

The Optimal Strategy for Prepayment of Mortgages

Dejun Xie
University of Pittsburgh

Consider a mortgage contract with a given duration and fixed mortgage rate, where the borrower has the right to terminate the contract at any premature time by paying off the outstanding loan balance all at once. It is of interest to investigate this contract from the perspectives both of the borrower and of the lender. From the borrower's point of view, he needs to decide, when he has sufficient amount of money, whether to terminate the contract by paying off the balance or to invest on the financial market, expecting the return from the investment be more than enough to cover the cost of subsequent mortgage payments. On the other hand, the lender may, for many good reasons, want to know the market value of such a contract. In this talk, I will present a mathematical model where the optimal prepayment of the mortgage is treated as a free boundary. Certain analytical and numerical features of the model will be discussed. Finally, I will propose an analytical formula to approximate globally (in time) the optimal prepayment boundary with high accuracy.