Appendix: Banks' Credit Lines to Nonbank Mortgage Companies and Downstream Mortgage Originations

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For our analysis of whether banks' increased provision of credit lines to NMCs have any effects on banks' direct originations in the downstream mortgage market, we use the following bank-county level regression:

$$\Delta Origination_{b,c} = \beta_1 Liquidity_{b,pre} + \gamma X_{b,pre} + \tau controls_c + \alpha_c + \epsilon_{b,c},$$

where the unit of observation is bank *b* in county *c* at time *t*. The dependent variable is the change in the logarithm of total mortgage volume originated by bank *b* in county *c* between before 2019 and after 2020, specifically the liquidity injection associated with the 2020 quantitative easing (QE). The main independent variable of interest is a bank's exposure measure, $Liquidity_{b,pre}$, which is defined as a bank's pre-QE percentage of liquid assets (reserves plus cash) over total assets, measured in the second quarter of 2019. To make the interpretation of the coefficient magnitudes easier, all variables are standardized, so the coefficients measure the percentage change of the dependent variable for a one-standard-deviation change in the exposure variable $Liquidity_{b,pre}$. $X_{b,pre}$ is a vector of bank characteristics that is also fixed in the second quarter of 2019 and includes size (logarithm of total assets), the ROA (return on assets), and the capital ratio (book equity over total assets). Additionally, we include mortgage portfolio controls such as average FICO score, LTV and DTI ratios. α_c are county fixed effects. Standard errors are double-clustered by bank and county.

Crucially, we augment this regression with an interaction term capturing the share of mortgages originated by financed NMCs in the same county. This allows us to check whether a bank increases its mortgage origination in the same counties where the NMCs it finances are operating.

To test whether more liquidity-constrained banks were less exposed to interest rate risk at the end of the mortgage-boom period, we use the following dynamic difference-in-difference specification:

$$Y_{b,t} = \sum_{t=-4}^{t=6} (\beta_t I_t * Liquidity_{pre}) + \gamma_b + \gamma_t + \epsilon_{b,t}$$

The left-hand-side variable, $Y_{b,t}$, represents outcome variables that have been shown to affect banks' sensitivity to the hiking and financial instability episode of 2022-23. In particular, they include MBS over assets, asset-based maturity in years, gains on securities over assets and uninsured deposits over assets. $Liquidity_{b,pre}$ is the same bank exposure variable used in the previous regression. I_t represents the dynamic difference-in-differences time coefficients of interest. The (omitted) reference period corresponds to the quantitative tightening in the first quarter of 2022. γ_b and γ_t are bank and quarter fixed effects, which ensure that we control for common shocks that affect bank's balance sheets during each quarter or bank-specific, time-invariant influences. Standard errors are clustered at the bank level.