

vice versa. Before the crisis, the aggregate data showed virtually no aggregate jumbo spread. As the quantity of jumbo mortgages contracted towards 2009, their relative price increased by almost 40 basis points, and as much as 70 basis points in early 2009. As the market share of jumbo mortgages recovered, the jumbo spread decreased by up to 60 basis points. The positive correlation between aggregate price and quantity suggests that supply shocks may be partially responsible for driving the aggregate trends. If the contraction in jumbo quantity was solely driven by demand for jumbos (e.g., due to a decline in house prices), we should also observe a decrease in the pricing of jumbo mortgages.

We next show that changes in the capitalization of the banking sector are a candidate source of these supply shocks. Figure 1D illustrates that the banking sector capitalization originally declined, bottoming out in 2009, and then began increasing. Figure 2A and 2B show that the series are in fact related: there is a strong positive association between bank capitalization and quantity of jumbo originations. Overall, these patterns suggest that as traditional bank capitalization declines, the amount of on-balance sheet (jumbo) lending declines and their relative pricing increases. In other words, these aggregate facts are consistent with the idea that a decline in the balance sheet capacity of the banking sector serves as a supply shock to on-balance-sheet lending, at least relative to lending, which can be securitized.

III.A.2 Shadow Bank Migration and Banks' Business Model Adjustment

The jumbo and conforming market segments experienced large changes in their market structure, which can be captured in two trends. The first trend is related to the migration of residential mortgage origination activity to shadow banks. Prior work shows that during this period, 25 pp of market share migrated to shadow banks (Buchak et al. 2018). Central to this paper, we show that the migration of shadow banks did not take place in balance-sheet intensive jumbo lending. Bank market share in the jumbo market has remained roughly constant, varying between 85% and 95%. This contrasts with the conforming market, in which bank market share declined by over one third, from slightly under 80% in 2007 to about 50% in 2016 (Figure 3A). In other words, the contraction and later expansion in the amount of jumbo lending is mainly driven by changes in originations by traditional banks. The changes in the conforming market, on the other hand, are driven by changes in both shadow and traditional bank originations.

We next document that traditional banks adjusted their business models during this period. One possible way to interpret the facts above is that traditional banks *uniformly* contracted their lending across markets, but shadow banks chose to only expand in the conforming market. This was not the case. Figure 3B shows that as banks' capitalization decreased from 2007 to 2009, the share of jumbo mortgages in their lending declined from 30% to 10%. As bank capitalization increased, they shifted their originations back to on-balance-sheet lending with jumbo mortgages comprising more than 40% of their originations by 2016. In other words, banks appear to adjust to capitalization and other regulatory shocks by switching between the classic banking model (originating and retaining loans) and the originate-to-distribute model (shadow bank model). We call this margin on which banks can adjust the "balance sheet retention margin."