EXECUTIVE SUMMARY

THE IMPACT OF ASYMMETRIC INFORMATION ABOUT COLLATERAL VALUES IN MORTGAGE LENDING

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I empirically analyze the sources and magnitude of asymmetric information between lenders that compete to originate mortgages used to purchase newly constructed properties. In this market, builders and property developers regularly provide home buyers with mortgage financing offers through vertically integrated mortgage lenders. These integrated lenders might have better information than non-integrated lenders about the value of the house that is used to collateralize the mortgage. For example, an integrated lender might have access to the builder's information about aspects of construction quality that are difficult for non-integrated lenders to observe, such as the skills and qualifications of the individual subcontractors working simultaneously on neighboring homes within a development. I find that such asymmetric information about collateral quality is a significant source of adverse selection in this market. In addition to testing for the presence of asymmetric information and uncovering its sources, I also quantify the impact of this asymmetric information on the cost of mortgages, which I find to be significant.

A simple theoretical model guides the analysis of the competition between integrated and non-integrated mortgage lenders and generates a number of testable predictions. In the model, an integrated lender obtains an informative signal about the quality of the housing collateral, while competing lenders only know average collateral quality. The integrated lender conditions its financing offer on its superior information (offering lower interest rates for mortgages secured by high-quality collateral) and thereby subjects non-integrated lenders to adverse selection. As true house quality is revealed over time, those homes financed by an integrated lender should thus outperform ex-ante similar homes financed by non-integrated lenders. This effect is bigger when the integrated lender's signal about collateral quality is more precise. To compensate for the adverse selection, non-integrated lenders need to charge higher interests rate to break even than if they were competing only against equally informed lenders (they engage in “bid shading”). Interest rates rise by more for borrowers whose repayment is more sensitive to changes in collateral values, for example because they make a smaller downpayment.

I show empirically that such asymmetric information between competing lenders is in fact an important feature in the financing of newly developed homes, and that it generates the adverse selection predicted by the theoretical model. I construct a dataset of all housing transactions and associated mortgages in Arizona between 2000 and 2011 to track the return of properties following their initial sale. About 85% of new homes are in developments with an active integrated lender, and, when present, the average market share of these integrated lenders is about 73%. I find that in developments with an integrated lender, those houses financed by the integrated lender outperform ex-ante similar houses in the same development financed by non-integrated lenders by an average of 40 basis points annually. When I analyze the distribution of returns, I find that the 40 basis point mean return difference is driven by a lower probability of the integrated lender financing houses that experience very significant capital losses (i.e. a thinner left-tail in the distribution of returns conditional on observable characteristics). This is consistent with a story in which the information of the integrated lender pertains to the relative likelihood of low-probability, high-cost events, such as the cracking of foundations. I also find that mortgages financed by an integrated lender are over 40% less likely to enter into foreclosure than ex-ante observationally similar mortgages financed by other lenders.

An important result is that the annual outperformance of the integrated lender's collateral portfolio is larger (about 100 basis points) amongst houses built on “expansive soil,” a high clay content soil that makes housing returns more sensitive to unobservable aspects of construction quality such as the care with which the foundation was poured. This result provides additional evidence that the construction quality of the housing collateral is a significant source of asymmetric information. Consistent with the predictions from the theoretical model, the outperformance of houses financed by the integrated lender is also bigger when the borrower makes a larger downpayment, which makes mortgage repayment less sensitive to changes in house prices. As a result, non-integrated lenders find it less necessary to adjust their interest rate offers to avoid the winner's curse and in equilibrium end up lending against lower quality collateral.

I also compare the return and foreclosure probability for the ownership duration of the *second* owner of the house. The relative outperformance of those houses *initially* financed by the integrated lender remains the same. This result confirms that the outperformance is to a large extent explained by asymmetric information about the housing collateral, not the borrower, since the identity of a possible second owner of the house was not known to *any* lender at the time the mortgage was granted to the initial owner. This specification also rules out that my results are driven by an initial price bundling of the mortgage and the house. Such bundling could be a concern, since any discounts on the house given to customers of the integrated lender would be observationally equivalent to a true collateral outperformance when the house gets subsequently sold. However, any such discounts would be capitalized in the transaction

price between the first and second owners and should thus not contaminate the observed collateral return during the ownership of the second owner.

To further test the theory, I analyze the textual description of houses in property listings when these houses are resold by their initial owners. I scan these property listings for evidence of significant depreciation and identify listings that either (i) demand an "as is" sale in which the seller is not responsible for fixing any defects, or that (ii) contain phrases that signal damage to the property, such as "fix up" and "repair needed" or that (iii) suggest that the property might be particularly attractive for a handyman or investor. I find that houses initially financed by integrated lenders are significantly less likely to contain evidence of damage to the property along all three dimensions, suggesting that that the integrated lender's outperformance can be best explained by differential depreciation rates of houses, not differential initial pricing.

I also analyze the cost to borrowers in terms of higher interest rates that result from this asymmetric information. I find evidence consistent with non-integrated lenders charging an average interest rate premium of 10 basis points annually for otherwise similar mortgages when competing against an integrated lender. This higher interest rate compensates non-integrated lenders for the adverse selection in the presence of an integrated lender. The interest rate increase is larger, at 23 basis points, for mortgages to purchase houses built on expansive soil. The return of those houses is particularly sensitive to aspects of construction quality about which the integrated lender could have superior information. As predicted by the model, the interest rate increase is also larger for mortgages with a low downpayment, rising to almost 50 basis points annually for mortgages with a downpayment of less than 3%. For those mortgages the repayment probability is more sensitive to changes in collateral values. Non-integrated lenders thus need to charge higher interest rates to break even when facing adverse selection on collateral quality.

From a policy perspective, the identification of collateral values as a key source of asymmetric information in mortgage lending helps to develop proposals to improve the functioning of this market. For example, it suggests that better credit scoring technology and the more extensive sharing of borrower information will not address all forms of asymmetric information and that policies to address asymmetric information about collateral quality are also important.

This project also provides insights into the lending behavior of financial institutions in the pre-crisis period 2000 - 2007. It has sometimes been argued that due to a lack of "skin in the game" generated by securitization or agency problems within firms, many loan officers no longer had incentives to distinguish between borrowers and collateral of differential quality, which could help to explain the lower quality of mortgages originated. In contrast, the evidence uncovered in this project is highly consistent with

lenders actually attempting to price cross-sectional differences in collateral quality in a highly sophisticated manner.

Finally, this project provides new evidence on the role of integrated lenders during the recent construction boom, and suggests that rather than making low-quality mortgages in order to sell more houses, integrated lenders were actually able to select an equilibrium portfolio of mortgages that was of higher quality than that of competing non-integrated lenders.