS EUR data from 2008 to 2022 (<https://eurodw.eu/>) and we will look for a reduced-form modeling framework for mortgage backed securities. section of market price. Then, we will re-phrase the standard approach with bayes-nets / structural causal models to investigate if a causal link can be identified (see [3], [4]).

References

- [1] N. Boyarchenko, Nina, A. Fuster, D. Lucca, 2014, Understanding Mortgage Spreads, *Federal Reserve Bank of New York Staff Report*, (2014).
- [2] M. Chernov, B. R. Dunn, F. A. Longstaff, Macroeconomic-Driven Prepayment Risk and the Valuation of Mortgage-Backed Securities, *The Review of Financial Studies*, **31** (2018), 1132—1183.
- [3] A. Denev, A. Papaioannou, O. Angelini, A Probabilistic Graphical Models Approach to Model Interconnectedness. *International Journal of Risk Assessment and Management*, **23(2)** (2017), 119-133.
- [4] R. Rebonato, A financially justifiable and practically implementable approach to coherent stress testing, *Quantitative Finance*, **19(5)** (2019), 827—842.