

example, if an intermediary is charging higher prices for a given markup, this implies that the intermediary is facing higher lending costs, which the lender passes on to consumers. Recall that for a bank, the cost of portfolio lending depends on its current capital ratio  $\rho_j$ , the statutory capital requirement  $\bar{\rho}$ , other parameters such as the risk weights  $\xi_g$  and  $\xi_j$ , and the type of mortgage. To the extent that low capitalization indeed causes a higher cost of portfolio lending, the model implies how these higher costs should be passed through to different types of mortgages given estimated demand.

Table 7 shows the estimated parameters. Because we estimate costs using intermediaries' pricing decisions, we cannot separate the baseline origination and financing costs. Intuitively, if a bank's baseline financing costs increase by 0.5% (50 basis points), but origination costs decline by 0.5%, the costs of making a loan do not change. Since mortgage demand is quite price elastic the markups are quite moderate, with an average markup of 1.6 pp.

As banks' capitalization declines, their financing costs rise. To better understand the different costs of mortgages, Figure 9 plots total marginal costs for different levels of excess bank capitalization, defined as the difference between the bank's capital ratio and the statutory requirement,  $\rho - \bar{\rho}$ . Several aspects are worth discussing. First, well-capitalized banks have a cost advantage over poorly capitalized banks because they can lend with lower-cost balance sheet financing. Even poorly capitalized banks have a cost advantage over shadow banks. While all intermediaries can finance mortgages through GSEs, the model estimates that banks can do so more cheaply than shadow banks. This estimate likely reflects the advantage of banks in originating mortgages: the existing pool of bank customers means they have a lower customer acquisition cost, and the existing relationship with the customer may make document processing and screening for irregularities in mortgage applications easier. The baseline costs of originating and financing a mortgage varies from 4.3%–4.8%, reflecting the low markups in this market. This represents the cost of financing and originating a new purchase mortgage if a bank were flush with capital.

Second, financing jumbo mortgages is more expensive than financing conforming mortgages, even when the latter are retained on the balance sheet. Jumbo mortgages' risk weight is 2.5 that of conforming mortgages, i.e., a dollar in a jumbo mortgage tightens the capital constraint more than a dollar of conforming mortgages, resulting in higher financing cost.<sup>14</sup> This difference declines with bank capitalization. In other words, if the capital constraint is loose, then a higher risk weight has a small cost. For a bank whose capital exceeds the statutory capital by 3%, the additional financing cost is around 50 bps; at 10% of capital above the statutory limit the cost difference declines to 5 bps.

Quantitatively, these numbers are reasonable. In 2009, a time period outside of the estimation window, the typical bank originator of a jumbo loan had an excess capital ratio of roughly 7%. According to our model, this corresponds to a roughly 4.5% marginal cost. At the same time, the typical bank origination of a conforming loan had an excess capital ratio of roughly 6.7%, which

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<sup>14</sup> Exposures to U.S. government-sponsored enterprises receive 20% risk weights; exposure to first-lien mortgages on owner-occupied single-family houses receive a 50% risk weight. See: <https://www.mercatus.org/system/files/mercatus-barth-primer-capital-standards-v1.pdf>.