Who Sells the Rate? Homebuilder Captive Finance and Mortgage Rate Discounts

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Abstract

U.S. homebuilders often respond to rising mortgage rates by offering below-market financing through lenders they own. Using linked loan, transaction, and lender-ownership data from the fifty largest metropolitan areas, we study how much these rate discounts lower buyer costs, who receives them, and whether they expand mortgage access at the cost of additional credit risk. After 2021, rate spreads fall by 0.43 percentage points at lenders wholly owned by the selling builder and by 0.22 at joint ventures, relative to unaffiliated lenders. Builders that own lenders cut both prices and rates rather than raising home prices to offset lower rates, and they offer larger discounts where competition for buyers is stronger. Borrowers at builder-affiliated lenders shift toward relatively lower incomes, but we find no evidence that these lenders relax underwriting or originate loans with higher early delinquency.

Keywords: captive finance, homebuilders, mortgage rate, vertical integration, credit access, house prices
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1 Introduction

Mortgage rates rose from about 3 percent in 2021 to nearly 8 percent in late 2023.[1] Existing home sales fell to their lowest levels since 1995, yet the largest homebuilders set new sales records in 2023 and again in 2024.[2] Builders describe mortgage rate buydowns as a central tool for sustaining sales when rates rise, often offering them through their own mortgage subsidiaries.[3] In line with this, lenders owned by builders ("captive lenders") offered lower rates than the rest of the market in 2023 (Bhutta and Lambie-Hanson, 2024). These lenders also financed a growing share of new home purchases, rising from 31 percent in 2018 to 53 percent in 2025.[4] We refer to builders that own these lenders as captive builders and to the lower rates at captive lenders relative to unaffiliated lenders as the captive rate discount.

The captive rate discount raises broader questions beyond mortgage pricing. Does the discount fully lower the buyer's monthly payment, given that a captive builder also sets the sales price and may adjust it in response? Which buyers receive the cheaper rate, and to what extent does it extend mortgage credit to buyers who would not qualify at the market rate? If the discount reflects the builder's incentive to sustain sales, does the same incentive also lead captive lenders to relax underwriting, increasing the credit risk? We answer these questions by linking 716,080 new-home purchase loans in the fifty largest metropolitan areas from 2018 to 2025 to deed records and to the selling builder's ownership stake in the lender, which together allow us to observe the sales price, mortgage pricing, and borrower characteristics at the loan level. We additionally use mortgage applications and loan servicing data to examine mortgage qualification standards and early loan performance at captive lenders.

Before turning to these questions, we quantify the captive rate discount and how it varies with the builder's ownership of the lender. We compare rates on captive and unaffiliated loans on similar homes before and after mortgage rates rose, within the same market and quarter and, more narrowly, within the same builder or the same subdivision. The discount

[1] According to Freddie Mac's *Primary Mortgage Market Survey*, the average 30-year fixed mortgage rate was 3.0 percent in 2021 and reached 7.79 percent in October 2023, its highest level since 2000.

[2] The National Association of Realtors reports 4.09 million existing home sales in 2023 and 4.06 million in 2024. D.R. Horton closed 82,917 homes in fiscal 2023 and 89,690 in fiscal 2024, compared with 82,744 in fiscal 2022 (D.R. Horton, Inc., 2024a, Financial Summary). Lennar delivered 73,087 homes in fiscal 2023 and 80,210 in fiscal 2024, compared with 66,399 in fiscal 2022 (Lennar Corporation, 2025, p. 1).

[3] By late 2024, D.R. Horton's mortgage subsidiary financed 77 percent of the company's buyers, and more than 80 percent of these borrowers received a rate buydown (D.R. Horton, Inc., 2024b). In the third quarter of 2023, Taylor Morrison's mortgage subsidiary financed 88 percent of buyers, and about 94 percent of closings involved discount points (Taylor Morrison Home Corporation, 2023).

[4] This share is computed from deed records of financed new home purchases in the fifty largest metropolitan areas, described in Section 3.2. Captive lenders include lenders that the builder wholly owns and joint ventures in which it holds an ownership stake.

is substantially larger at wholly owned captives than at joint ventures, where the builder shares the lending profit with a mortgage partner. The rate spread, the annual percentage rate (APR) minus the Average Prime Offer Rate (APOR), fell by 0.43 percentage points at wholly owned captives relative to unaffiliated lenders in the same market and quarter and by 0.22 at joint ventures. The corresponding declines are 0.38 and 0.20 percentage points within the same builder, market, and quarter, and 0.39 and 0.19 within the same subdivision and quarter. The captive rate discount is not paid for by the borrower through points, holds within each loan type and for first-time and repeat buyers alike, and persists relative to each type of unaffiliated lender.

Because a captive builder also sets the sales price, a lower mortgage rate need not fully reduce the buyer's cost if the builder uses financing terms to support home prices (Agarwal and Phillips, 1983; U.S. Department of Housing and Urban Development, 2010). If builders raise sales prices when offering rate discounts, buyers partly pay for the lower rate through a larger loan. We find no evidence of such a price offset. Relative to unaffiliated-financed homes of the same builder, market, and quarter, or of the same subdivision and quarter, prices of captive-financed homes rise by only 0.1 to 0.4 percent after 2021, and these changes are not statistically significant. Among captive-financed homes in the same subdivision and quarter, those with lower mortgage rates also do not sell for higher prices. Captive builders do not raise prices on all of their homes either. Over the same period, their prices fall by 4.5 percent relative to builders without a captive lender in the same market and quarter. This evidence therefore points to a genuine reduction in buyer financing costs rather than being recouped through higher sales prices.

If captive builders compete for buyers through the mortgage rate, rate discounts should be larger where homes are harder to sell. We therefore compare the rate discount within builders across markets that differed in the local selling conditions. After mortgage rates rose in 2022, captive lenders reduced rates more in markets with a larger preexisting presence of rival captive builders. Discounts are also larger in ZIP codes where homes take longer to sell and for homes sold later in the builder's sales sequence within a subdivision. We find no corresponding relationship between these conditions and sales prices. Markets with more preexisting mortgage lock-in are instead associated with larger price discounts after 2021, but not with larger rate discounts. This pattern suggests that captive builders rely mainly on rate discounts to compete for buyers, and on price cuts to attract existing homeowners buying their next home, who are more likely to be affected by mortgage lock-in.

We next examine which buyers receive the captive rate discount and how much it extends access to mortgage credit. Because underwriting caps the ratio of payments to income, the decline in purchase originations during the 2022–2023 tightening was concentrated among

borrowers pushed above debt-to-income limits (Bosshardt et al., 2024). A permanent buydown lowers the note rate used to qualify the borrower, so it can bring these buyers back under the limits. Consistent with this, the incomes of captive borrowers fall relative to those of unaffiliated borrowers as the discount widens. After 2021, their income falls by 7.6 percent relatively in the same market and quarter and by 3.2 percent within the same subdivision and quarter. However, we find little evidence that the discount is targeted at constrained borrowers. After 2021, the discount widens by a comparable magnitude across borrower income groups, and it shows no jump at debt-to-income limits. The discount lowers the income needed to qualify at a given debt-to-income ratio by 3.1 to 4.3 percent. Without it, an additional 5.4 to 7.3 percent of captive loans would exceed the common debt-to-income limit of 43 percent.

Captive lenders can expand mortgage access either by lowering the rate or by easing underwriting standards. If the rate discount reflects the builder's incentive to sell homes, the same incentive may also lead its lender to relax underwriting, as documented in other durable-goods markets (Xu, 2022). We find no corresponding loosening of underwriting at captive lenders. Among buyers in the same subdivision and quarter, the share of captive loans with a loan-to-value ratio of at least 95 percent does not change relative to unaffiliated loans, and the share with a debt-to-income ratio of at least 43 percent falls by 3.1 percentage points. In mortgage application records, the denial rate at captive lenders does not change significantly relative to unaffiliated lenders after 2021.

Captive lenders could still relax underwriting on dimensions not observed in these records, and the denial rate would not change if the composition of applicants changed at the same time. We hence examine subsequent loan performance. Understanding whether these discounts shift credit risk is especially important because captive lending is increasingly concentrated in government-insured loans, where losses fall on taxpayers.[5] Historically, loans from builder-affiliated lenders defaulted less often than other loans despite observably riskier borrowers (Agarwal, 2014), plausibly reflecting more disciplined underwriting (Gartenberg, 2014). We find the same pattern. Captive loans originated before 2022 are 0.95 percentage points less likely than unaffiliated loans in the same market and quarter to become 60 or more days delinquent within a year, on a mean of 4.45 percent, and the gap does not narrow for loans originated in 2022, when the discount widens. The gap remains when we control for the note rate.

Overall, our analysis shows that when mortgage rates rise, builders that own lenders use mortgage pricing as a central margin for supporting home sales. The discounts translate

[5]Among FHA and VA home purchase loans, the share originated by captive lenders increased from 6.0 percent in 2021 to 13.8 percent in 2025.

into lower financing costs rather than being recouped through higher sales prices, and they vary with local competition for buyers that builders face. They bring in lower-income buyers by reducing required payments, not by lowering qualification standards, and the resulting loans do not show worse early performance. Our results show that, when higher rates push buyers above debt-to-income limits, sellers who also control the financing of their product can absorb part of the tightening for their buyers. These results come with two important caveats. Our evidence on loan performance covers only the first year after origination and therefore does not speak to longer-term default. We also study permanent rate discounts on fixed-rate mortgages and do not cover temporary buydowns or adjustable-rate mortgages, which provide other ways to lower buyers' initial monthly payments.

This paper contributes to the literature on captive finance and the joint pricing of goods and credit. Sellers can use financing terms to offer discounts to selected buyers (Brennan et al., 1988), and disruptions to financing can reduce product sales (Benmelech et al., 2017). Financing their own products can also encourage manufacturers to protect resale values because those products serve as collateral for their loans (Murfin and Pratt, 2019). The benefit to buyers, however, depends on the price they pay for the product. Argyle et al. (2021) show that longer loans increase the prices paid for equivalent used cars, partly offsetting the benefit of lower monthly payments. In housing, Stroebel (2016) finds that homes financed by integrated lenders have similar initial prices but higher subsequent appreciation, as these lenders use better information to select higher-quality collateral. Our focus is how builders use mortgage pricing to support sales and how this affects buyer costs. Building on evidence of the recent captive rate discount (Bhutta and Lambie-Hanson, 2024), we examine whether permanent mortgage rate buydowns are offset by higher home prices.[6] We link mortgage records to deed transactions, property characteristics, and precise locations to examine mortgage pricing together with sales prices. Accounting for differences in collateral characteristics and location is important because both mortgage terms and sales prices depend on the homes being financed. The linked data allow us to compare captive and unaffiliated loans on similar homes, including homes sold by the same builder or within the same subdivision and quarter.

We contribute to work on mortgage credit access by measuring how captive rate discounts change the income needed to qualify for a given home purchase. Lenders shape the pass-through of funding conditions to borrower rates (Scharfstein and Sunderam, 2016; Fuster et al., 2024; Kalda et al., 2023; Bhutta et al., 2026), and captive loan rates can also reflect cost shocks to the parent manufacturer (Hankins et al., 2026).[7] Mortgage rates af-

[6]Mortgage rate buydowns were also used during the high-rate period of the early 1980s (DeMagistris, 1982; Agarwal and Phillips, 1983).

[7]Prepayment expectations affect agency mortgage-backed security prices (Stanton, 1995; Boyarchenko

fect existing homeowners through refinancing opportunities (Berger et al., 2021; Eichenbaum et al., 2022) and mortgage lock-in (Fonseca and Liu, 2024; Liebersohn and Rothstein, 2025; Batzer et al., 2024). Borrowers also adjust by renegotiating terms, switching lenders, prepaying, or locking in rates (Adelino et al., 2026; Fuster et al., 2026). For prospective buyers, higher payments can prevent qualification, and the decline in purchase originations during the 2022–2023 tightening was concentrated among borrowers pushed above debt-to-income limits (Bosshardt et al., 2024). We use the matched loan–deed data to compare incomes of captive and unaffiliated borrowers within the same subdivision and quarter. We test whether discounts widen more for lower-income borrowers and whether discounts show discrete increases at debt-to-income thresholds. Holding the home purchase, loan amount, and other debts fixed, we calculate how much the discount reduces qualifying income and the additional share of loans that would exceed common debt-to-income benchmarks without it.

Finally, we contribute to work on lender organization and lending incentives (Buchak et al., 2018; Fuster et al., 2019) by examining whether captive lenders' sales incentives weaken underwriting or increase credit risk. In automobile markets, manufacturers lower financing rates and relax lending standards when their products become harder to sell (Xu, 2022). Manufacturers facing liquidity needs also approve riskier buyers to generate cash from product sales (Benetton et al., 2026). The same concern arises when builders offer larger mortgage discounts to support home sales as market rates rise. Earlier housing evidence, however, shows that borrowers of builder-affiliated lenders were observably riskier but defaulted less often during the mid-2000s boom (Agarwal, 2014). Reliance on secondary-market loan sales can help explain this pattern by disciplining underwriting (Gartenberg, 2014). We extend this evidence by examining whether lower-income buyers qualify through lower payments or more lenient lending standards as captive discounts widen. The captive rate discounts reduce the income needed to qualify without a corresponding loosening of observed underwriting. We also find no deterioration in first-year delinquency relative to unaffiliated loans for the 2022 origination cohort, when the discount begins to widen.

2 Background

2.1 Builders and Their Lenders

Many large U.S. homebuilders own mortgage lenders that primarily finance buyers of their homes, including D.R. Horton's DHI Mortgage, Lennar's Lennar Mortgage, and Pulte-

et al., 2019), while the TBA forward market provides liquidity for agency mortgage trading (Vickery and Wright, 2013; Gao et al., 2017).

Group's Pulte Mortgage. Builders may also hold mortgage joint ventures with outside partners or maintain preferred-lender arrangements with lenders they do not own.

We define four types of builder–lender relationships. A *wholly owned* captive is a mortgage lender fully owned by the selling builder. A *joint venture* is a mortgage lender jointly owned by the builder and a mortgage partner, and the builder receives a share of the venture's profits through its ownership stake. A *preferred* lender is an independent lender to which the builder refers buyers but in which it has no ownership stake. An *unaffiliated* lender has no relationship with the selling builder beyond financing the buyer and serves as our benchmark.[8]

Federal regulations on affiliated business arrangements allow a builder to refer buyers to a lender it owns and to offer them a bona fide discount for using it, as long as buyers are not required to use the lender and the builder receives nothing of value from the arrangement beyond a return on its ownership interest. Lending profits therefore accrue fully to the builder under a wholly owned captive, partially under a joint venture according to its ownership interest, and not at all under a preferred-lender relationship in which the builder holds no equity. Section B.1 describes these regulations.

Figure 1a shows the growing role of captive financing in new-home sales.[9] The share financed by wholly owned captives increased from 24.8 percent in 2018 to 40.5 percent in 2025, and the share financed by joint ventures from 5.9 to 12.8 percent, with much of the growth between 2022 and 2024. These lenders finance sales by their parent or partner builders almost exclusively: only 0.2 percent of loans by wholly owned captives and 0.6 percent of loans by joint ventures financed homes sold by an unrelated builder. Figure 1b shows that the growth reflects both a rising market share of builders with captive lenders and a rising share of their buyers financed through those lenders.

2.2 Rate Locks, Buydowns, and Forward Commitments

New-home financing differs in when the mortgage rate is locked and how any rate concession is funded. In a standard loan, the borrower locks a rate with a lender, usually after signing the sales contract, and the lender hedges the lock, typically with forward sales of mortgage-backed securities or commitments to sell the loan to investors, until the loan is sold. In a loan-by-loan buydown, the rate is also set at the borrower's lock, but the builder funds discount points associated with that specific transaction to lower the rate at closing. In a

[8]The last two classifications are specific to a builder–lender pair. The same lender can be a preferred lender for one builder and unaffiliated with another.

[9]These statistics are based on all financed new-home deed records described in Section 3.2, regardless of whether they are matched to an HMDA loan record.

forward commitment, the builder or its lender secures a block of below-market rates before buyers are identified, and the rate is assigned to buyers who close within the commitment window. The cost of the commitment may include an upfront fee and additional amounts associated with loans subsequently assigned to it, and the length of the commitment window and the homes it covers vary across builders and programs. Appendix Figure B.1 illustrates the three paths.

Neither buydown approach requires the builder to own a lender. A builder can fund discount points through an outside lender or obtain a forward commitment from one, and builders with and without a captive lender use these approaches.[10] However, agency rules treat the two approaches differently. Points funded for a specific sale count toward the limits on concessions that a seller may pay, whereas a commitment obtained before a sales contract is signed falls outside these limits, as described in Section B.1.

The buydowns we study are permanent and lower the note rate for the life of the loan, and with it both the monthly payment and the rate used to qualify the borrower. Temporary buydowns, which subsidize the first one to three years of payments through an escrow, leave the note rate unchanged and are therefore outside our measures. They remained a small share of agency purchase lending, while permanent buydowns became common among large builders.[11]

3 Data and Measurement

We link new-home deeds to Home Mortgage Disclosure Act (HMDA) records from 2018 through 2025 and classify each lender's relationship with the builder using hand-collected data. The linked records let us observe the sales price, mortgage terms, and property characteristics for each transaction. We also use HMDA applications to study mortgage qualification and servicing records to measure delinquency.

[10] In 2023, D.R. Horton reported roughly $1.1 billion of mortgage-backed securities positions associated with its below-market financing program that had not yet been assigned to borrower rate locks or closed loans (D.R. Horton, Inc., 2023a), and PulteGroup described buying "tranches of mortgage commitments in the market" (PulteGroup, 2023). At Taylor Morrison, 18 percent of closings in the third quarter of 2023 used a forward commitment, while most other closings included discount points (Taylor Morrison Home Corporation, 2023). Smith Douglas, which has no wholly owned lender, obtains forward commitments through outside lenders (Smith Douglas Homes Corp., 2025).

[11] Among Freddie Mac's owner-occupied, conforming 30-year fixed-rate purchase loans, the share with a temporary buydown peaked at 7.6 percent in December 2022 and fell to 2.8 percent by June 2023 (**?**). The AEI Housing Center estimates that in June 2025, 64 percent of new homes sold by the largest builders had a permanent buydown, compared with about 13 percent for smaller builders (Li and Pinto, 2025).

3.1 Mortgage Pricing and Applications

Loan-level pricing comes from public Home Mortgage Disclosure Act (HMDA) records for 2018 through 2025, the years in which HMDA includes the note rate and the fee fields. We use originated first-lien, owner-occupied, site-built home-purchase loans. For each loan, we observe the note rate, the rate spread, discount points, lender credits, borrower-paid origination charges, the loan type, the loan-to-value and debt-to-income ratios, borrower income, and the census tract.[12]

We use two loan pricing measures. The note rate is the contract rate and reflects any permanent buydown. The annual percentage rate (APR) adds the borrower's finance charges, such as points, origination fees, and mortgage insurance premiums, to the note rate over the life of the loan. The rate spread is the APR minus the average prime offer rate (APOR), which the FFIEC publishes weekly, for a comparable loan in the week in which the rate is locked. Loans originated in the same year may have been locked under market rates that differ by several percentage points, as in 2022, and the rate spread removes these differences. We therefore examine the rate spread as the main mortgage pricing outcome. We also examine the note rate, which determines the borrower's monthly payment, the rate at which the borrower qualifies, and the security coupon into which the loan is delivered.

We complement these two measures with the fee fields, which distinguish whether a lower rate is paid for by the borrower or by another party. Discount points include points paid by any party, whereas origination charges include only amounts paid by the borrower, so we measure non-borrower-paid points as $\max\{\text{discount points} - \text{borrower-paid origination charges}, 0\}$. This measure is a lower bound because origination charges also include other fees, and it does not identify who pays. In a new-home sale, the payer is most likely the builder or its lender, although other parties such as an employer or an assistance program can also contribute. We use it in Section 4.2 to test whether borrowers pay for the captive discount through their own points.

For the analysis of mortgage qualification in Section 6, we use HMDA purchase applications in the fifty CBSAs that ended in an origination, a denial, or an approval that the applicant did not accept. Applications that were withdrawn or closed as incomplete did not receive a credit decision and are excluded. For denied applications, HMDA reports the lender's reasons, and we use the first to separate denials for debt-to-income from denials for other reasons. An application that is not originated cannot be linked to a deed, so we classify the lender and not the builder–lender pair, the sample includes applications for existing homes, and we do not observe the subdivision or the closing date. We exclude KBHS Home

[12] Public HMDA gives the year but not the date of origination and has no credit score, both of which are available only in the restricted-access version.

Loans, the joint-venture lender of KB Home, from the main estimates because a change of joint-venture partner in 2021 was followed by a sharp change in how its unsuccessful applications are recorded, and we report estimates that include it in the appendix.[13]

3.2 Matched New Home Deed–Loan Sample

Property transactions come primarily from ATTOM's deed recorder and tax-assessor archives. Each deed includes the sales price, the closing date, the buyer and seller names, and the amount and lender of the purchase mortgage, and a parcel identifier links it to the assessor's property characteristics. Deeds do not flag new homes, so we classify a deed as a new-home sale when the seller is a corporate entity and the assessor year built falls within one year of the sale year. We keep arm's-length sales of a whole interest to individual buyers, which removes investor and built-to-rent purchases. The resulting sample contains 2.59 million new-home sales in the fifty CBSAs from 2018 through 2025.

We link each new-home deed to the HMDA loan that financed it. Following Bayer et al. (2018) and Bartlett et al. (2022), we match deeds and loans on census tract, loan amount, sales price, and lender name within the same year, and we keep only pairs in which exactly one deed and one loan share these fields. The match links 1.11 million new-home deeds, or 50 percent of those eligible for the match. Section C.1 and Section C.2 describe the deed records, the new-home classification, the match, and their validation.

The link adds information that public HMDA lacks. The deed gives the sales price, so we observe the house price and the mortgage rate on the same transaction. It gives the closing date, whereas public HMDA has only the year of origination. The deed also links it to the assessor's property characteristics and places each loan in a subdivision, which we define from the assessor's subdivision field within a county.

3.3 Builder–Lender Relationships

We classify each builder–lender pair as wholly owned, joint venture, preferred, or unaffiliated, and we refer to wholly owned and joint-venture lenders as captive lenders. We first assign the seller on each new-home deed to a builder by standardizing seller names, grouping the legal entities and spellings that belong to the same firm into one builder, and assigning subsidiaries using a hand-collected registry of ownership links and builder acquisition dates. The resulting registry contains 40,824 builders that sold new homes from 2018 through 2025, and these builders account for 84 percent of financed new-home sales.

[13] Its joint-venture partner changed in March 2021, when Stearns Lending was acquired by Guaranteed Rate. In 2022, its denials fell by about two-thirds and its withdrawn applications rose about fivefold.

We then identify the relationship between each builder and its lenders in three steps. For public builders, annual reports name the lending subsidiary and state whether it is wholly owned or a joint venture. For private builders, we identify each lender's owner from the legal-entity register (GLEIF) and affiliated-business disclosures. Finally, to identify preferred lenders and joint ventures that these documents miss, we flag builder–lender pairs in which the lender finances a share of the builder's sales far above its share of the local market. We verify every candidate relationship by hand against public documents, in the order of SEC filings, the builder's legal documents, the lender's website, and press reports. The final map contains 150 relationships between 73 builders and 110 lenders, of which 45 are wholly owned captives, 38 joint ventures, and 67 preferred arrangements. Section C.3 describes further details.

We assign each sale a financing channel based on the relationship between its seller and its lender in the year of the sale. A captive lender occasionally finances a home sold by a builder other than its owner. These cross-captive loans are rare, and we exclude them, together with loans whose lender is not classified, from all comparisons of captive and unaffiliated loans.

3.4 Loan Performance and Mortgage Lock-in

Loan performance comes from CoreLogic Loan-Level Market Analytics (LLMA) servicing records. LLMA reports each loan's origination terms, credit score, ZIP code, and monthly payment status. Our extract contains 7.8 million first-lien purchase loans originated from January 2018 through January 2024, with payment status observed through January 2024. We link LLMA loans to new-home deeds by ZIP code, loan amount, and closing month to classify each loan as captives or non-captives. The deed-HMDA link results in 379,440 matches.

We measure early default as an indicator for 60 or more days delinquent, in foreclosure, or real-estate owned. Because payment status ends in January 2024, the outcomes are complete for the 2018–2022 cohorts. We compare captive loans with loans from unaffiliated banks and independent mortgage companies using loans with a known outcome, an identified subdivision, and observed controls. LLMA also reports the borrower's credit score, which public HMDA does not, and we include it as a control in loan-level analysis. Section C.5 reports the sample at each step. These outcomes allow us to test in Section 6 whether captive loans carried more credit risk as the discount widened. We also use LLMA to measure mortgage lock-in in each CBSA as the December 2021 gap between the Freddie Mac Primary Mortgage Market Survey 30-year fixed rate and the average note rate on active owner-occupied fixed-rate purchase loans, standardized across CBSAs. We use this

measure in Section 5. Section C.5 describes the deed-LLMA link, the outcome sample, and the lock-in measure details.

3.5 Other Data Sources

We use five additional data sources. First, we use public builders' 10-K filings to collect the capture rates reported in Table C.2 and, for six builders with available disclosures, to validate our identification of captive lenders by comparing HMDA purchase-loan counts with the origination counts reported in their filings over 2018–2023, as shown in Appendix Section C.4. Second, we use Realtor.com's monthly median days on market at the five-digit ZIP code level to measure local selling conditions. Third, we use the Federal Housing Finance Agency's annual all-transactions house price index at the same geographic level to measure local house price growth from the origination year to the following year. Fourth, we use the Federal Reserve Bank of Philadelphia's HMDA Lender File to classify unaffiliated lenders by type in each reporting year (Federal Reserve Bank of Philadelphia, 2026). Fifth, we use first-time-buyer indicators from Fannie Mae and Freddie Mac loan-level records to estimate captive rate discounts separately for first-time and repeat buyers.

3.6 Analysis Sample and Summary Statistics

Our analysis sample starts from the 1.02 million matched new-home loans from 2018 through 2025 with a note rate and a rate spread. Of these, 799,634 are on homes sold by builders in our registry, and 716,080 of those are 30-year fixed-rate loans, which we use throughout the main analysis. Results that add adjustable-rate and other fixed-rate loans appear as robustness checks in the appendix. Wholly owned, joint-venture, preferred, and unaffiliated lenders originated 704,908 of the 30-year fixed-rate loans, and the remaining loans are cross-captive loans or loans from unclassified lenders. A subdivision is identified for 78 percent of the sample, and a sales price is available for 82 percent.

Figure 2 shows the rise in mortgage rates that defines our comparison periods. The 30-year fixed rate averaged about 3 percent in 2021, began rising in the first quarter of 2022, and exceeded 7 percent by late 2023. Over the same period, new homes rose from 19.3 percent to 25.3 percent of home sales in the fifty largest metropolitan areas. We therefore refer to 2018 through 2021 as the period before the rate increase and to 2022 onward as the period after it, and we use this definition throughout.

Table 1 summarizes the analysis sample by financing channel before and after the rise in mortgage rates. From 2018 through 2021, mortgage pricing differs little across channels. Mean rate spreads are 0.23 percentage points at wholly owned captives and 0.32 at joint

ventures, compared with 0.40 at unaffiliated lenders, while mean note rates range from 3.41 to 3.57 percent. From 2022 through 2025, pricing separates with the degree of integration. Mean rate spreads are −0.50 percentage points at wholly owned captives, −0.24 at joint ventures, −0.10 at preferred lenders, and 0.16 at unaffiliated lenders. Mean note rates are 5.44 percent at wholly owned captives and 5.79 percent at unaffiliated lenders. Non-borrower-paid points (lower bound) rise from less than $400 per loan in every channel before 2022 to about $3,700 at wholly owned and joint-venture lenders, compared with $825 at unaffiliated lenders, while borrower-paid charges at wholly owned captives are about half those at unaffiliated lenders. Borrowers and homes are broadly similar across captive and unaffiliated lenders. Median borrower income at captive lenders shifts from slightly above that at unaffiliated lenders before 2022 to slightly below it afterward, while the median sales price after 2021 is about $486,000 in both groups. Preferred lenders serve lower-income borrowers who purchase less expensive homes and more often use FHA or VA loans.

Appendix Table A.1 reports the same statistics when adjustable-rate and other fixed-rate loans are added. Thirty-year fixed-rate loans account for 85 to 96 percent of loans in every channel and period, and the patterns are unchanged. Appendix Table A.2 summarizes the HMDA application sample used in Section 6.1. Denial rates at captive and unaffiliated lenders are 11.0 and 8.7 percent in 2018–2021, respectively, and 11.8 and 9.2 percent in 2022–2025. Appendix Table A.3 summarizes the 50,180 loans in the baseline delinquency estimation sample. Unadjusted first-year delinquency rates at captive and unaffiliated lenders are 4.70 and 4.50 percent for loans originated in 2018–2021, respectively, and 3.11 and 3.62 percent for loans originated in 2022.

4 The Captive Rate Discount

This section establishes whether builder-affiliated lenders offer discounted rates after mortgage rates rise and how these discounts vary with the degree of integration between builders and lenders. It then shows that the discount is not explained by borrower-paid points, loan composition, the fee waiver for first-time buyers, or selection into captive financing, and that it is not offset by higher sales prices.

4.1 Rate Discounts and Builder–Lender Integration

We begin by describing the raw difference in mortgage pricing between captive and unaffiliated lenders. Figure 3 compares the distribution of mortgage rate spreads across captive and unaffiliated lenders before and after the rise in mortgage rates, using 2021 and 2023 as

benchmark years. Figure 3a and 3b show the rate spread distributions. In 2021, the two distributions lie nearly on top of one another, apart from a thicker right tail among unaffiliated lenders. Mean spreads are 0.25 and 0.37 percentage points at captive and unaffiliated lenders, with standard deviations of 0.43 and 0.64. By 2023, the captive distribution shifts left by 0.77 percentage points, compared with 0.27 percentage points among unaffiliated lenders, widening the difference in mean spreads from 0.12 to 0.62 percentage points. The same pattern appears in note rates in Figure 3c and 3d. In 2023, the mean note rate is 5.93 percent on captive loans and 6.45 percent on unaffiliated loans, compared with a difference of only four basis points in 2021.

We compare loans within the same local market and period while holding loan characteristics fixed and separating lenders by their degree of integration with the builder. For loan i on a new-home sale in CBSA m closing in year-quarter q, we estimate

$$\text{RateSpread}_i = \sum_{c \in \mathcal{C}} \delta_c \mathbf{1}[\text{Tier}_i = c] + \sum_{c \in \mathcal{C}} \sum_{t \in \mathcal{T}} \beta_{c,t} \mathbf{1}[\text{Tier}_i = c] D_{t,i} + X_i' \Gamma + \alpha_{m(i),q(i)} + \varepsilon_i, \quad (1)$$

where $\mathcal{C} = \{\text{wholly owned}, \text{joint venture}, \text{preferred}\}$ indexes the relationship between the builder that sold the home and the lender that financed it, with unaffiliated lenders as the omitted category. Pooled specifications combine wholly owned and joint-venture lenders, in both of which the builder holds an equity stake, into a single captive category and drop loans from preferred lenders. X_i includes log borrower income, log loan amount, loan-class indicators, bins for loan-to-value and debt-to-income ratios, and property characteristics (log square feet, bedrooms, bathrooms, log lot size, and a single-family indicator). $\alpha_{m(i),q(i)}$ are CBSA by deed-closing year-quarter fixed effects, and we also estimate specifications with builder fixed effects, builder by CBSA by year-quarter fixed effects, or subdivision by year-quarter fixed effects. Standard errors are clustered by CBSA.

Our main specification is an event study estimated quarterly or annually, in which $D_{t,i}$ are indicators for the period of closing, with the last period of 2021 as the reference. δ_c is then the gap in spreads between tier c and unaffiliated lenders in the reference period, and $\beta_{c,t}$ is the change in that gap since then. We plot $\beta_{c,t}$, or the gap in each period, $\delta_c + \beta_{c,t}$, when the gap before 2022 is itself informative. We also estimate a difference-in-differences version in which $D_{t,i}$ is a single indicator for closings from 2022 onward, so that δ_c is the average gap before 2022 and $\beta_{c,\text{post}}$ is the average change afterward.

Figure 4 shows the quarterly event study. Panel a pools wholly owned and joint-venture lenders. Before 2022, the gap remains within 0.1 percentage points of its 2021Q4 reference value, apart from a few imprecisely estimated quarters. It changes little in the first half of 2022 and then widens sharply by 0.35 percentage points by 2022Q4 and 0.58 by 2023Q4.

By 2025, it is about 0.7 percentage points wider than in 2021Q4. The estimates are similar with tighter fixed effects. Panel b separates the integration tiers. In 2021Q4, wholly owned captives already priced 0.12 percentage points below unaffiliated lenders, joint ventures were at par, and preferred lenders were 0.16 percentage points above. Wholly owned captives then move first and by the most. Their discount is 0.55 percentage points in 2022Q4, while joint ventures and preferred lenders remain within 0.15 percentage points of unaffiliated lenders. By 2023Q4, the discounts are 0.74 percentage points at wholly owned captives, 0.48 at joint ventures, and 0.42 at preferred lenders. By 2025, the three gaps are about 0.9, 0.6, and 0.5 percentage points.[14]

The captive rate discount persists with more granular fixed effects, as shown in Table 2. The pooled specifications in Panel A show that captive loan spreads are 0.11 percentage points below those on unaffiliated loans before 2022, and that the gap widens by a further 0.38 percentage points after 2021 within CBSA and quarter in column 1. The additional post-2021 discount is 0.38 percentage points with builder fixed effects, 0.33 within builder, market, and quarter, and 0.34 within subdivision and quarter, with or without builder fixed effects, in columns 2–5. Panel B separates the tiers. Within CBSA and quarter, the gap widens by 0.43 percentage points at wholly owned captives, 0.22 at joint ventures, and 0.36 at preferred lenders. Within builder, market, and quarter, the corresponding changes are 0.38, 0.20, and 0.22 percentage points, with nearly identical estimates within subdivision. Because preferred lenders charged 0.10 percentage points more than unaffiliated lenders before 2022, their post-2021 discount is 0.25 percentage points, compared with 0.27 at joint ventures and 0.54 at wholly owned captives. The discount is therefore not explained by integrated builders operating in different markets or subdivisions, or by time-varying differences across builders, and remains largest at wholly owned captives. Appendix Table A.4 additionally shows that the rate spread estimates are robust to stricter deed–loan matching, alternative control sets, and adjustments for contemporaneous FHA premium cuts and LLPA waivers.

The rate spread is based on APR and therefore includes prepaid finance charges and mortgage insurance, so we also report results using the note rate, as discussed in Section 3.1. The post-2021 widening is 0.36 percentage points with CBSA $\times$ year-quarter fixed effects and 0.34 percentage points within builder, market, and quarter or within subdivision. The discount therefore appears primarily in the contractual note rate rather than in fees or discount points. We further examine who paid the points and other charges in Section 4.2.

[14]The preferred-lender series is imprecisely estimated throughout, since preferred relationships are less common and are identified from the deed record rather than from filings, and not statistically distinguishable from the joint-venture series.

4.2 Alternative Explanations

The captive rate discount estimates from Section 4.1 compare mortgage pricing across financing channels. The measured rate gap could overstate the discount if borrowers pay for the lower rate through points, if captive and unaffiliated lenders originate different types of loans, if the GSE fee waiver for first-time buyers lowered rates on loans that captive lenders make more often, or if borrowers select into captive financing. We evaluate these alternative explanations.

Borrower-funded buydowns. A lower note rate could still be purchased with the borrower's own funds rather than provided by the builder or lender. The rate spread partly accounts for this concern because borrower-paid points enter the APR as prepaid finance charges and offset part of the benefit of a lower note rate.[15] We thus additionally examine these payments directly using the discount points paid by any party, borrower-paid origination charges, and lender credits reported in HMDA. Because origination charges include points paid by the borrower, discount points in excess of origination charges must have been paid by another party. We use this excess, floored at zero, as a lower bound on points paid by the builder or lender and refer to it as non-borrower-paid points.

Appendix Table A.6 reports these payment components by year, and Appendix Figure A.1 plots the two key series. Non-borrower-paid points on captive loans are 0.06–0.11 percent of the loan amount in 2018–2021, 0.36 percent in 2022, and 1.12, 1.24, and 1.37 percent in 2023, 2024, and 2025, or about $4,500 to $6,000 per loan. At unaffiliated lenders, non-borrower-paid points rise from 0.02 to 0.45 percent. The share of captive loans with any non-borrower-paid points increases from 13 percent in 2021 to 57 percent in 2025, compared with 3 to 18 percent at unaffiliated lenders. Borrower-paid charges move in the opposite direction. They are 0.48 percent of the loan at captives in 2021 and 0.53 percent in 2025, while at unaffiliated lenders they rise from 0.64 to 1.27 percent. Borrower-paid origination charges rise much more at unaffiliated lenders than at captive lenders. Lender credits are small at captives, 0.09 to 0.16 percent of the loan before 2022, and decline to 0.05 percent by 2025, while at unaffiliated lenders they remain at 0.22 to 0.23 percent after 2021, down from 0.27 to 0.33 percent before.

We also examine loans with no recorded discount points, as they provide a direct test of how much of the captive discount remains without an observed buydown. Appendix Table A.7 restricts the sample to loans with zero points and estimates the rate spread gaps.

[15] The rate spread offsets this only in part: borrower-paid points enter the APR as prepaid finance charges, but amortized over the loan's term, so a point typically raises the APR by much less than it lowers the note rate.

The post-2021 widening is 0.32 percentage points with CBSA × year-quarter fixed effects and 0.16–0.18 percentage points within subdivision, about half the full-sample estimate. Recorded points therefore account for part, but not all, of the within-subdivision captive discount.

Two limitations of these fields should be kept in mind. First, HMDA records the amount of discount points but not who paid them, so our measure of non-borrower-paid points is a lower bound. Second, HMDA does not capture concessions that do not pass through the mortgage, including closing-cost credits and free upgrades.

Loan composition. Differences in loan composition could contribute to the measured rate gap if captive lenders originate different types of mortgages than unaffiliated lenders. The concern is particularly relevant for mortgage insurance, which enters APR and raises the rate spread relative to APOR. FHA and VA loans include insurance premiums, while conventional loans with loan-to-value ratios above 80 percent generally include private mortgage insurance. Appendix Table A.8 therefore estimates Table 2 separately for conforming conventional loans, for FHA and VA loans, and for conforming conventional loans with loan-to-value at or below 80 percent. The post-2021 captive rate discount widens by 0.39, 0.41, and 0.42 percentage points across these three groups, respectively.

First-time-buyer fee waiver. The GSE upfront-fee waiver introduced in December 2022 reduced lenders' costs on eligible mortgages to lower-income first-time buyers. Bhutta et al. (2026) document incomplete pass-through, with substantial variation across lenders and loan officers. If captive lenders serve a larger share of eligible borrowers, passing through the waiver could widen their note-rate discount relative to unaffiliated lenders. We examine whether this policy might be driving our result. First, FHA and VA loans are not subject to the waiver, yet their additional post-2021 captive rate-spread discount is 0.41 percentage points, compared with 0.39 for conforming conventional loans, as discussed above. Second, the captive rate discount persists across first-time buyer status. Since neither deed nor HMDA records identify first-time buyers, we match our deed-loan sample to Fannie Mae and Freddie Mac issuance records, which include a first-time homebuyer indicator. We then estimate the pooled version of Equation (1) separately by first-time buyer status, using the note rate as the outcome variable. Appendix Table A.11 reports additional post-2021 discounts of 0.36 percentage points for repeat buyers in column 2 and 0.34 for first-time buyers in column 3, compared with 0.35 in the full matched sample in column 1.

Selection into financing channels. Buyers who finance with unaffiliated lenders despite purchasing from captive builders may differ from captive borrowers. If these buyers were rejected by, or did not qualify for, captive financing, selection would widen the measured discount. If they are buyers whom the captive lender turned away, selection would bias the captive discount upwards. If they are buyers who found a better offer elsewhere, selection would bias it downwards. The types of unaffiliated lenders they use speak to these possibilities. Appendix Table A.9 replaces the captive indicator with indicators for banks, independent mortgage banks, and credit unions, with captive lending as the omitted category. Before 2022, loans at banks and credit unions have spreads within 0.04 percentage points of captive loans, while loans at independent mortgage banks have spreads 0.18 percentage points higher. Borrowers who finance outside the captive are therefore not a homogeneous group. However, after 2021, all three become more expensive relative to captive loans, by 0.36 percentage points at banks, 0.38 at independent mortgage banks, and 0.23 at credit unions, leaving post-2021 gaps of 0.32, 0.56, and 0.21 percentage points. The discount therefore persists relative to each type of unaffiliated lender and is not driven by borrowers who use higher-cost independent mortgage banks. Section 6 examines the other side of selection, using HMDA applications to test whether captive lenders changed whom they deny.

Taken together, the evidence supports interpreting the captive rate discount as a genuine concession to buyers. It is not paid for by the borrower through points, appears within each loan type and across first-time and repeat buyers, and remains relative to each type of unaffiliated lender.

4.3 Do Captive Rate Discounts Come with Higher Sales Prices?

A builder with a captive lender sets two prices for its buyers, the price of the home and the mortgage rate. A lower rate is a concession to the buyer only if the builder does not make up for it with a higher price. If it did, the buyer would pay for the discount through a larger loan, and the rate comparison in the previous subsection would overstate what the buyer gains. We therefore test whether builders recover the lower mortgage rate through a higher home price. Specifically, we examine whether captive-financed buyers pay more than other buyers in the same market, whether larger rate discounts are associated with higher prices among captive-financed sales, and whether captive builders charge higher prices overall than builders without captive lenders.

We first estimate Equation (1) with the log sales price as the dependent variable, on the deeds with a disclosed price. Loan amount, loan-to-value, and debt-to-income are functions of the sales price and are therefore omitted, while other control variables are included as before.

Table 3 reports the estimates. Within CBSA and quarter in column 1 of Panel A, homes financed through the captive sell for the same price as homes financed by unaffiliated lenders before 2022 and for 2.0 percent less after 2021. Adding builder fixed effects in column 2 or comparing within builder, market, and quarter in column 3 changes the estimates in two ways. Before 2022, captive-financed buyers purchase homes that are 2.7 and 1.1 percent more expensive than those purchased by unaffiliated-financed buyers of the same builder. This difference disappears within subdivision in columns 4 and 5, which suggests that it reflects the communities in which captive buyers purchase rather than a premium for the same home. After 2021, the 2.4 percent relative decline in column 2 reflects captive builders cutting prices more than other builders, as we discuss below. Within the same builder, market, and quarter in column 3 or the same subdivision and quarter in columns 4 and 5, the post-2021 change is only 0.1 to 0.4 percent, with standard errors of 0.2 to 0.3 percentage points. The tier estimates in Appendix Table A.5 are consistent with the pooled estimates. Overall, the additional captive rate discount after 2021 is not accompanied by higher home prices. The 1 to 3 percent premium on captive-financed homes before 2022 appears only when buyers across different subdivisions are pooled and does not increase when the rate discount widens.

The average price comparison could still miss a buyer-level trade-off if, within the same subdivision, builders offered larger rate discounts to buyers who paid more. Panel B of Table 3 therefore regresses the log sales price on the loan's own rate among captive loans, within subdivision and quarter, with separate slopes before 2022 and after 2021 and with and without lender fixed effects. Before 2022, when the captive discount was small, a one percentage point higher rate spread is associated with a 1.2 to 1.3 percent lower price, as expected if smaller loans and riskier borrowers are charged higher rates. If builders paired larger discounts with higher prices once the discount widened, this slope would become more negative after 2021. Instead, after 2021 a one percentage point higher rate spread is associated with a 0.1 to 0.2 percent lower price, with a standard error of 0.1 percentage points, and the relationship is not statistically significant. The slope on the note rate rises by a similar amount, from a 0.7 percent lower price per percentage point before 2022 to a 0.2 to 0.3 percent higher price after 2021. Its positive sign is the opposite of what a trade-off would produce and, if anything, is consistent with buyers who receive lower rates also paying lower prices. Among captive buyers in the same subdivision and quarter, lower rates are therefore not paired with higher home prices.

The price comparisons above are between financing channels rather than builders. A price increase that a captive builder applies to all of its buyers would not appear in the within-builder specifications and would be only partly captured by the CBSA and quarter

comparison in column 1 of Panel A, since the builder's unaffiliated-financed buyers remain in the comparison group. Panel C therefore compares captive builders directly with builders without a captive lender. It uses every priced new-home deed by a registry builder, 1.44 million sales including cash purchases. Before 2022, prices are indistinguishable within CBSA and quarter or within tract and quarter. After 2021, prices at captive builders fall by 4.5 percent within CBSA and quarter and by 3.5 percent within tract and quarter relative to other builders. Within subdivisions that contained both types of builders before 2022, the relative decline is 1.8 percent and imprecisely estimated. Among cash sales, where no mortgage concession is possible, the relative decline is 7.2 percent. Taken together, the evidence shows that captive builders do not raise sales prices while discounting mortgage rates.

5 Housing Market Conditions and Mortgage Pricing

If captive rate discounts are motivated by the builder's incentive to sell homes, they should respond to the selling conditions that the builder faces. We examine this using two sets of measures of local selling conditions. The first set is measured before 2022 and consists of the presence of rival captive builders, which increases competition for new-home buyers over financing terms, and mortgage lock-in among existing homeowners. The second set varies over time and consists of ZIP code level days on market and sale rank, which captures how early or late a home sells in its builder's sales sequence within the subdivision.

We compare loans financed by the same builder's captive lender across markets by estimating

$$\text{RateSpread}_i = \psi\, Z_i + \phi\, Z_i \times \text{Post}_i + X_i'\Gamma + \alpha_{b(i),m(i)} + \alpha_{b(i),q(i)} + \varepsilon_i, \tag{2}$$

where Z_i is a selling condition for loan i on a home sold by builder b in CBSA m and year-quarter q, Post_i equals one for loans originated after 2021, $\alpha_{b(i),m(i)}$ are builder $\times$ CBSA fixed effects, and $\alpha_{b(i),q(i)}$ are builder $\times$ year-quarter fixed effects. The conditions measured before 2022 do not vary within a builder and CBSA, so only ϕ is identified, and it compares the change in the same builder's captive loan spreads after 2021 across markets with different conditions. For the time-varying measures, ψ is the relationship before 2022 and ϕ is its change afterward.

Columns 1 to 3 of Panel A in Table 4 report how captive rate discounts vary with competition from other captive builders. In column 1, a ten-percentage-point higher pre-2022 share of rival captive builders is associated with a 4.3 basis point larger decline in rate spreads after 2021. The estimate is similar in column 2, which controls for mortgage

lock-in in the CBSA, measured as the December 2021 gap between the prevailing 30-year mortgage rate and the average coupon on outstanding mortgages. Column 3 additionally controls for the pre-2022 shares of the largest national unaffiliated lenders and the largest unaffiliated builders in the market to distinguish competition among captive builders from broader competition. The exposure estimate is 4.4 basis points per ten percentage points and remains statistically distinguishable from zero.

Mortgage lock-in can affect builders' incentives to offer discounts through two opposing mechanisms. By discouraging existing homeowners from listing their homes, it reduces competition from resales and may lessen the need for concessions. It also discourages homeowners from moving, which weakens demand from move-up buyers. For rate spreads, the lock-in estimates in Table 4 are not statistically significant. Appendix Table A.10 and Appendix Figure A.2 instead interact lock-in with the captive and post-2021 indicators without other market characteristics. Greater lock-in is associated with smaller captive discounts before 2022, and this relationship does not clearly change after the rate shock.

Columns 4 to 6 of Panel A repeat the analysis with the log sales price as the dependent variable. Exposure to rival captive builders has no statistically significant relationship with the change in prices after 2021. However, lock-in shows the opposite pattern, with no relationship to spreads but a larger decline in prices after 2021 where lock-in is greater. Builders describe their buydown programs as aimed primarily at first-time buyers, who have no existing mortgage and are therefore not themselves locked in.[16] Weaker demand from locked-in move-up buyers is therefore more likely to be met with a lower price than with a lower rate.

Panel B examines selling conditions that vary over time. Column 1 uses the median days on market in the home's ZIP code in the previous quarter. A ten-day increase is associated with rate spreads that are 1.43 basis points lower, and the interaction with the post-2021 indicator is also negative and statistically significant, so the relationship strengthens after the rate shock. Rate discounts are therefore larger where homes take longer to sell. Column 2 uses the home's sale rank within its builder's sales in the subdivision. Sale rank may reflect differences in a home's appeal, such as its location or natural light, as well as construction schedules and the builder's incentive to clear remaining inventory. Homes sold later in the sequence have lower captive rate spreads. On average, within a builder's subdivision, prop-

[16] On its Q3 2023 earnings call, Lennar said that it buys forward commitments to fund rate buydowns, that the program is "primarily used for our first-time buyers," and that it has to "help our first-time buyers more than our move-up buyers" (Lennar Corporation, 2023). On D.R. Horton's Q4 2023 call, management said that over half of its business is first-time homebuyers and that it delivers affordability to them "through the monthly payment process," which has been "a big driver for the rate buydowns" (D.R. Horton, Inc., 2023b).

erties sold last have rate spreads about 1.89 basis points lower than the property sold first. The interaction with the post-2021 indicator is small and statistically insignificant, so this relationship does not substantially change when mortgage rates rise. In the corresponding regressions of the log sales price, neither the coefficients on the two measures nor their post-2021 interactions are statistically significant.

Altogether, the results show that captive builders compete primarily through mortgage rates. Captive rate spreads decline more after 2021 where rival captive builders have a greater presence and where homes take longer to sell, while prices do not respond to either condition. The larger price declines in markets with greater mortgage lock-in is provides suggestive evidence that builders rely on prices instead when demand from move-up buyers weakens, consistent with rate discounts being aimed mainly at first-time buyers.

6 Access to Credit and Loan Performance

A lower mortgage rate can help lower-income buyers qualify for a loan, but a lender whose owner profits from the home sale may also have an incentive to loosen underwriting. This section examines who borrows from captive lenders as the discount widens and how their loans perform. We first study borrower income and test whether captive lenders direct larger discounts to particular borrowers or relax their qualification standards. We then compare captive and unaffiliated loans on early delinquency, which reflects credit risk.

6.1 Borrower Income and Qualification

To characterize who borrowed from captive lenders as the discount widened, we estimate Equation (1) with log borrower income as the dependent variable. We exclude loan controls, since loan type, loan-to-value, and debt-to-income are themselves outcomes of the borrower's choice of lender. Figure 5 shows the yearly estimates for captive lenders, pooling wholly owned and joint-venture lenders. Before 2022, the income of captive borrowers relative to unaffiliated borrowers in the same market and quarter differs from its 2021 level by at most 2.2 percent. It falls by 5.1 percent in 2022 and by 7.8 in 2023, and it is 8.0 and 9.6 percent lower in 2024 and 2025. Appendix Figure A.3 separates the integration tiers.

Table 5 reports the pooled estimates. Before 2022, captive and unaffiliated borrowers in the same market and quarter have the same income in column 1 of Panel A. After 2021, captive borrowers' income falls by 7.6 percent relative to unaffiliated borrowers. The decline is 7.2 percent with builder fixed effects in column 2, 3.7 within builder, market, and quarter in column 3, and 3.2 to 3.3 within subdivision and quarter in columns 4 and 5. About half

of the decline therefore reflects the communities in which captive borrowers buy, and half remains among buyers in the same subdivision and quarter. Panel B separates the tiers. Within market and quarter, income falls by 7.4 percent at wholly owned captives and 8.4 at joint ventures. Within subdivision, the declines are 3.5 percent at wholly owned captives and 2.7 at joint ventures. The change at preferred lenders is not statistically distinguishable from zero.[17]

The lower income of captive borrowers within a market therefore partly reflects the homes they buy, but a decline of more than 3 percent remains among buyers in the same subdivision and quarter.[18] This remaining shift toward lower-income borrowers could arise from lenders' decisions. Captive lenders could have directed larger rate discounts to lower-income borrowers, so that the discount drew in the buyers for whom the monthly payment was most likely to bind. Alternatively, captive lenders could have relaxed their qualification standards and approved applicants whom they would previously have denied.

We first test whether captive lenders targeted the discount by examining whether it varies by borrower income and debt-to-income ratio. We measure income relative to the FFIEC area median and group borrowers into below 80 percent, 80–120 percent, 120–180 percent, and 180 percent or more. For each dimension, we estimate Equation (1) with a separate captive indicator for each group and with group × CBSA × year-quarter fixed effects, so that captive and unaffiliated borrowers are compared within the same market, quarter, and group.

Figure 6 plots the yearly captive discount estimates by group. Panel a shows the rate-spread gap by income band. Lower-income borrowers received larger discounts before rates rose, 0.14 percentage points in the lowest band against 0.06 in the highest in 2018–2021, and the four series rise by similar amounts after 2021, to 0.86 and 0.77 percentage points by 2025. Appendix Table A.12 reports the estimates. On average after 2021, the discount widens by 0.36 to 0.38 percentage points in every band, and the difference in this widening between the lowest and highest bands is 0.001 percentage points with a standard error of 0.033.

Panel b shows the captive discount at each debt-to-income ratio before and after 2021.[19] If discounts were targeted to bring borrowers just below underwriting limits, the gap should

[17] As mentioned earlier, preferred lenders account for a small share of loans, so the estimate is imprecise and insignificant.

[18] Adding the property controls of Table 2 reduces the post-2021 decline within market and quarter from 7.6 to 3.7 percent and leaves the within-subdivision estimate at 3.1 to 3.2 percent, as shown in Appendix Table A.13.

[19] HMDA reports debt-to-income as an exact value between 36 and 49 percent and in ranges outside that interval, as shown in the figure.

be larger for loans that land at 43, 45, or 49 percent than for nearby loans.[20] The figure shows no such pattern. Among conforming loans after 2021, the discount increases modestly from 0.43–0.47 percentage points at ratios of 36–42 percent to 0.48–0.55 at ratios of 43–49 percent, with no discrete increase at the underwriting limits. Among FHA and VA loans, the discount has no systematic relationship with the debt-to-income ratio.

Next, we examine whether captive lenders admitted lower-income buyers by relaxing qualification standards. We estimate Equation (1) with borrower and loan characteristics as dependent variables and, as with income, without loan controls. Table 6 shows the results. Column 2 restates the income result as a share. The share of captive borrowers with income below 80 percent of the area median rises by 4.3 percentage points after 2021 relative to unaffiliated borrowers within market and quarter, and by 1.9 percentage points within subdivision. Columns 3 to 5 turn to the loans. The captive share of loans with a debt-to-income ratio of at least 43 percent in column 5 falls by 2.0 percentage points within market and quarter, and by 3.1 percentage points within subdivision. The shares of FHA and VA loans in column 3 and of loans with a loan-to-value ratio of at least 95 percent in column 4 rise by 1.7 and 3.0 percentage points across the market but do not change within subdivision, so the increase reflects where captive loans are made and not more lenient lending on the same homes. Overall, originated captive loans do not move toward the underwriting limits.

We then turn to the HMDA application sample, which also includes applications that the lender denied and applications that it approved but the applicant did not accept, as described in Section 3.1. Table 7 reports regressions of denial on a captive-lender indicator and its interaction with the post-2021 period. All columns control for loan type, income, loan amount, and loan-to-value, and columns 2, 4, and 6 add debt-to-income. The post-2021 change in the captive denial gap lies between −0.3 and −0.8 percentage points across the six columns, against a mean denial rate of 8.7 percent, and none is statistically significant.[21]

The estimates are similar across income bands, as shown in Appendix Table A.14. Appendix Table A.15 shows one exception. For applications with a debt-to-income ratio of 50 to 60 percent, captive lenders denied 5.7 percentage points more than unaffiliated lenders before 2022, and this difference narrows by 3.1 percentage points afterward, with a standard error of 0.9. Captive lenders remain at least as strict as unaffiliated lenders in this range,

[20] Three values are common thresholds in underwriting. The original qualified-mortgage definition capped the ratio at 43 percent, until a price-based definition became mandatory in October 2022. Fannie Mae and Freddie Mac allow a ratio of up to 45 percent on manually underwritten loans, and Fannie Mae's automated underwriting system allows up to 50 percent.

[21] We exclude KBHS Home Loans from the application sample, as mentioned in Section 3.1. Appendix Table A.16 shows the estimates when it is included. The post-2021 change is −1.8 to −2.2 percentage points without lender fixed effects and −1.5 to −1.8 percentage points with them, where it is not statistically significant.

and the change amounts to about 0.6 percentage points of the overall captive denial rate.

Appendix Table A.17 separates denials by the reason the lender reports. Denials for debt-to-income do not change relative to unaffiliated lenders. Denials for other reasons decline by about 0.6 percentage points across captive lenders, but the decline is smaller and not statistically significant within the same lender.

One limitation applies to these estimates. Because applications that are not originated cannot be linked to deeds, as discussed in Section 3.1, the comparison group includes all purchase applicants at unaffiliated lenders in the same markets, and the comparison rests on the loan controls and on the tract $\times$ year and lender fixed effects.

Finally, we quantify how much the discount itself relaxes the payment constraint. For each captive loan, we recompute the monthly payment and the debt-to-income ratio at the rate the borrower would have paid without the discount, which adds back the captive rate gap estimated for the loan's year and loan type. Appendix Table A.18 reports the calculation by year. The rate gap of 0.53 to 0.75 percentage points in 2023 to 2025 lowers the monthly payment by 5.4 to 7.8 percent and the income required to keep the same debt-to-income ratio by 3.1 to 4.3 percent, close to the 3.2 to 3.3 percent decline in captive borrower income within subdivision. At the market rate, an additional 5.4 to 7.3 percent of captive loans would exceed a debt-to-income ratio of 43 percent, 6.1 to 8.4 percent would exceed 45 percent, and 4.5 to 8.6 percent would exceed 50 percent.

In summary, the widening of the captive discount after 2021 was a broad reduction in the rate offered to captive borrowers and was not directed at borrowers with lower incomes or at those closest to an underwriting threshold, and captive lenders did not admit lower-income buyers by loosening their standards. The lower income of captive borrowers is instead consistent with the discount itself, which lowers the payment and the debt-to-income ratio of a given buyer and keeps more captive loans below the common underwriting thresholds.

6.2 Early Delinquency

The previous subsection examines the dimensions of underwriting that public HMDA reports, such as income, loan-to-value, and debt-to-income. Captive lenders could still relax standards on dimensions that public HMDA does not report, such as credit scores, cash reserves, or the documentation of income and employment.[22] We therefore examine loan performance, which reflects borrower quality on all of these dimensions.

A builder that finances its own sales gains from the home sale but bears little of the credit risk of the loan. The captive lender sells the loan to Fannie Mae or Freddie Mac or

[22] All agency lenders verify income, employment, assets, and credit, but a captive lender could still apply these standards more leniently, for example by approving exceptions or accepting weaker documentation.

pools it into Ginnie Mae securities, so credit losses fall mainly on the GSEs, the FHA and VA, and private mortgage insurers.[23] These incentives could also lead captive lenders to approve borrowers whose ability to repay is weak even at the discounted rate. We therefore test whether the captive–unaffiliated delinquency gap increases when the discount begins to widen. We measure delinquency in the first 12 months because early payment problems reflect the borrower's ability to pay at origination rather than later shocks to income or house prices, and because lenders and the agencies use early payment default to judge underwriting quality.

We use the LLMA servicing records linked to new-home deeds described in Section 3.4. The outcome equals one if a loan is 60 or more days delinquent, in foreclosure, or real-estate owned within its first 12 months. We compare captive and unaffiliated loans on new homes sold in the same market and quarter:

$$Y_i = \beta_1 \,\text{Captive}_i + \beta_2 \,\text{Captive}_i \times \text{Post}_i + X_i'\delta + \alpha_{m(i),q(i)} + \tau_{t(i)} + \varepsilon_i, \tag{3}$$

where Y_i is the outcome for loan i in percentage points, Post_i equals one for loans originated in 2022, $\alpha_{m,q}$ are CBSA $\times$ deed-closing-quarter fixed effects as in Equation (1), and τ_t are origination-year fixed effects. X_i contains bins of the credit score, loan-to-value ratio, debt-to-income ratio, the log loan balance at origination, and indicators for the loan program, adjustable rate, term, occupancy, and property type, all from LLMA, together with the property controls of Table 2.

Table 8 reports the estimates. Captive loans become delinquent less often than unaffiliated loans, and the gap does not close as the discount widens. Among new homes sold in the same market and quarter in column 1 of Panel A, captive loans originated before 2022 are 0.95 percentage points less likely to become 60 or more days delinquent within a year, with the outcome mean of 4.45 percent. For loans originated in 2022, when the discount begins to widen, the gap is 1.82 percentage points. The estimated gap remains even after controlling for the note rate. Holding the note rate fixed in column 3, the gaps are 0.87 and 1.90 percentage points. Within the same subdivision and quarter in Panel B, the gaps are 0.71 and 0.87 percentage points and are not statistically significant. We therefore find no evidence that captive lenders used the discount to lend to borrowers who were more likely to

[23] Investors in agency securities are guaranteed timely payment of principal and interest, so security prices reflect prepayment risk and not credit risk. The lender still bears some of the cost of credit risk. On loans sold to Fannie Mae and Freddie Mac, riskier loans are charged higher guarantee fees and loan-level price adjustments at delivery, and the lender can be required to repurchase a loan that is found to breach its representations and warranties, including in reviews triggered by early payment default. On loans in Ginnie Mae securities, the issuer must advance payments to investors while a loan is delinquent and absorbs losses not covered by FHA insurance or the VA guaranty.

fall behind on their payments. This differs from captive lenders of durable-goods manufacturers, which relax lending standards when their products become harder to sell (Xu, 2022), and is in line with the lower default rates of builder-affiliated mortgages in the mid-2000s (Agarwal, 2014; Gartenberg, 2014).

The home-price results in Section 4.3 indicate that captive buyers do not pay a higher price in exchange for the lower rate, so their loan-to-value ratios should not overstate their equity. Loan performance provides additional support. If captive buyers nevertheless held less equity than comparable unaffiliated borrowers, their loans should perform relatively worse where local house-price growth is weak or negative. We find no evidence of this. In column 2 of Panel A, the interaction of captive lending with local price growth over the year after origination is positive, which would mean that captive loans perform relatively better where prices grow more slowly, and it is not statistically significant. The estimate has the same sign and remains insignificant when we hold the note rate fixed in column 4 and within subdivision in Panel B. Because local prices fell for only 4.4 percent of loans, the evidence speaks mainly to slow price growth rather than to price declines.

Overall, captive loans are less likely than unaffiliated loans to become delinquent early, both before and after the discount begins to widen, and they are not more sensitive to weak local price growth. Together with the evidence in Section 6.1, these results indicate that the discount extended credit by lowering its price and not by loosening the standards for obtaining it.

7 Conclusion

When mortgage rates rose after 2021, homebuilders that own lenders used mortgage pricing to support home sales. The captive rate discount widens from 2022 onward and is about twice as large at wholly owned lenders as at joint ventures. Discounts are larger where builders face more competition from rival captive builders and where homes take longer to sell. These rate discounts are not offset by higher home prices. If anything, captive builders cut both mortgage rates and home prices relative to the rest of the market. This evidence suggests that ownership of the lender gives builders an additional margin on which to compete for buyers.

Lower mortgage rates also affect who can buy. Higher market rates restrict purchase lending primarily by pushing borrowers above debt-to-income limits, while a permanently lower rate reduces the payment used to qualify for a mortgage. Consistent with this, after 2021, the incomes of captive borrowers fall by about 3.2 percent relative to those of unaffiliated borrowers in the same subdivision and quarter, close to the reduction in qualifying

income implied by the discount. However, the discount is not concentrated among borrowers near underwriting limits, captive lenders do not appear to ease their approval standards, and their loans do not perform worse during the first year. Captive lenders expand access primarily by lowering the price of credit rather than by relaxing underwriting.

These results have implications for the transmission of monetary policy to housing. A seller that controls the financing of its product can absorb part of an increase in market rates for its own buyers. The same monetary tightening can therefore affect buyers differently depending on whether they purchase a new or existing home and whether the builder has a captive lender. The results also distinguish captive mortgage lending from captive finance in other durable-goods markets. Existing evidence suggests that captive lenders elsewhere relax lending standards when products become harder to sell. Homebuilders' captive lenders instead originate loans under underwriting rules set largely by the agencies to which they sell them.

The growing role of captive finance may also affect competition among homebuilders. The share of financed new-home purchases originated by the selling builder's own lender rises from 31 percent to 53 percent. Large integrated builders may therefore have a financing margin that builders without captive lenders cannot use in the same way. Whether this advantage affects market shares, entry, or industry concentration is an open question.

Several other questions remain unanswered. One is whether loans with larger discounts perform similarly over horizons longer than the first year. Another is whether builders without a captive lender, and unaffiliated lenders, compete through channels that we do not observe, such as free upgrades, temporary buydowns, or adjustable-rate mortgages. A third is how borrowers with below-market rates respond when market rates subsequently fall. As new-home sales and captive lending continue to grow, understanding these effects will become increasingly important for both housing and mortgage markets.

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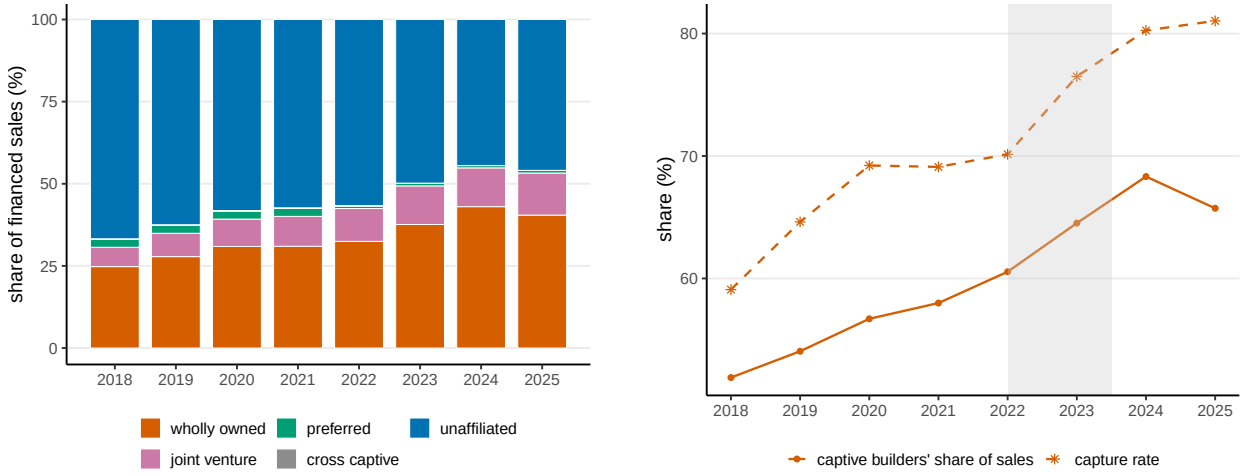


(a) New-home financing channels

(b) Captive builder market share and capture

Figure 1: Growing Captive Lending in New-Home Sales in the Fifty Largest Metros

Notes: This figure shows the trend in captive lending, using the new-home deed sample in the fifty largest metros described in Section 3.2. Panel a plots the share of financed new-home transactions accounted for by each financing channel from 2018 onward. We classify a lender as a wholly owned captive if it is wholly owned by the selling builder, a joint venture if it is a joint venture involving the selling builder, a preferred lender if it is the selling builder's preferred lender, a cross captive if it is affiliated with another builder, and unaffiliated otherwise. Panel b plots the share of new-home sales accounted for by builders with captive lenders and their capture rate, defined as the share of their financed new-home sales originated by their captive lenders, in each year.

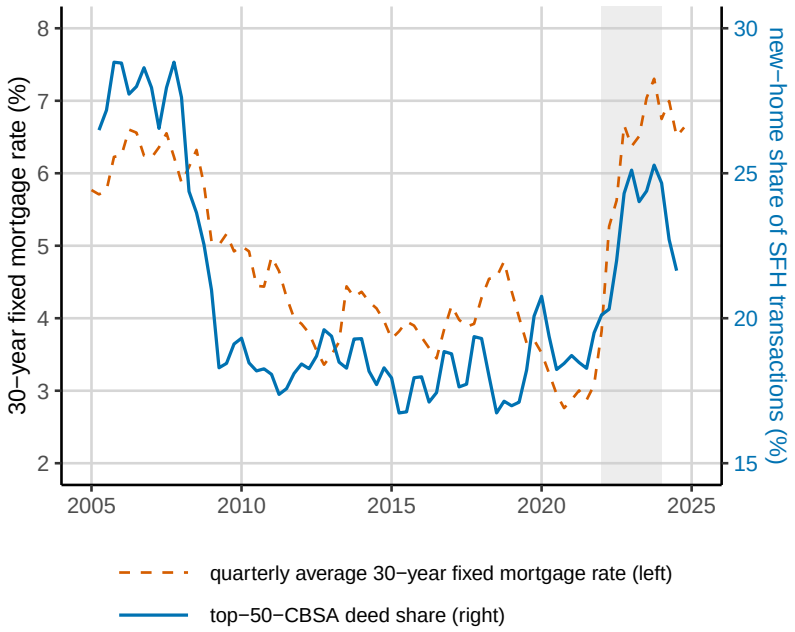
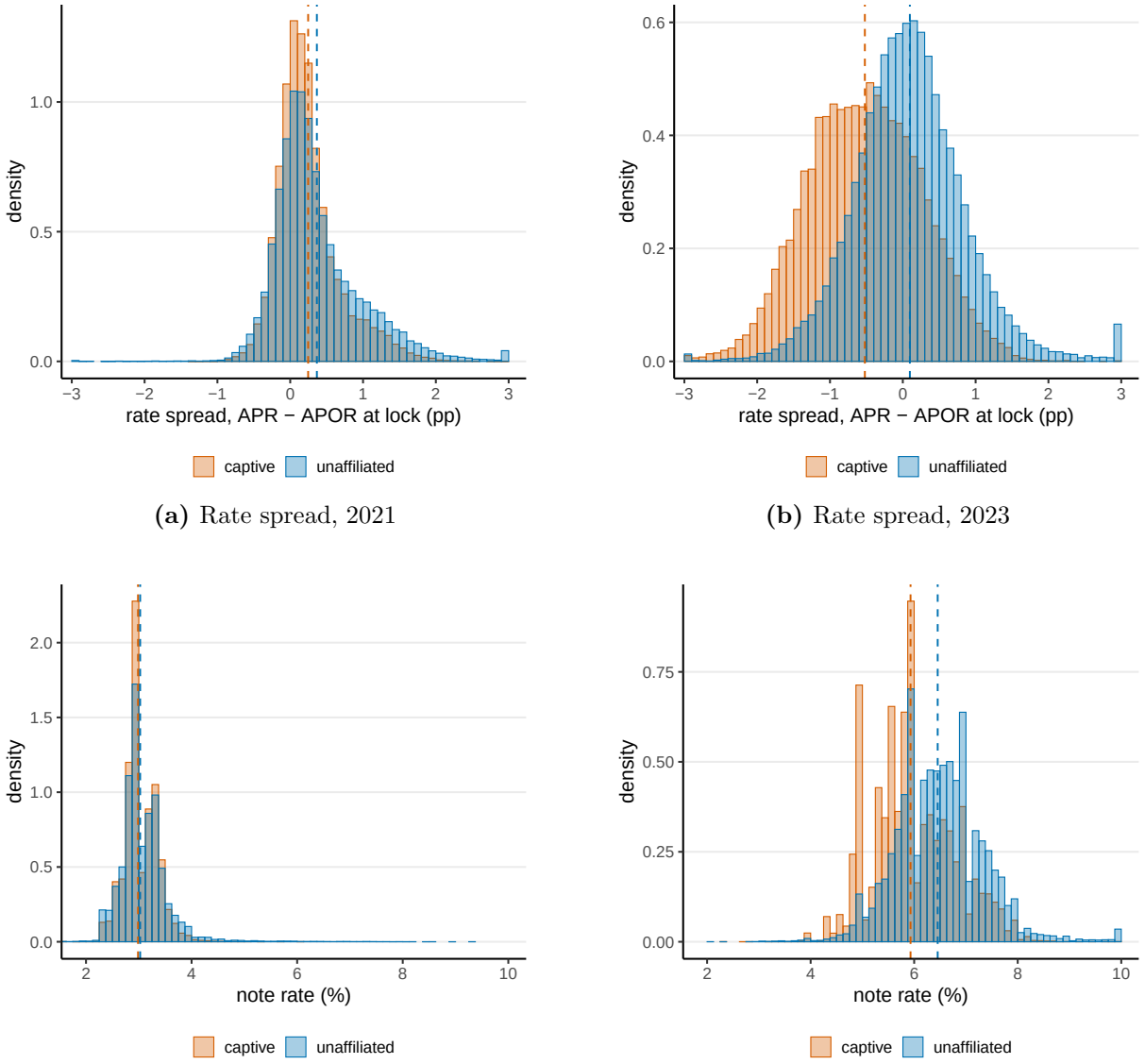


Figure 2: The Rate Shock and the Shift Toward New-Home Transactions

Notes: This figure shows the 30-year fixed mortgage rate and the share of new homes among home sales in the fifty largest metropolitan areas from 2005Q1 to 2024Q4. The dashed line plots the quarterly average of Freddie Mac's weekly 30-year fixed mortgage rate from the Primary Mortgage Market Survey. The solid line plots new-home deeds as a share of new-home deeds and arm's-length resale deeds in each quarter, excluding corporate sellers and buyers where identified, as a centered three-quarter moving average. The shaded area marks 2022Q1–2023Q4.



(a) Rate spread, 2021

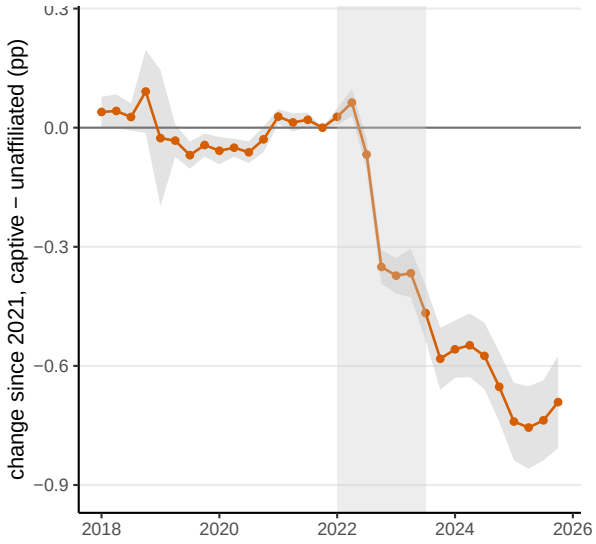
(b) Rate spread, 2023

(c) Note rate, 2021

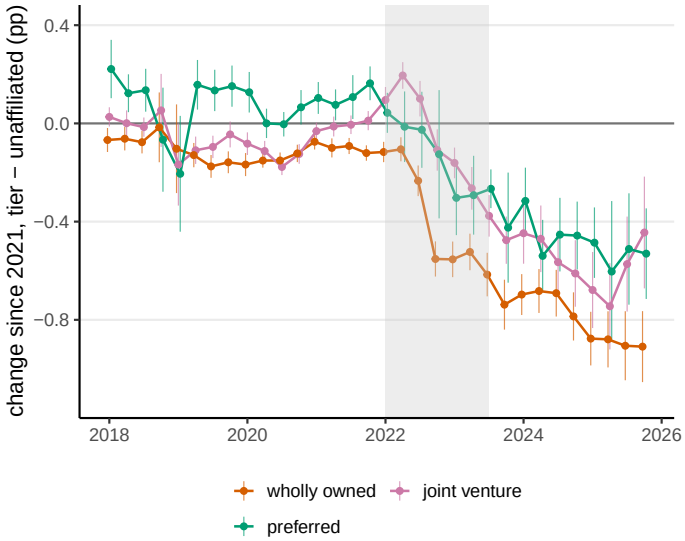
(d) Note rate, 2023

Figure 3: Mortgage Pricing at Captive vs. Unaffiliated Lenders, Before and After the Rate Shock

Notes: This figure shows histograms of mortgage pricing at captive lenders and at unaffiliated lenders in 2021 (left) and 2023 (right). The top row plots the rate spread, defined as the loan's APR minus the average prime offer rate (APOR) at rate lock, in percentage points. The bottom row plots the note rate in percent. The sample is 30-year fixed-rate new-home purchase originations in the matched deed–HMDA sample described in Section 3, restricted to loans at the selling builder's wholly owned or joint-venture lender ("captive") and loans at unaffiliated lenders. Bars are densities within each group, with a bin width of 0.1 percentage points for the rate spread and 0.125 for the note rate. Dashed vertical lines mark group means.



(a) Captive (wholly owned and joint venture)



(b) By degree of integration

Figure 4: The Rate Discount over Time and by Degree of Integration

Notes: This figure plots the quarterly estimates from Equation (1). The dependent variable is the rate spread in percentage points, and the coefficients are estimated on tier × year-quarter indicators with CBSA × year-quarter fixed effects and loan and property controls using the matched new-home deed–HMDA sample of 30-year fixed-rate loans. Panel a pools wholly owned and joint venture lenders and plots the captive–unaffiliated spread gap in each quarter relative to 2021Q4. Panel b reports wholly owned, joint venture, and preferred lenders, separately and plots the level of each tier's gap relative to unaffiliated lending in the same CBSA and quarter. Vertical bars report 95% confidence intervals based on standard errors clustered by CBSA.

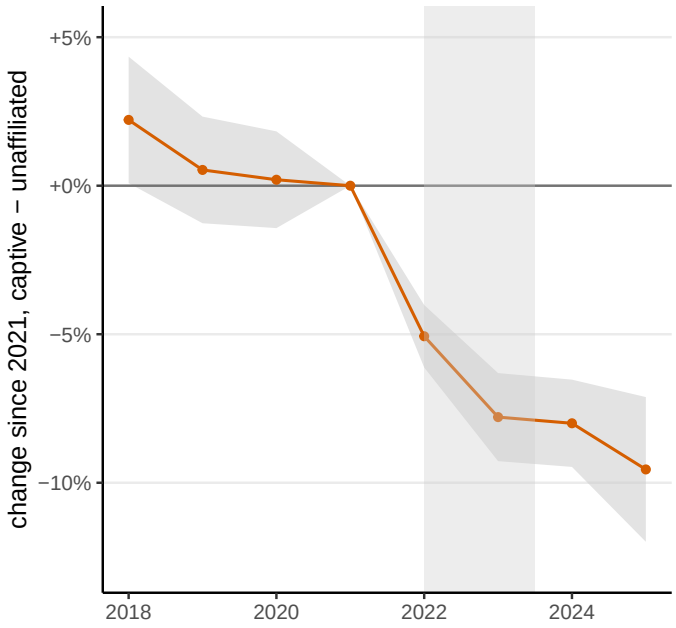
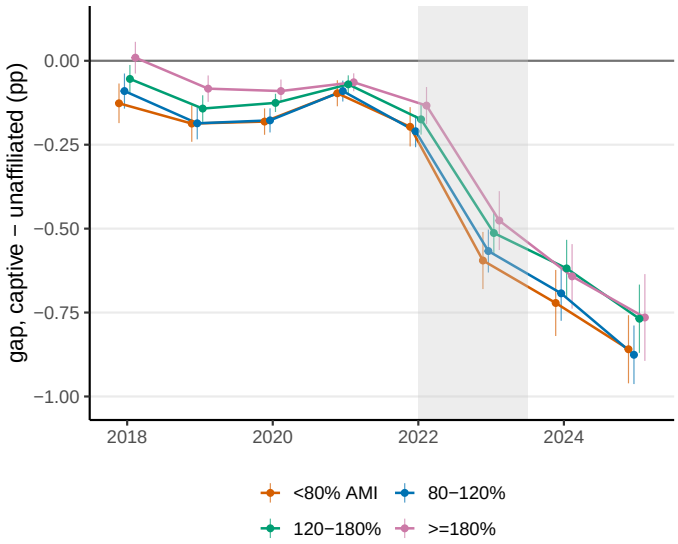
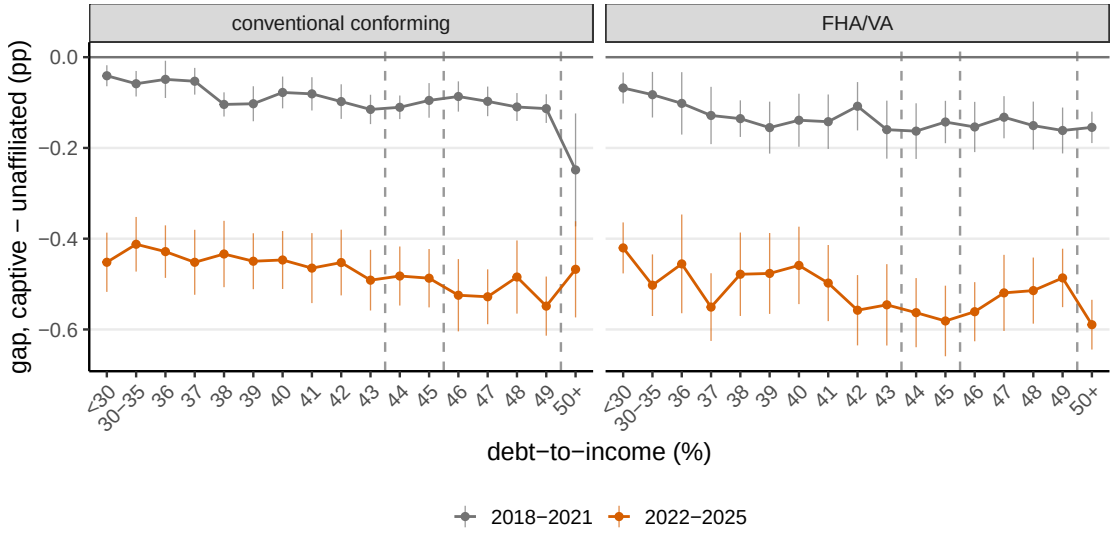


Figure 5: Borrower Income at Captive and Unaffiliated Lenders

Notes: This figure plots yearly estimates from Equation (1) with log borrower income as the dependent variable, CBSA × year-quarter fixed effects, and no controls, using the matched new-home deed–HMDA sample of 30-year fixed-rate loans. Captive pools wholly owned and joint-venture lenders. The figure plots the captive–unaffiliated income gap in each year relative to 2021. The shaded band reports 95% confidence intervals based on standard errors clustered by CBSA.



(a) By borrower income



(b) By debt-to-income ratio

Figure 6: The Captive Discount by Borrower Income and Debt-to-Income Ratio

Notes: This figure plots the captive–unaffiliated rate-spread gap, in percentage points, using the matched new-home deed–HMDA sample of 30-year fixed-rate loans. Captive pools wholly owned and joint-venture lenders. Panel a plots yearly estimates by borrower income band, defined relative to the FFIEC area median family income, from a specification with income band × CBSA × year-quarter fixed effects and the loan and property controls of Table 2. Panel b plots estimates for 2018–2021 and 2022–2025 by reported debt-to-income value, separately for conforming conventional and FHA and VA loans, from a specification with debt-to-income value × CBSA × year-quarter fixed effects and the same controls other than debt-to-income. Dashed vertical lines mark 43, 45, and 50 percent. Vertical bars report 95% confidence intervals based on standard errors clustered by CBSA.

Table 1: Summary Statistics by Financing Channel

	Wholly owned (1)	Joint venture (2)	Preferred (3)	Unaffiliated (4)
Panel A. 2018–2021				
Rate spread (pp)	0.23	0.32	0.59	0.40
Note rate (%)	3.42	3.41	3.57	3.50
Non-borrower-paid points, lower bound ($)	378	55	82	75
Borrower-paid charges ($)	1,491	2,323	1,784	2,118
FHA or VA share	0.26	0.28	0.42	0.32
Median income ($000)	105	105	84	101
Median loan amount ($000)	335	345	275	325
Median sale price ($000)	409	404	304	379
Loans	103,557	24,713	6,961	194,746
Panel B. 2022–2025				
Rate spread (pp)	−0.50	−0.24	−0.10	0.16
Note rate (%)	5.44	5.56	5.52	5.79
Non-borrower-paid points, lower bound ($)	3,704	3,706	1,694	825
Borrower-paid charges ($)	2,442	4,071	4,385	5,016
FHA or VA share	0.30	0.35	0.42	0.34
Median income ($000)	125	122	115	128
Median loan amount ($000)	395	395	375	405
Median sale price ($000)	486	469	437	486
Loans	137,614	38,680	4,475	194,162

Notes: This table summarizes the 704,908 30-year fixed-rate loans in the matched deed–HMDA sample originated from 2018 through 2025 by wholly owned, joint-venture, preferred, and unaffiliated lenders, as defined in Section 3.3. The first five rows are means. Rate spread is the loan's APR minus APOR at rate lock. Non-borrower-paid points equal $\max\{\text{discount points} - \text{borrower-paid origination charges}, 0\}$ in dollars, a lower bound on points paid by the builder or the lender, and exclude loans with blank origination charges. Blank discount-point fields are coded as zero. Loan amounts use the midpoints of HMDA's $10,000 bins.

Table 2: The Rate-Spread Discount by Builder–Lender Affiliation

Panel A: Captive (wholly owned and joint venture) vs. unaffiliated

	(1)	(2)	(3)	(4)	(5)
Captive	-0.105***	-0.120***	-0.124***	-0.104***	-0.109***
	(0.015)	(0.017)	(0.015)	(0.015)	(0.015)
Captive x Post	-0.378***	-0.375***	-0.333***	-0.335***	-0.338***
	(0.020)	(0.021)	(0.024)	(0.028)	(0.030)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	677,875	665,675	632,060	432,025	428,005
R2	0.412	0.441	0.519	0.623	0.632
Outcome mean	0.088	0.084	0.075	0.106	0.104

Panel B: By degree of integration

	(1)	(2)	(3)	(4)	(5)
Wholly owned	-0.118***	-0.138***	-0.144***	-0.125***	-0.127***
	(0.017)	(0.019)	(0.019)	(0.019)	(0.020)
Joint venture	-0.051***	-0.086***	-0.050***	-0.031**	-0.043***
	(0.016)	(0.017)	(0.011)	(0.014)	(0.013)
Preferred lender	0.104***	0.046**	0.022	0.028	-0.008
	(0.025)	(0.019)	(0.028)	(0.030)	(0.030)
Wholly owned x Post	-0.426***	-0.418***	-0.376***	-0.398***	-0.393***
	(0.025)	(0.027)	(0.031)	(0.036)	(0.037)
Joint venture x Post	-0.217***	-0.217***	-0.202***	-0.180***	-0.191***
	(0.038)	(0.036)	(0.033)	(0.050)	(0.049)
Preferred lender x Post	-0.358***	-0.262***	-0.222***	-0.240***	-0.196***
	(0.060)	(0.036)	(0.049)	(0.046)	(0.038)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	689,242	677,042	643,531	440,813	436,773
R2	0.419	0.445	0.522	0.627	0.634
Outcome mean	0.092	0.088	0.080	0.111	0.109

Notes: This table reports the pooled version of Equation (1). The dependent variable is the rate spread to APOR, in percentage points, on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Captive in Panel A pools wholly owned and joint-venture lenders. Post is an indicator for closings from 2022 onward. Loan controls are log income, log loan amount, loan-class indicators, and bins of loan-to-value and debt-to-income. Property controls are log square feet, bedrooms, bathrooms, log lot size, and a detached single-family indicator, each with a missing-value indicator. Columns (4) and (5) are estimated on the subsample of deeds with an identified subdivision. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 3: Sales Prices by Financing Channel, Mortgage Rate, and Builder Type

Panel A: Price by financing channel

	(1)	(2)	(3)	(4)	(5)
Captive	-0.001	0.027***	0.011***	0.000	0.005
	(0.009)	(0.004)	(0.004)	(0.004)	(0.003)
Captive x Post	-0.020***	-0.024***	0.002	0.001	0.004
	(0.006)	(0.005)	(0.003)	(0.003)	(0.002)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	555,399	546,458	521,119	348,440	345,557
R2	0.746	0.813	0.843	0.928	0.936
Outcome mean	13.022	13.020	13.016	12.990	12.991

Panel B: Price and rate spread among captive loans

	Rate spread		Note rate	
	(1)	(2)	(3)	(4)
Rate x Pre	-0.012***	-0.013***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.002)	(0.001)
Rate x Post	-0.001	-0.002	0.003*	0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Subdivision x quarter	Yes	Yes	Yes	Yes
Lender		Yes		Yes
Observations	173,723	173,722	173,723	173,722
R2	0.937	0.938	0.937	0.938
Outcome mean	13.023	13.023	13.023	13.023

Panel C: Price by builder type

	(1)	(2)	(3)	(4)	(5)
Captive builder	-0.003	0.000	0.008	0.003	0.082*
	(0.015)	(0.009)	(0.018)	(0.018)	(0.048)
Captive builder x Post	-0.046***	-0.035***	-0.018	-0.014	-0.072**
	(0.007)	(0.007)	(0.011)	(0.011)	(0.032)
CBSA x quarter	Yes				
Tract x quarter		Yes			
Subdivision x quarter			Yes	Yes	Yes
Observations	1,438,214	1,388,028	252,158	224,090	21,108
R2	0.642	0.835	0.811	0.849	0.725
Outcome mean	12.955	12.949	12.870	12.868	12.900

Notes: The table reports regressions of log sales price on captive financing, which pools wholly owned and joint-venture lenders, in Panel A, on the loan's own mortgage rate among captive loans in Panel B, and on an indicator for captive builders in Panel C. Panel A uses unaffiliated loans as the comparison group, and Panel B enters the rate spread in columns 1–2 and the note rate in columns 3–4, in percentage points, separately before 2022 and from 2022 onward. Panel C uses all priced new-home deeds including cash sales by captive vs non-captive builders. Controls are the property controls in Table 2, plus log borrower income in Panels A and B and loan-class indicators in Panel B. Standard errors clustered by CBSA are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 4: The Captive Discount and Local Selling Conditions

Panel A: Market conditions before 2022

	Rate spread			log sales price		
Regressor × Post	(1)	(2)	(3)	(4)	(5)	(6)
Captive-builder exposure	-0.429***	-0.413***	-0.445***	0.030	0.012	0.027
	(0.101)	(0.112)	(0.126)	(0.038)	(0.039)	(0.047)
Lock-in		0.024	0.028		-0.027***	-0.027***
		(0.027)	(0.029)		(0.009)	(0.009)
Large unaff. lender share			-0.255			0.005
			(0.260)			(0.065)
Large unaff. builder share			-0.374*			0.105
			(0.208)			(0.080)
Observations	300,602	300,602	300,602	270,186	270,186	270,186
R^2	0.566	0.566	0.566	0.815	0.815	0.815

Panel B: Time-varying selling conditions

	Rate spread		log sales price	
	(1)	(2)	(3)	(4)
ZIP DOM (10 days)	-0.0143**		0.0011	
	(0.0060)		(0.0032)	
ZIP DOM × Post	-0.0213**		-0.0039	
	(0.0105)		(0.0032)	
Sale rank		-0.0189***		0.0087
		(0.0054)		(0.0078)
Sale rank × Post		0.0062		-0.0005
		(0.0132)		(0.0104)
Observations	299,710	210,287	269,658	184,442
R^2	0.565	0.590	0.815	0.817

Notes: The table reports Equation (2). The sample is 30-year fixed-rate loans in the matched new-home deed–HMDA sample, 2018–2025, financed by the captive lender on homes sold by builders whose wholly owned or joint-venture lenders finance at least 100 matched loans over 2018–2025. The dependent variable is the rate spread, in percentage points, in columns (1) to (3) of Panel A and columns (1) and (2) of Panel B, and the log sales price in the remaining columns. Panel A reports market conditions measured before 2022 interacted with Post, an indicator for closings from 2022 onward. Exposure is captive-holding builders' share of the CBSA's 2018–2021 new-home sales, excluding the selling builder's own sales from both the numerator and denominator. Lock-in is the December 2021 prevailing 30-year mortgage rate minus the average coupon on eligible outstanding owner-occupied fixed-rate first-lien mortgages in the CBSA, standardized across CBSAs. Large unaffiliated lender share is the share of the CBSA's 2018–2021 unaffiliated purchase originations written by the 25 largest national unaffiliated lenders, and large unaffiliated builder share is the share of the CBSA's new-home sales sold by the 50 largest builder families outside the captive-holding group, excluding the selling builder. Panel B reports selling conditions that vary over time and their interactions with Post. ZIP days on market is the average over the previous quarter of the monthly median days on market from Realtor.com, in units of 10 days. Sale rank runs from 0 for the first observed closing to 1 for the last within each builder × subdivision, for groups with at least 10 sales on at least two dates. All columns include builder × CBSA and builder × year-quarter fixed effects and the loan and property controls of Table 2. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 5: Borrower Income by Builder–Lender Affiliation

Panel A: Captive (wholly owned and joint venture) vs. unaffiliated

	(1)	(2)	(3)	(4)	(5)
Captive	-0.001	0.042***	0.017**	-0.007	0.001
	(0.012)	(0.008)	(0.007)	(0.005)	(0.006)
Captive x Post	-0.076***	-0.072***	-0.037***	-0.032***	-0.033***
	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	687,292	674,955	640,841	438,588	434,486
R2	0.138	0.285	0.333	0.535	0.545
Outcome mean	4.762	4.760	4.753	4.731	4.731

Panel B: By degree of integration

	(1)	(2)	(3)	(4)	(5)
Wholly owned	-0.000	0.047***	0.018**	-0.007	0.000
	(0.013)	(0.010)	(0.008)	(0.005)	(0.005)
Joint venture	-0.003	0.027**	0.013*	-0.007	0.004
	(0.015)	(0.010)	(0.008)	(0.009)	(0.011)
Preferred lender	-0.115***	-0.016	-0.007	0.032**	0.015
	(0.020)	(0.010)	(0.017)	(0.015)	(0.015)
Wholly owned x Post	-0.074***	-0.075***	-0.040***	-0.034***	-0.035***
	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Joint venture x Post	-0.084***	-0.060***	-0.028***	-0.023**	-0.027***
	(0.020)	(0.014)	(0.010)	(0.009)	(0.008)
Preferred lender x Post	0.049	0.014	0.007	-0.033	-0.018
	(0.031)	(0.016)	(0.019)	(0.022)	(0.021)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	698,683	686,346	652,323	447,422	443,300
R2	0.139	0.286	0.335	0.536	0.546
Outcome mean	4.759	4.756	4.750	4.727	4.727

Notes: The table reports the pooled version of Equation (1) with log borrower income as the dependent variable, on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Captive in Panel A pools wholly owned and joint-venture lenders. Post is an indicator for closings from 2022 onward. No controls are included. Columns follow Table 2. Columns (4) and (5) are estimated on the subsample of deeds with an identified subdivision. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 6: Borrower and Loan Characteristics at Captive Lenders

Panel A: Within CBSA and quarter

	(1)	(2)	(3)	(4)	(5)
	Log income	Below 80% AMI	FHA/VA	LTV>=95	DTI>=43
Captive	-0.001	-0.025***	-0.059***	-0.107***	-0.002
	(0.012)	(0.007)	(0.009)	(0.011)	(0.006)
Captive x Post	-0.076***	0.043***	0.017***	0.030***	-0.020***
	(0.008)	(0.006)	(0.006)	(0.006)	(0.004)
CBSA x quarter	Yes	Yes	Yes	Yes	Yes
Observations	687,292	687,292	693,453	684,206	691,524
R2	0.138	0.031	0.047	0.044	0.041
Outcome mean	4.762	0.162	0.312	0.372	0.403

Panel B: Within subdivision and quarter

	(1)	(2)	(3)	(4)	(5)
	Log income	Below 80% AMI	FHA/VA	LTV>=95	DTI>=43
Captive	0.001	-0.009	-0.072***	-0.116***	-0.038***
	(0.006)	(0.005)	(0.006)	(0.009)	(0.005)
Captive x Post	-0.033***	0.019***	0.002	0.002	-0.031***
	(0.006)	(0.005)	(0.007)	(0.006)	(0.007)
Subdivision x quarter	Yes	Yes	Yes	Yes	Yes
Builder	Yes	Yes	Yes	Yes	Yes
Observations	434,486	434,486	438,925	432,566	437,552
R2	0.545	0.366	0.351	0.364	0.282
Outcome mean	4.731	0.167	0.317	0.377	0.403

Notes: The table reports the pooled version of Equation (1) with borrower and loan characteristics as dependent variables, on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Column (1) is log borrower income. Column (2) is an indicator for income below 80 percent of the FFIEC area median family income. Column (3) is an indicator for an FHA or VA loan. Column (4) is an indicator for a loan-to-value ratio of at least 95 percent. Column (5) is an indicator for a debt-to-income ratio of at least 43 percent. Captive pools wholly owned and joint-venture lenders, and unaffiliated lending is the omitted category. Post is an indicator for closings from 2022 onward. Panel A includes CBSA × year-quarter fixed effects. Panel B includes subdivision × year-quarter and builder fixed effects and uses deeds with an identified subdivision. No controls are included, since the outcomes are themselves borrower and loan characteristics. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 7: Denial of Mortgage Applications at Captive Lenders

	(1)	(2)	(3)	(4)	(5)	(6)
Captive	2.261***	0.402	1.951***	0.245		
	(0.382)	(0.319)	(0.390)	(0.307)		
Captive x Post	-0.528	-0.427	-0.788	-0.505	-0.497	-0.322
	(0.452)	(0.342)	(0.487)	(0.369)	(0.837)	(0.682)
CBSA x year	Yes	Yes				
Tract x year			Yes	Yes	Yes	Yes
Lender					Yes	Yes
DTI control		Yes		Yes		Yes
Observations	15,055,581	15,023,587	15,046,295	15,014,358	15,046,098	15,014,166
R2	0.028	0.194	0.061	0.220	0.102	0.249
Outcome mean	8.753	8.699	8.745	8.691	8.745	8.691

Notes: The table reports regressions of an indicator for denial, multiplied by 100, on a captive-lender indicator and its interaction with Post, an indicator for applications from 2022 onward. The sample is HMDA purchase applications in the 50 markets, 2018–2025, that ended in an origination, an approval not accepted, or a denial. Captive pools wholly owned and joint-venture lenders, and unaffiliated lenders are the omitted category. All columns control for loan type, log income, log loan amount, and loan-to-value bins. Columns (2), (4), and (6) add debt-to-income bins. Columns (1) and (2) include CBSA × year fixed effects, columns (3) and (4) tract × year fixed effects, and columns (5) and (6) tract × year and lender fixed effects, which absorb the captive level. Standard errors, clustered by CBSA in columns (1) to (4) and by lender in columns (5) and (6), in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 8: Early Delinquency at Captive and Unaffiliated Lenders

	(1)	(2)	(3)	(4)
Panel A: CBSA × quarter fixed effects				
Captive	−0.950***	−1.043***	−0.866***	−0.946***
	(0.312)	(0.307)	(0.305)	(0.300)
Captive × Post	−0.872*	−0.520	−1.030*	−0.724
	(0.514)	(0.568)	(0.536)	(0.591)
Captive × ΔHPI		4.302		3.715
		(2.904)		(2.866)
ΔHPI		−3.029		−2.347
		(3.144)		(3.063)
Mean of dep. var. (%)	4.45	4.45	4.45	4.45
Observations	50,180	50,180	50,180	50,180
R^2	0.109	0.109	0.112	0.112
Panel B: Subdivision × quarter and builder fixed effects				
Captive	−0.709	−1.078	−0.738	−1.097
	(0.939)	(1.025)	(0.908)	(0.991)
Captive × Post	−0.162	1.090	−0.244	0.974
	(1.424)	(1.478)	(1.409)	(1.458)
Captive × ΔHPI		12.628		12.303
		(8.420)		(8.531)
Mean of dep. var. (%)	4.44	4.44	4.44	4.44
Observations	29,502	29,502	29,502	29,502
R^2	0.369	0.369	0.371	0.371
Note-rate bins (0.125 pp)	No	No	Yes	Yes
Origination year FE	Yes	Yes	Yes	Yes
Loan, property, DTI controls	Yes	Yes	Yes	Yes

Notes: This table reports Equation (3). The dependent variable is an indicator for 60 or more days delinquent, foreclosure, or REO within 12 months of origination, in percentage points. The sample is the LLMA loans linked to new-home deeds and originated from 2018 through 2022, with an observed debt-to-income ratio and a ZIP-code price change. LLMA payment status ends in January 2024, so 2022 is the last cohort with a complete 12-month window. Captive pools wholly owned and joint-venture lenders. The comparison group is unaffiliated banks and independent mortgage companies. Post is an indicator for loans originated in 2022. ΔHPI is the growth rate of the FHFA ZIP-code house price index from the origination year to the following year, demeaned. Panel A includes CBSA × year-quarter fixed effects. Panel B includes subdivision × year-quarter and builder fixed effects. Within each panel, all columns use the same loans. Columns (3) and (4) add indicators for 0.125-percentage-point bins of the note rate. Loan controls are bins of the credit score, loan-to-value ratio, and debt-to-income ratio, log loan balance, and indicators for loan program, adjustable rate, term, occupancy, and property type. Property controls are those of Table 2. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Appendix for

"Who Sells the Rate?"

A Supplementary Tables and Figures

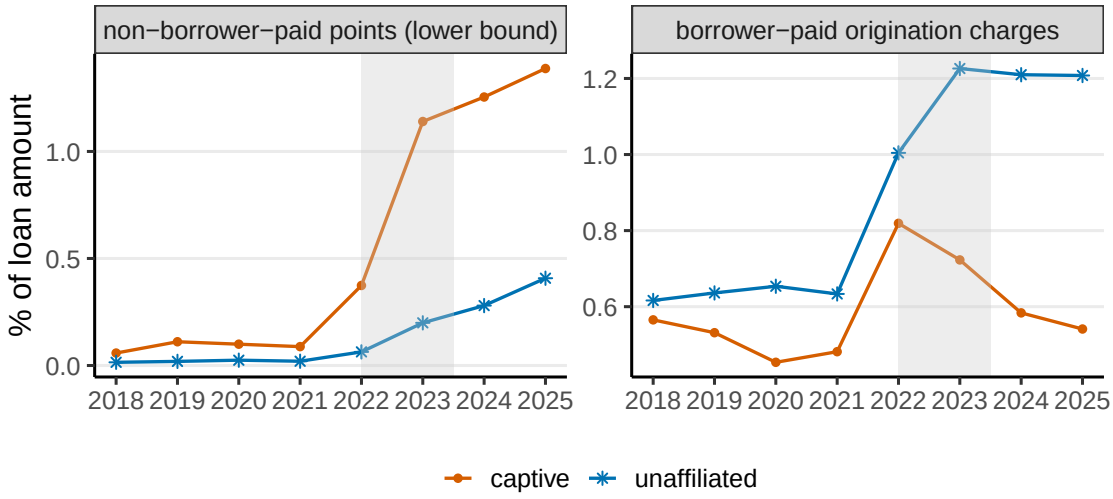


Figure A.1: Non-Borrower-Paid Points and Borrower-Paid Charges by Year

Notes: Annual means of the first and fourth columns of Table A.6, in percent of the loan amount, for captive (wholly owned and joint-venture) and unaffiliated lenders. The left panel is discount points in excess of borrower-paid origination charges, a lower bound on points paid by the builder or lender; the right panel is borrower-paid origination charges, which include any points the borrower paid. The panels use separate vertical scales.

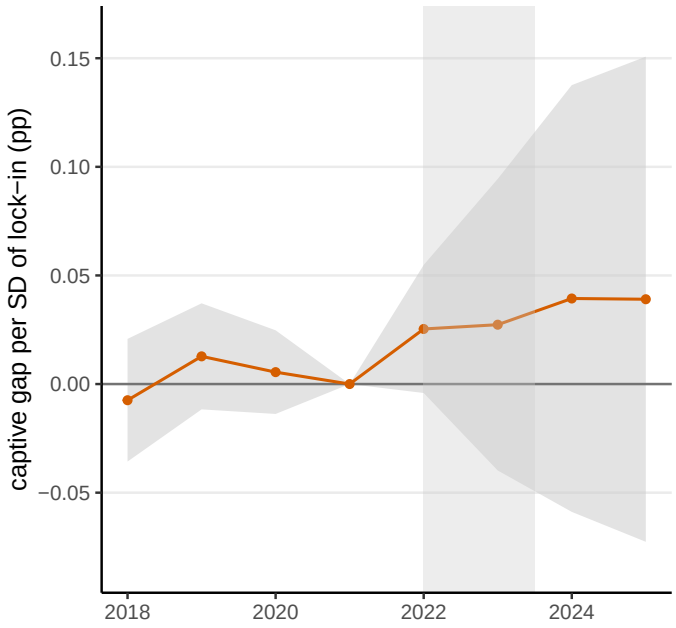


Figure A.2: The Captive Discount per Standard Deviation of Lock-in, by Year

Notes: Yearly coefficients on captive × lock-in from a version of the specification in Table A.10, column (1), in which the captive indicator and its product with lock-in each enter interacted with year indicators, with CBSA × year-quarter fixed effects and the loan and property controls of Table 2. Each point is the change in the captive–unaffiliated rate-spread gap per standard deviation of the December 2021 CBSA rate gap, in percentage points, relative to 2021. Vertical bars report 95% confidence intervals based on standard errors clustered by CBSA.

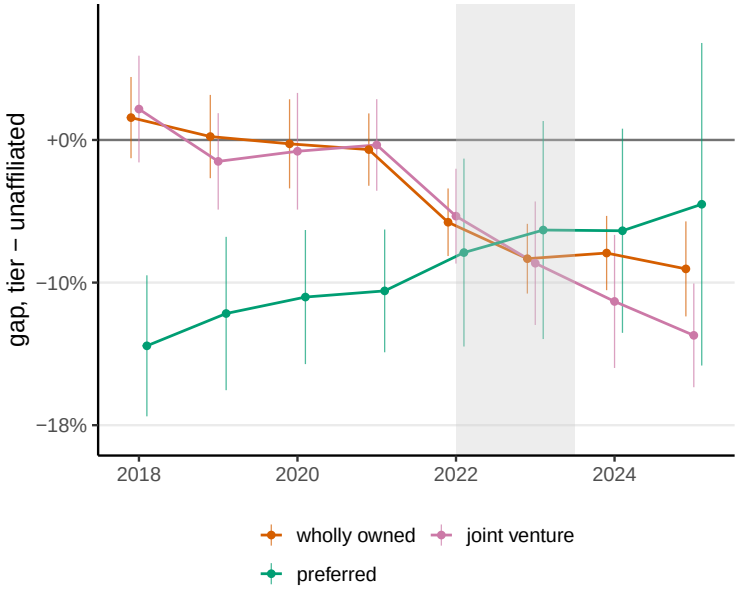


Figure A.3: Borrower Income by Degree of Integration

Notes: This figure plots yearly estimates from Equation (1) with log borrower income as the dependent variable, CBSA × year-quarter fixed effects, and no controls, separately for wholly owned, joint-venture, and preferred lenders. Each series is the level of the tier's income gap relative to unaffiliated lending in the same CBSA and quarter. Vertical bars report 95% confidence intervals based on standard errors clustered by CBSA.

Table A.1: Summary Statistics by Financing Channel, All Loan Products

	Wholly owned (1)	Joint venture (2)	Preferred (3)	Unaffiliated (4)
Panel A. 2018–2021				
Rate spread (pp)	0.23	0.32	0.58	0.38
Note rate (%)	3.40	3.39	3.55	3.49
Non-borrower-paid points, lower bound ($)	372	56	82	71
Borrower-paid charges ($)	1,491	2,312	1,786	2,106
FHA or VA share	0.24	0.27	0.41	0.28
Median income ($000)	107	106	85	105
Median loan amount ($000)	335	335	275	335
Median sale price ($000)	412	406	306	386
30-year fixed share	0.92	0.94	0.96	0.89
Adjustable-rate share	0.02	0.01	0.00	0.05
Loans	112,710	26,291	7,288	217,654
Panel B. 2022–2025				
Rate spread (pp)	−0.48	−0.24	−0.09	0.14
Note rate (%)	5.41	5.52	5.51	5.70
Non-borrower-paid points, lower bound ($)	3,689	3,979	1,649	751
Borrower-paid charges ($)	2,477	4,073	4,318	4,802
FHA or VA share	0.28	0.34	0.40	0.29
Median income ($000)	126	123	117	135
Median loan amount ($000)	395	395	385	415
Median sale price ($000)	492	472	442	504
30-year fixed share	0.93	0.92	0.94	0.85
Adjustable-rate share	0.03	0.05	0.03	0.11
Loans	147,661	42,196	4,763	229,050

Notes: As Table 1, for the 787,613 matched loans of all products, which add adjustable-rate and other fixed-rate loans to the 30-year fixed-rate sample. The two additional rows are the shares of 30-year fixed-rate and adjustable-rate loans.

Table A.2: Summary Statistics of the HMDA Application Sample

	Captive (1)	Unaffiliated (2)
Panel A. 2018–2021		
Denial rate (%)	11.0	8.7
Approved, not accepted (%)	2.6	2.7
FHA or VA share	0.37	0.28
Median income ($000)	95	90
Median loan amount ($000)	295	285
Median loan-to-value ratio (%)	94	91
Share with DTI of 43 or above	0.43	0.35
Share below 80% of area median income	0.20	0.29
Lenders	46	4,179
Applications	584,871	8,401,887
Panel B. 2022–2025		
Denial rate (%)	11.8	9.2
Approved, not accepted (%)	2.9	2.9
FHA or VA share	0.45	0.27
Median income ($000)	112	120
Median loan amount ($000)	365	365
Median loan-to-value ratio (%)	95	90
Share with DTI of 43 or above	0.54	0.44
Share below 80% of area median income	0.23	0.26
Lenders	47	3,845
Applications	738,788	6,076,091

Notes: The sample is the 15.8 million HMDA purchase applications in the fifty CBSAs from 2018 through 2025 that ended in an origination, an approval that the applicant did not accept, or a denial, excluding KBHS Home Loans. A lender is captive when it is wholly owned by a builder or is a builder's joint venture, and all other lenders are unaffiliated. The denial rate and the share approved but not accepted are in percent of applications. DTI is the debt-to-income ratio. Shares are computed among applications with a nonmissing value.

Table A.3: Summary Statistics of the LLMA Delinquency Sample

	2018–2021		2022	
	Captive (1)	Unaffiliated (2)	Captive (3)	Unaffiliated (4)
First-year delinquency (%)	4.70	4.50	3.11	3.62
Mean note rate (%)	3.58	3.43	4.47	4.46
FHA or VA share (%)	43.9	31.3	40.8	27.2
Median credit score	741	752	741	759
Median loan amount ($000)	316	336	357	430
Median loan-to-value ratio (%)	94.0	90.0	90.0	82.3
Median debt-to-income ratio (%)	39.9	38.0	40.2	40.0
Loans	33,216	9,313	4,919	2,732

Notes: This table summarizes the 50,180 loans in the common estimation sample used in Panel A of Table 8. Loans are linked to new-home deeds and originated from 2018 through 2022. Captive lenders are wholly owned by the selling builder or are its joint ventures. Unaffiliated lenders are banks and independent mortgage companies. First-year delinquency is the percentage of loans that become 60 or more days delinquent, enter foreclosure, or become real-estate owned within 12 months of origination. The statistics are unadjusted. Credit scores, loan amounts, loan-to-value ratios, and debt-to-income ratios are measured at origination. LLMA payment status ends in January 2024, so 2022 is the last cohort with a complete 12-month observation window.

Table A.4: Robustness of the Captive Discount

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	baseline	R1 matches	no hedonics	pre-determined	program ctrls	program x builder	product: all
Captive	-0.105***	-0.118***	-0.109***	-0.157***	-0.088***	-0.110***	-0.107***
	(0.015)	(0.018)	(0.015)	(0.019)	(0.013)	(0.015)	(0.014)
Captive x Post	-0.378***	-0.399***	-0.377***	-0.371***	-0.398***	-0.380***	-0.352***
	(0.020)	(0.026)	(0.020)	(0.021)	(0.021)	(0.022)	(0.022)
CBSA x quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Builder x LLPA waiver						Yes	
Builder x FHA MIP cut						Yes	
Observations	677,875	446,973	677,875	687,292	677,875	663,127	757,432
R2	0.412	0.455	0.412	0.267	0.435	0.469	0.378
Outcome mean	0.088	0.058	0.088	0.090	0.088	0.084	0.085

Notes: Each column re-estimates column (1) of Table 2, Panel A, with CBSA × year-quarter fixed effects. *Baseline* repeats that column. *R1 matches* keeps deed–loan pairs matched on tract, loan amount, sales price, and lender name. *No hedonics* drops the property controls. *Pre-determined* drops log loan amount and the LTV and DTI bins. *Program ctrls* adds indicators for FHA loans closing after the March 2023 premium cut and for loans eligible for the first-time-buyer LLPA waiver, each interacted with Post; *program* × *builder* interacts these indicators with builder fixed effects. The last column adds adjustable-rate and non-30-year loans with indicators for both. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.5: Sales Prices by Degree of Integration

	(1)	(2)	(3)	(4)	(5)
Wholly owned	0.001	0.031***	0.013***	0.002	0.005*
	(0.009)	(0.004)	(0.004)	(0.004)	(0.003)
Joint venture	-0.012	0.013*	0.001	-0.007	0.005
	(0.010)	(0.007)	(0.006)	(0.007)	(0.006)
Preferred lender	-0.055***	-0.016**	-0.006	0.006	0.004
	(0.012)	(0.006)	(0.008)	(0.004)	(0.005)
Wholly owned x Post	-0.020***	-0.026***	0.001	0.002	0.004
	(0.006)	(0.005)	(0.004)	(0.004)	(0.003)
Joint venture x Post	-0.020**	-0.019**	0.006	0.001	0.001
	(0.008)	(0.009)	(0.004)	(0.008)	(0.005)
Preferred lender x Post	0.033	0.030***	0.005	-0.006	-0.009
	(0.021)	(0.011)	(0.009)	(0.007)	(0.007)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	566,177	557,236	531,987	356,745	353,842
R2	0.747	0.814	0.844	0.929	0.936
Outcome mean	13.018	13.016	13.012	12.985	12.985

Notes: As Panel A of Table 3, with wholly owned, joint-venture and preferred lenders entered separately; unaffiliated lending is the omitted category. Columns follow Table 2: (1) CBSA × year-quarter fixed effects; (2) adds builder fixed effects; (3) builder × CBSA × year-quarter; (4) subdivision × year-quarter; (5) adds builder fixed effects to (4). Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.6: Points, Credits, and Charges by Year

year	side	n	non-borrower-paid (lower bound)	points not attributed	lender credits	borrower-paid charges	lower bound ($)
2018	captive	21,387	0.06	0.30	0.09	0.57	192
2018	unaffiliated	39,079	0.01	0.21	0.26	0.62	52
2019	captive	23,687	0.11	0.27	0.12	0.53	370
2019	unaffiliated	33,979	0.02	0.22	0.26	0.64	69
2020	captive	38,917	0.10	0.21	0.13	0.45	344
2020	unaffiliated	62,096	0.02	0.22	0.28	0.65	92
2021	captive	55,010	0.09	0.24	0.16	0.48	327
2021	unaffiliated	82,500	0.02	0.22	0.32	0.63	80
2022	captive	57,493	0.37	0.62	0.15	0.82	1,507
2022	unaffiliated	88,094	0.06	0.56	0.22	1.00	295
2023	captive	57,702	1.14	0.59	0.12	0.72	4,625
2023	unaffiliated	68,149	0.20	0.74	0.21	1.23	958
2024	captive	51,914	1.25	0.46	0.08	0.58	5,280
2024	unaffiliated	51,940	0.28	0.72	0.23	1.21	1,364
2025	captive	22,748	1.39	0.41	0.05	0.54	6,146
2025	unaffiliated	20,867	0.41	0.72	0.22	1.21	2,103

Notes: Annual means on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, by financing channel. Captive pools the selling builder's wholly owned and joint-venture lenders; unaffiliated lenders are the comparison group. Columns (4)–(7) are percent of the loan amount. *Non-borrower-paid points (lower bound)* is discount points in excess of borrower-paid origination charges, floored at zero; because origination charges include any points the borrower paid, the excess must have been paid by another party, and the measure is a lower bound because the payer is not observed. *Points not attributed* is the remainder of discount points, which could have been paid by the borrower. *Lender credits* are payments from the lender to the borrower. *Borrower-paid charges* are HMDA origination charges. Blank discount points and lender credits are coded as zero; the 1–3 percent of loans with blank origination charges are excluded from the lower bound, the unattributed points, and the borrower-paid charges. The last column converts the lower bound to dollars at the mean loan amount of the year and channel. The same pattern holds within conventional and within FHA/VA loans. Seller-funded temporary buydowns and concessions outside the mortgage (closing-cost assistance, upgrades, option credits) appear in none of these fields.

Table A.7: The Rate-Spread Discount on Loans with Zero Discount Points

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Captive	-0.084***	-0.100***	-0.088***	-0.076***	-0.078***	-0.063***	-0.084***	-0.068***	-0.059***	-0.060***
	(0.014)	(0.017)	(0.015)	(0.015)	(0.016)	(0.012)	(0.015)	(0.013)	(0.013)	(0.014)
Captive x Post	-0.322***	-0.296***	-0.178***	-0.165***	-0.160***	-0.312***	-0.290***	-0.199***	-0.182***	-0.179***
	(0.026)	(0.026)	(0.031)	(0.033)	(0.035)	(0.028)	(0.029)	(0.032)	(0.035)	(0.037)
CBSA x quarter	Yes	Yes				Yes	Yes			
Builder		Yes			Yes		Yes			Yes
Builder x CBSA x quarter			Yes					Yes		
Subdivision x quarter				Yes	Yes				Yes	Yes
Observations	303,153	294,218	270,331	167,621	165,447	303,153	294,218	270,331	167,621	165,447
R2	0.384	0.417	0.537	0.660	0.672	0.847	0.854	0.881	0.909	0.911
Outcome mean	0.233	0.231	0.229	0.263	0.262	4.278	4.276	4.252	4.112	4.112

Notes: The dependent variable is the rate spread to APOR, in percentage points, on 30-year fixed-rate loans in the matched new-home deed–HMDA sample, 2018–2025, restricted to loans on which HMDA reports no discount points paid by any party. Captive pools the selling builder's wholly owned and joint-venture lenders; unaffiliated lending is the omitted category, and Post indicates closings from 2022 onward. Columns follow Table 2: (1) CBSA × year-quarter fixed effects; (2) adds builder fixed effects; (3) builder × CBSA × year-quarter fixed effects; (4) subdivision × year-quarter fixed effects; (5) adds builder fixed effects to (4). Columns (4) and (5) use deeds with an identified subdivision. All columns include the loan and property controls of Table 2. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.8: The Rate-Spread Discount within Loan Type

Panel A: Conventional conforming

	(1)	(2)	(3)	(4)	(5)
Captive	-0.075***	-0.082***	-0.085***	-0.072***	-0.074***
	(0.013)	(0.015)	(0.015)	(0.015)	(0.016)
Captive x Post	-0.394***	-0.395***	-0.358***	-0.335***	-0.339***
	(0.022)	(0.023)	(0.027)	(0.035)	(0.037)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	440,792	431,719	406,648	262,095	259,541
R2	0.292	0.327	0.424	0.556	0.567
Outcome mean	0.049	0.044	0.034	0.053	0.052

Panel B: FHA and VA

	(1)	(2)	(3)	(4)	(5)
Captive	-0.133***	-0.149***	-0.161***	-0.156***	-0.165***
	(0.018)	(0.018)	(0.014)	(0.018)	(0.017)
Captive x Post	-0.406***	-0.404***	-0.365***	-0.369***	-0.374***
	(0.020)	(0.020)	(0.026)	(0.031)	(0.032)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	207,939	202,379	187,168	107,041	105,839
R2	0.636	0.660	0.725	0.797	0.806
Outcome mean	0.172	0.164	0.148	0.193	0.189

Panel C: Conventional conforming, LTV $\leq$ 80

	(1)	(2)	(3)	(4)	(5)
Captive	-0.068***	-0.078***	-0.087***	-0.065***	-0.067***
	(0.011)	(0.014)	(0.015)	(0.017)	(0.019)
Captive x Post	-0.420***	-0.423***	-0.384***	-0.354***	-0.359***
	(0.022)	(0.022)	(0.030)	(0.036)	(0.038)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	245,969	239,511	221,451	126,724	125,515
R2	0.271	0.313	0.435	0.578	0.590
Outcome mean	-0.091	-0.096	-0.111	-0.098	-0.100

Notes: As Panel A of Table 2, estimated separately on conventional conforming loans (Panel A), FHA and VA loans (Panel B), and conventional conforming loans with a loan-to-value ratio at or below 80 percent, on which no mortgage insurance enters the APR (Panel C). The loan-class indicator is replaced by an FHA-vs-VA indicator in Panel B and dropped in Panels A and C. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.9: Rate Spreads at Outside Lenders by Type, Relative to Captive Lending

	(1)	(2)	(3)	(4)	(5)
Bank	-0.041***	-0.034*	-0.032*	-0.035**	-0.034**
	(0.015)	(0.018)	(0.017)	(0.015)	(0.015)
Independent mortgage bank	0.184***	0.192***	0.197***	0.170***	0.174***
	(0.015)	(0.017)	(0.016)	(0.017)	(0.017)
Credit union	-0.015	-0.011	-0.008	-0.023	-0.023
	(0.019)	(0.017)	(0.017)	(0.019)	(0.018)
Bank x Post	0.359***	0.360***	0.311***	0.315***	0.318***
	(0.027)	(0.026)	(0.027)	(0.029)	(0.031)
Independent mortgage bank x Post	0.375***	0.376***	0.340***	0.341***	0.345***
	(0.020)	(0.021)	(0.024)	(0.029)	(0.031)
Credit union x Post	0.227***	0.221***	0.152***	0.172***	0.173***
	(0.033)	(0.036)	(0.038)	(0.044)	(0.046)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	668,150	655,988	622,411	425,107	421,124
R2	0.421	0.450	0.528	0.629	0.638
Outcome mean	0.084	0.080	0.071	0.102	0.100

Notes: The dependent variable is the rate spread to APOR, in percentage points, on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Loans financed by the selling builder's wholly owned or joint-venture lender are the omitted category; unaffiliated lenders are classified as banks, independent mortgage banks, and credit unions from the HMDA lender panel. Post is an indicator for closings from 2022 onward. Fixed effects and controls follow Table 2. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.10: The Captive–Unaffiliated Gap and Mortgage Lock-in

	(1)	(2)	(3)	(4)	(5)
Captive	-0.099***	-0.103***	-0.118***	-0.105***	-0.107***
	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)
Captive × Post	-0.276***	-0.273***	-0.212***	-0.219***	-0.219***
	(0.016)	(0.016)	(0.017)	(0.019)	(0.020)
Captive × Lock-in	0.037**	0.042***	0.054***	0.042***	0.042***
	(0.014)	(0.013)	(0.013)	(0.013)	(0.012)
Captive × Lock-in × Post	0.025	0.021	0.025	-0.011	-0.008
	(0.019)	(0.018)	(0.020)	(0.027)	(0.028)
CBSA × quarter	Yes	Yes			
Builder		Yes			Yes
Builder × CBSA × quarter			Yes		
Subdivision × quarter				Yes	Yes
Observations	571,826	560,773	532,684	370,851	367,158
R-squared	0.395	0.422	0.487	0.596	0.604
Outcome mean	0.177	0.174	0.169	0.196	0.194

Notes: The table reports regressions of the rate spread to APOR, in percentage points, on the captive indicator, its interaction with Post, and both interacted with CBSA lock-in, on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Captive denotes financing through the selling builder's wholly owned or joint-venture lender; unaffiliated lending is the omitted category. Lock-in is defined as in Table 4; its main effects are absorbed by the fixed effects in every column. Columns follow Table 2: (1) CBSA × year-quarter; (2) adds builder; (3) builder × CBSA × year-quarter; (4) subdivision × year-quarter; (5) adds builder to (4). Controls are the loan and property controls of Table 2. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.11: The Captive Note-Rate Discount by First-Time-Buyer Status

	(1)	(2)	(3)
Captive	-0.039***	-0.030***	-0.054***
	(0.009)	(0.008)	(0.011)
Captive x Post	-0.353***	-0.358***	-0.343***
	(0.020)	(0.019)	(0.025)
CBSA x quarter	Yes	Yes	Yes
Observations	298,376	181,364	116,985
R2	0.869	0.872	0.866
Outcome mean	4.783	4.739	4.850

Notes: This table reports the pooled version of Equation (1) using note rates as the dependent variable and the CBSA by year-quarter fixed effects and loan and property controls in column 1 of Panel A in Table 2. The sample contains conventional 30-year fixed-rate new-home purchase loans in the deed–HMDA sample matched to Fannie Mae and Freddie Mac issuance records. Column (1) includes all matched loans, column (2) includes repeat buyers, and column (3) includes first-time buyers, as identified in the agency records. Captive pools wholly owned and joint-venture lenders. Post indicates closings from 2022 onward. Coefficients are in percentage points. Standard errors clustered by CBSA are in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.12: The Captive Discount by Borrower Income

	Rate spread		Note rate	
	(1)	(2)	(3)	(4)
Captive x <80% AMI	-0.140***	-0.127***	-0.094***	-0.074***
	(0.020)	(0.023)	(0.015)	(0.020)
Captive x 80-120%	-0.130***	-0.152***	-0.094***	-0.109***
	(0.017)	(0.020)	(0.014)	(0.016)
Captive x 120-180%	-0.095***	-0.123***	-0.072***	-0.094***
	(0.013)	(0.016)	(0.010)	(0.012)
Captive x >=180%	-0.061***	-0.089***	-0.059***	-0.090***
	(0.014)	(0.016)	(0.012)	(0.014)
Captive x <80% AMI x Post	-0.382***	-0.374***	-0.384***	-0.406***
	(0.025)	(0.037)	(0.020)	(0.033)
Captive x 80-120% x Post	-0.377***	-0.334***	-0.378***	-0.366***
	(0.018)	(0.027)	(0.018)	(0.026)
Captive x 120-180% x Post	-0.355***	-0.294***	-0.339***	-0.309***
	(0.022)	(0.027)	(0.021)	(0.026)
Captive x >=180% x Post	-0.381***	-0.362***	-0.338***	-0.328***
	(0.029)	(0.038)	(0.028)	(0.036)
Captive x (lowest - highest), 2018-2021	-0.078***	-0.038*	-0.035**	0.016
	(0.017)	(0.022)	(0.013)	(0.019)
Captive x (lowest - highest), 2022-2025	-0.080*	-0.050	-0.082**	-0.062
	(0.042)	(0.067)	(0.036)	(0.057)
Captive x (lowest - highest), change	-0.001	-0.012	-0.046	-0.078
	(0.033)	(0.052)	(0.030)	(0.048)
Income band x CBSA x quarter	Yes		Yes	
Income band x builder x CBSA x quarter		Yes		Yes
Observations	677,766	596,434	677,766	596,434
R2	0.429	0.557	0.837	0.869
Outcome mean	0.088	0.067	4.625	4.625

Notes: The table reports regressions of the rate spread in columns (1) and (2) and the note rate in columns (3) and (4), in percentage points, on captive indicators by borrower income band and their interactions with Post, on the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Captive pools wholly owned and joint-venture lenders, and unaffiliated lending is the omitted category. Income bands are defined relative to the FFIEC area median family income. Post is an indicator for closings from 2022 onward. Columns (1) and (3) include income band × CBSA × year-quarter fixed effects, and columns (2) and (4) include income band × builder × CBSA × year-quarter fixed effects. All columns include the loan and property controls of Table 2. The last three rows report the difference between the lowest and highest income bands in 2018–2021, in 2022–2025, and in the change between the two periods. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.13: Borrower Income by Builder–Lender Affiliation with Property Controls

Panel A: Captive (wholly owned and joint venture) vs. unaffiliated

	(1)	(2)	(3)	(4)	(5)
Captive	-0.018**	0.028***	0.016***	-0.001	0.005
	(0.008)	(0.005)	(0.005)	(0.004)	(0.005)
Captive x Post	-0.037***	-0.044***	-0.030***	-0.031***	-0.032***
	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	687,292	674,955	640,841	438,588	434,486
R2	0.348	0.405	0.434	0.566	0.573
Outcome mean	4.762	4.760	4.753	4.731	4.731

Panel B: By degree of integration

	(1)	(2)	(3)	(4)	(5)
Wholly owned	-0.020**	0.029***	0.018***	-0.003	0.004
	(0.008)	(0.006)	(0.005)	(0.004)	(0.005)
Joint venture	-0.011	0.021***	0.011	0.004	0.009
	(0.010)	(0.006)	(0.007)	(0.007)	(0.009)
Preferred lender	-0.049***	0.004	-0.005	0.022**	0.012
	(0.014)	(0.008)	(0.014)	(0.010)	(0.011)
Wholly owned x Post	-0.038***	-0.047***	-0.033***	-0.032***	-0.032***
	(0.006)	(0.005)	(0.006)	(0.007)	(0.007)
Joint venture x Post	-0.036***	-0.034***	-0.020**	-0.026***	-0.032***
	(0.010)	(0.008)	(0.010)	(0.007)	(0.007)
Preferred lender x Post	0.015	0.003	0.010	-0.022	-0.010
	(0.024)	(0.012)	(0.016)	(0.017)	(0.018)
CBSA x quarter	Yes	Yes			
Builder		Yes			Yes
Builder x CBSA x quarter			Yes		
Subdivision x quarter				Yes	Yes
Observations	698,683	686,346	652,323	447,422	443,300
R2	0.348	0.405	0.435	0.566	0.574
Outcome mean	4.759	4.756	4.750	4.727	4.727

Notes: The table reports the regressions of Table 5 with the property controls of Table 2 added. The dependent variable is log borrower income, and the sample is the matched new-home deed–HMDA sample of 30-year fixed-rate loans, 2018–2025. Captive in Panel A pools wholly owned and joint-venture lenders. Columns (1) to (5) follow Table 5. Standard errors clustered by CBSA in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.14: Denial at Captive Lenders by Applicant Income

	(1)	(2)	(3)
Captive x <80% AMI	2.732***	2.618***	0.938
	(0.602)	(0.559)	(0.837)
Captive x 80-120%	0.792**	0.686*	-1.033
	(0.352)	(0.363)	(0.698)
Captive x 120-180%	-0.130	-0.403	-1.562**
	(0.264)	(0.271)	(0.760)
Captive x >=180%	-1.410***	-1.638***	-1.887**
	(0.333)	(0.295)	(0.793)
Captive x <80% AMI x Post	-0.390	-0.290	-0.065
	(0.651)	(0.656)	(1.012)
Captive x 80-120% x Post	-0.586	-0.726*	-0.360
	(0.389)	(0.431)	(0.721)
Captive x 120-180% x Post	-0.659**	-0.800***	-0.522
	(0.293)	(0.291)	(0.586)
Captive x >=180% x Post	-0.334	-0.556*	-0.521
	(0.300)	(0.281)	(0.540)
Income band x CBSA x year	Yes		
Income band x tract x year		Yes	Yes
Lender			Yes
Observations	14,836,757	14,741,218	14,741,024
R2	0.196	0.255	0.282
Outcome mean	8.717	8.672	8.672

Notes: The table reports regressions of an indicator for denial, multiplied by 100, on captive-lender indicators by applicant income band and their interactions with Post. Income bands are defined relative to the FFIEC area median family income. The sample and loan controls are those of column (4) of Table 7. Column (1) includes income band × CBSA × year fixed effects, column (2) income band × tract × year fixed effects, and column (3) adds lender fixed effects. Standard errors, clustered by CBSA in columns (1) and (2) and by lender in column (3), in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.15: Denial at Captive Lenders by Debt-to-Income Ratio

	(1)	(2)	(3)
Captive x DTI <20	-3.785***	-3.662***	-3.810***
	(0.431)	(0.360)	(1.089)
Captive x DTI 20-30	-1.745***	-2.063***	-2.810***
	(0.209)	(0.207)	(0.807)
Captive x DTI 30-36	-0.865***	-1.094***	-2.187***
	(0.190)	(0.191)	(0.776)
Captive x DTI 36-42	0.162	-0.151	-1.545**
	(0.264)	(0.256)	(0.762)
Captive x DTI 43-49	0.890**	0.563	-1.105
	(0.357)	(0.356)	(0.773)
Captive x DTI 50-60	5.169***	5.729***	3.776***
	(0.750)	(0.659)	(1.152)
Captive x DTI >60	3.779***	4.577***	4.172
	(0.897)	(0.755)	(2.668)
Captive x DTI <20 x Post	-0.566	-0.510	-0.406
	(0.451)	(0.485)	(0.684)
Captive x DTI 20-30 x Post	-0.552**	-0.424*	-0.310
	(0.207)	(0.216)	(0.460)
Captive x DTI 30-36 x Post	-0.698***	-0.776***	-0.576
	(0.188)	(0.227)	(0.491)
Captive x DTI 36-42 x Post	-0.947***	-1.074***	-0.819
	(0.288)	(0.307)	(0.525)
Captive x DTI 43-49 x Post	-0.898**	-1.122***	-0.907
	(0.383)	(0.413)	(0.609)
Captive x DTI 50-60 x Post	-3.412***	-3.140***	-2.670*
	(0.816)	(0.874)	(1.610)
Captive x DTI >60 x Post	5.166***	3.467***	3.837
	(0.656)	(0.826)	(2.690)
DTI bin x CBSA x year	Yes		
DTI bin x tract x year		Yes	Yes
Lender			Yes
Observations	15,023,587	14,767,464	14,767,280
R2	0.197	0.275	0.300
Outcome mean	8.699	8.277	8.277

Notes: The table reports regressions of an indicator for denial, multiplied by 100, on captive-lender indicators by debt-to-income range and their interactions with Post. The sample and loan controls are those of column (4) of Table 7. Column (1) includes debt-to-income range × CBSA × year fixed effects, column (2) debt-to-income range × tract × year fixed effects, and column (3) adds lender fixed effects. Standard errors, clustered by CBSA in columns (1) and (2) and by lender in column (3), in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.16: Denial at Captive Lenders Including KBHS Home Loans

	(1)	(2)	(3)	(4)	(5)	(6)
Captive	3.635***	1.808***	3.251***	1.578***		
	(0.541)	(0.495)	(0.524)	(0.464)		
Captive x Post	-1.969***	-1.834***	-2.154***	-1.838***	-1.771	-1.543
	(0.589)	(0.509)	(0.606)	(0.508)	(1.218)	(1.106)
CBSA x year	Yes	Yes				
Tract x year			Yes	Yes	Yes	Yes
Lender					Yes	Yes
DTI control		Yes		Yes		Yes
Observations	15,125,473	15,093,444	15,116,188	15,084,216	15,115,991	15,084,024
R2	0.028	0.193	0.062	0.219	0.103	0.248
Outcome mean	8.819	8.766	8.811	8.758	8.811	8.758

Notes: The table reports the regressions of Table 7 on the application sample that includes KBHS Home Loans. Columns (1) to (6) follow Table 7. Standard errors, clustered by CBSA in columns (1) to (4) and by lender in columns (5) and (6), in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.17: Denial at Captive Lenders by Reported Reason

Panel A: Denied for debt-to-income

	(1)	(2)	(3)	(4)	(5)	(6)
Captive	2.714***	1.046***	2.550***	1.012***		
	(0.216)	(0.113)	(0.215)	(0.108)		
Captive x Post	0.093	0.204	-0.216	0.047	-0.082	0.091
	(0.241)	(0.150)	(0.256)	(0.156)	(0.584)	(0.443)
CBSA x year	Yes	Yes				
Tract x year			Yes	Yes	Yes	Yes
Lender					Yes	Yes
DTI control		Yes		Yes		Yes
Observations	15,055,581	15,023,587	15,046,295	15,014,358	15,046,098	15,014,166
R2	0.039	0.364	0.064	0.378	0.081	0.384
Outcome mean	3.196	3.189	3.193	3.187	3.193	3.187

Panel B: Denied for another reason

	(1)	(2)	(3)	(4)	(5)	(6)
Captive	-0.453*	-0.644***	-0.600**	-0.768***		
	(0.234)	(0.231)	(0.230)	(0.226)		
Captive x Post	-0.621**	-0.632***	-0.572**	-0.552**	-0.414	-0.413
	(0.240)	(0.228)	(0.254)	(0.243)	(0.399)	(0.392)
CBSA x year	Yes	Yes				
Tract x year			Yes	Yes	Yes	Yes
Lender					Yes	Yes
DTI control		Yes		Yes		Yes
Observations	15,055,581	15,023,587	15,046,295	15,014,358	15,046,098	15,014,166
R2	0.014	0.018	0.045	0.049	0.078	0.080
Outcome mean	5.557	5.511	5.551	5.505	5.551	5.504

Notes: The table reports the regressions of Table 7 separately by the reason the lender reports for the denial. The dependent variable, multiplied by 100, is an indicator for denial with debt-to-income as the first reported reason in Panel A and for denial with any other first reported reason in Panel B, so that the coefficients in the two panels sum to those in Table 7. Fewer than 1 percent of denials have no reported reason and are included in Panel B. The sample, controls, and fixed effects follow Table 7. Standard errors, clustered by CBSA in columns (1) to (4) and by lender in columns (5) and (6), in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.18: Captive Loans at the Market Rate

year	Loans	Rate gap	Payment	Income	>43, actual	>43, market	>45, actual	>45, market	>50, actual	>50, market
2018	18,157	-0.031	0.004	0.002	0.377	0.380	0.293	0.297	0.108	0.108
2019	20,739	-0.113	0.014	0.006	0.335	0.346	0.253	0.264	0.095	0.096
2020	35,326	-0.083	0.010	0.005	0.313	0.322	0.232	0.240	0.087	0.087
2021	49,271	-0.038	0.005	0.002	0.293	0.296	0.219	0.222	0.077	0.077
2022	51,563	-0.198	0.023	0.012	0.390	0.411	0.304	0.327	0.104	0.104
2023	53,766	-0.527	0.054	0.031	0.435	0.489	0.349	0.410	0.122	0.167
2024	48,136	-0.560	0.058	0.033	0.448	0.503	0.360	0.426	0.125	0.178
2025	20,318	-0.746	0.078	0.043	0.465	0.538	0.380	0.464	0.146	0.232

Notes: The table reports, by year of closing, the effect of the captive rate discount on the payment and the debt-to-income ratio of captive loans in the matched new-home deed–HMDA sample of 30-year fixed-rate loans. Captive pools wholly owned and joint-venture lenders. Column (1) is the number of captive loans. Column (2) is the captive–unaffiliated note-rate gap, in percentage points, estimated by year and loan type. Column (3) is the reduction in the monthly principal and interest payment at the actual rate relative to the rate without the gap, as a share of the latter. Column (4) is the corresponding reduction in the income required to keep the same debt-to-income ratio. Columns (5), (7), and (9) are the shares of captive loans with a debt-to-income ratio above 43, 45, and 50 percent at the actual rate, and columns (6), (8), and (10) are the same shares at the rate without the gap. HMDA reports debt-to-income in whole percentage points between 36 and 49 percent, and we treat loans as uniformly distributed within each point.

B Institutional Details

B.1 Regulation of Affiliated Lending and Seller Concessions

Affiliated business arrangements. Section 8(c)(4) of the Real Estate Settlement Procedures Act allows a builder to refer buyers to a lender it owns if the relationship is disclosed, the buyer is not required to use the lender, and the builder receives nothing of value from the arrangement beyond a return on its ownership interest (U.S. Congress, 1983). Regulation X permits discounts tied to the affiliate only if they are optional and are "a true discount below the prices that are otherwise generally available" that is not "made up by higher costs elsewhere in the settlement process" (Consumer Financial Protection Bureau, 2024).

Interested-party contributions. Rate buydowns funded by a builder or an affiliated lender for a specific transaction generally count toward interested-party contribution limits. For GSE loans on principal residences, these limits are from 3 to 9 percent of the lower of the sales prices, depending on the loan-to-value ratio. The limit for FHA loans is 6 percent of the sales price. VA limits seller concessions to 4 percent of reasonable value but excludes reasonable discount points and ordinary closing costs, so its cap does not bind a market-priced permanent buydown. Ordinary closing costs and discount points appropriate to the market are excluded, but additional points used to fund a permanent rate buydown count toward the limit. Under GSE rules, fees for blanket rate commitments obtained before a builder signs a sales contract with a buyer are excluded from financing-concession limits when they are not attributable to the specific loan transaction.

For loans with note dates on or after September 3, 2025, the GSEs also treat incentives from a lender that is, or is affiliated with, an interested party as sales concessions rather than lender incentives.

Temporary buydowns. A temporary buydown subsidizes the borrower's initial payment without changing the note rate. Because a temporary buydown leaves the note rate unchanged, the borrower qualifies at the full note rate, and the subsidy appears in neither the note rate nor the fee fields that HMDA reports. Temporary buydowns also face pooling limits. Effective May 19, 2025, Ginnie Mae limited buydown loans to 10 percent of each loan package delivered into Ginnie Mae II multiple-issuer pools, and effective June 16, 2025, it removed the limit for Ginnie Mae II custom single-family pools.

B.2 Three Paths to a New-Home Mortgage Rate

Figure B.1 shows the three ways a new-home buyer's rate can be set. The paths differ in when the rate is committed, who pays for a below-market rate, and who bears the risk that a buyer does not close.

In a standard loan, the builder funds no rate concession, and the note rate reflects the market rate for the borrower's characteristics and any points the borrower pays. In a loan-by-loan buydown, the builder's points are tied to a specific sale, and the lender can also fund part of the reduction by pricing the loan below its rate sheet and accepting a lower margin. In a forward commitment, the builder pays for the commitment in advance. The price is fixed when the commitment is made, so a subsequent rise in market rates can increase the rate discount observed at closing. Depending on the contract, unused commitments may be reassigned to another buyer, extended, or closed out. Because the cost is paid in advance, the resulting loan can have a below-market note rate but may have few discount points of its own. Reported discount points therefore combine payments from different parties and need not capture the builder's full cost of a forward commitment. Section B.3 explains the resale-price cost of a rate reduction.

B.3 Secondary-Market Pricing and the Cost of Buydowns

A fixed-rate agency mortgage's note rate equals the coupon paid to investors plus ongoing guarantee fees and servicing compensation. Holding this spread fixed, a lower mortgage rate implies a lower coupon and therefore fewer resale proceeds. Prices in the to-be-announced (TBA) market across coupons form the price ladder (Vickery and Wright, 2013). Its slope near par, κ_t, measures the proceeds forgone per percentage-point reduction in the coupon, in points of principal. One point equals one percent of the loan amount. A flatter ladder makes a given rate reduction less costly. Expected refinancing affects this slope because earlier repayment shortens the period over which investors receive the additional coupon (Bhutta et al., 2026; Kalda et al., 2023).

Figure B.2 shows that κ_t fell from about 6 in 2021 to about 3 in 2023 as market mortgage rates rose. At these slopes, a 25-basis-point coupon reduction near par implies a resale-price loss of about 1.5 percent of principal in 2021 and 0.75 percent in 2023. This comparison holds the note–coupon spread fixed and describes the resale-price component of a small buydown near par.

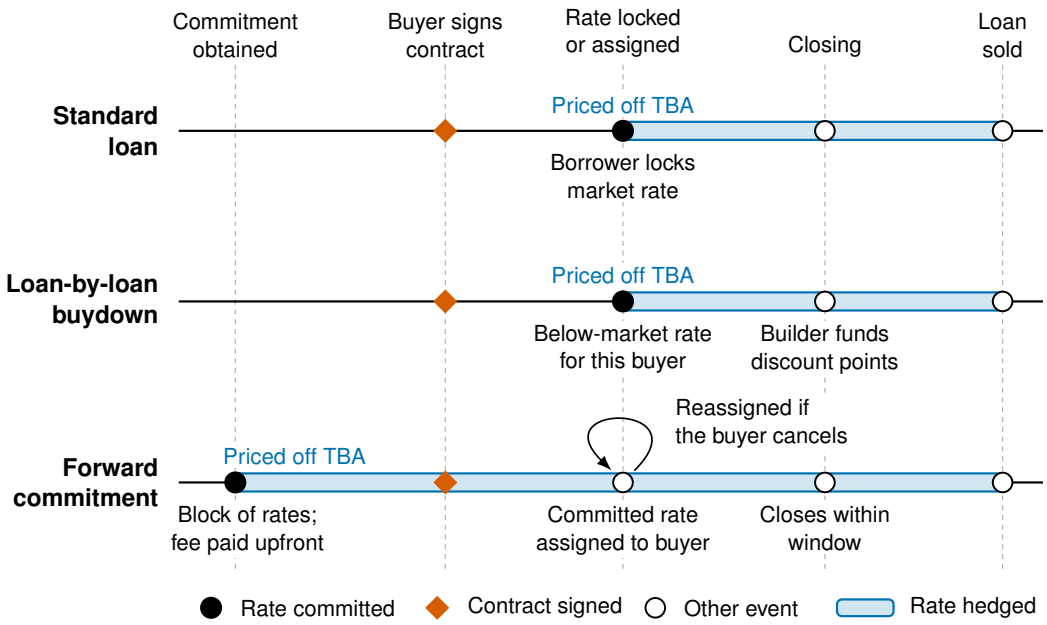


Figure B.1: Timing of Rate Commitment in New-Home Financing

Notes: For fixed-rate agency loans, TBA prices at commitment provide a pricing benchmark; forward commitments also reflect the settlement horizon and contract terms. Timing is illustrative, and the length of a forward commitment window varies across builders and programs.

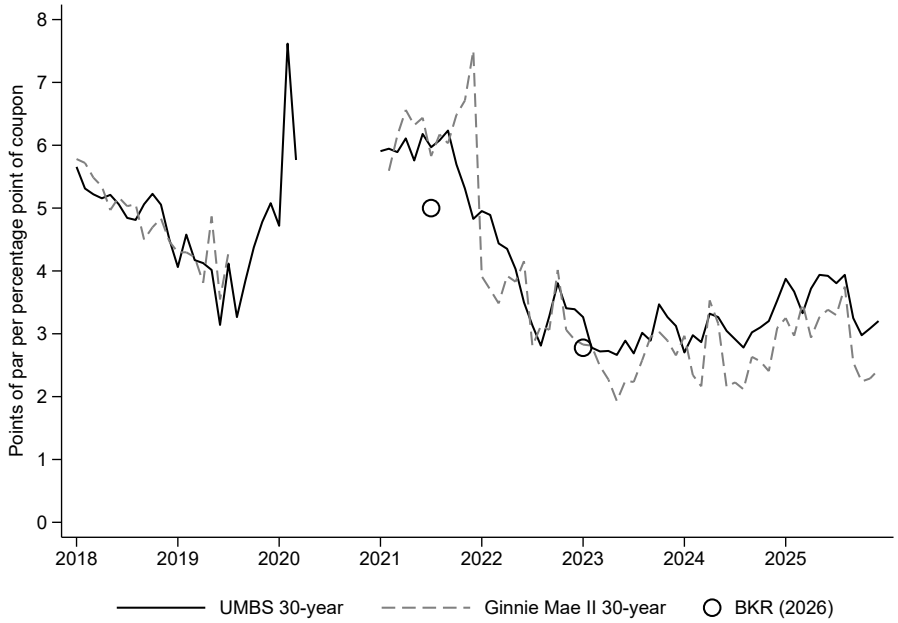


Figure B.2: The Price of a Coupon Point

Notes: Prices are daily LSEG mid quotes on 30-year UMBS contracts for Fannie Mae and Freddie Mac loans and 30-year Ginnie Mae II contracts for FHA and VA loans. For each program, κ_t is the monthly median of the daily price difference between the two TBA coupons that bracket par, divided by their coupon difference, in points of par per percentage point. Circles convert the estimates in Bhutta et al. (2026) to the same units (100 divided by basis points of rate per point). Gaps are months in which no pair of quoted coupons brackets par. In much of 2020, all quoted coupons traded above par. TBA prices exclude specified-pool pay-ups, retained servicing value, and loan-level price adjustments.

C Data Construction

This appendix describes how we construct the samples and variables in Section 3. The subsections follow the order of the main text.

C.1 Deed Records

We use deed records from two ATTOM deliveries. The May 2023 delivery provides deeds recorded before 2020, and the May 2026 delivery provides deeds recorded from 2020 onward. The 2023 delivery omits most deeds recorded between September 2018 and June 2019, so we take deeds for these months from the 2026 delivery. In Texas, most home sales are recorded as warranty deeds with vendor's lien rather than as plain warranty deeds, and we classify both document types as sales. We exclude non-disclosure states, where deeds do not report reliable sales prices, from the price regressions.

The deed reports whether the grantor is an individual or an entity, but this field is largely missing before 2020. For these deeds, we classify a seller as corporate when the grantor name contains tokens such as LLC, HOMES, or BUILDERS. We validate the name screen in two Georgia counties where grantor type is complete over 2020–2023. In these counties, the name screen identifies 98.8 to 99.5 percent of corporate sellers.

C.2 The Deed–Loan Match

Public HMDA does not report a loan identifier, so we match HMDA purchase loans to deeds on shared characteristics within closing year. The match proceeds in rounds. In each round, we accept a deed–loan pair only when it is the only deed and the only loan that share the round's key, and we remove matched pairs from both pools before the next round. Every key includes the census tract and the loan amount in \$10,000 bins. Tighter keys add the deed sales price, matched to the HMDA property value in \$10,000 bins, and the first seven or five characters of the normalized lender name.

In markets that disclose sales prices, the five rounds add, in order, the price and the seven-character prefix, the seven-character prefix alone, the price and the five-character prefix, and the price alone. The fifth round uses tract and amount alone. In non-disclosure markets, deeds do not report a usable sales price. The three rounds there add the seven-character prefix, then the five-character prefix, and the third round uses tract and amount alone.

Over 2018–2025, we match 40.5 percent of eligible deeds financed by wholly owned captives, compared with 56.5 percent of deeds financed by unaffiliated lenders (Figure C.1).

Using only first-round matches, the post-2021 widening of the captive discount is 0.40 percentage points, compared with 0.38 in the baseline (Table A.4).

C.3 Builder–Lender Classification

Documents. We record each lending subsidiary and its ownership from the 10-K filings of 31 public builders over fiscal years 1993–2025. For private builders, we follow Bhutta and Lambie-Hanson (2024) and screen HMDA lenders with at least 1,000 applications over 2018–2023, at least 95 percent of them for home purchase. GLEIF records and affiliated-business disclosures establish ownership, and builders' financing pages identify partner lenders.

Deeds. In each county, we flag a builder–lender pair when the lender finances at least 20 of the builder's sales and at least 15 percent of its financed sales, and this share is at least three times both the lender's county-wide share and its share of all builders' sales. We set these thresholds in Gwinnett County, Georgia. Applied unchanged in Osceola County, Florida, they flag every documented relationship in both counties.

Verification and dating. We verify each flagged pair against SEC filings, builder disclosures, lender websites, NMLS records, and press reports.[1] Documents determine the type of relationship, and deeds date it. We code loans from another builder's captive as cross-captive and exclude them from captive–unaffiliated comparisons. We drop manufactured-housing captives. Tables C.1 and C.2 list the relationships.

C.4 Builder Filings

We collect the 10-K filings of 31 public builders for fiscal years 1993–2025 and record each builder's mortgage affiliates, its ownership share, and the capture rate reported in Table C.2.

Six builders report their affiliated lenders' loan originations. For these builders, Table C.3 compares the filing counts with HMDA purchase loans under the affiliated LEIs over 2018–2023. HMDA counts equal 85 to 97 percent of the filing counts, and 93 percent overall. The gap partly reflects that filings count loans for all purposes, while HMDA counts here include only purchase loans.

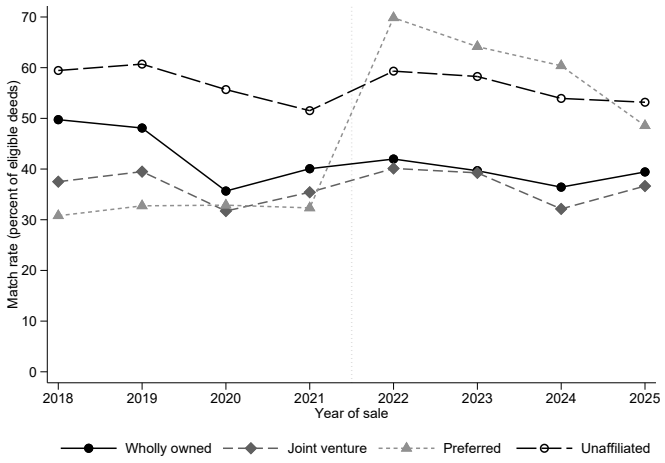
[1] AI agents searched public sources, and a second round tested each ownership claim. We reviewed every classification by hand; the replication package archives the documents.

C.5 Loan Performance

Link to deeds. We match LLMA loans to new-home deeds within ZIP code in rounds. In the first round, we match a loan to a deed when the two share the closing month and loan amount, no other loan or deed shares them, and the sales price does not conflict with the loan. In later rounds, we allow the closing month to differ by one month, or the loan amount to differ by up to $1,000 or 0.5 percent of the deed loan amount, whichever is smaller. We accept these matches only when at least two other fields agree, one of them the note rate or the sales price. The matched deed identifies the builder and the lender's affiliation with the builder.

Delinquency and payoff samples. We keep loans originated in 2018–2022. Each of these loans has at least one year of follow-up before LLMA reporting ends in January 2024. The comparison loans come from unaffiliated banks and independent mortgage companies. We identify these lender types with the Philadelphia Fed's HMDA Lender File (Federal Reserve Bank of Philadelphia, 2026). We exclude 125,376 unaffiliated loans because the file does not resolve their lender type. LLMA does not report the 12-month delinquency outcome for 42 percent of captive loans and 37 percent of comparison loans. Table C.4 shows each sample restriction.

Figure C.1: Deed–Loan Match Rates by Financing Channel



Notes: The figure plots the share of match-eligible new-home deeds matched to an HMDA loan, by year and by the relationship between the seller and the lender named on the deed. The dotted line separates 2018–2021 from 2022–2025.

Table C.1: The Builder–Lender Map

	Wholly owned (1)	Joint venture (2)	Preferred (3)	All (4)
Panel A. Relationships				
Public builders	27	15	25	67
Private builders	18	23	42	83
All builders	45	38	67	150
Active in 2018–2025	30	27	55	112
Panel B. Distinct firms				
Builders	36	24	38	73
Lenders	42	34	38	110

Notes: One row per relationship and ownership phase. A relationship is active in 2018–2025 if it ends in 2018 or later, or, if it has no end year, deeds, its start year, or the HMDA crosswalk show use from 2018. Links from acquired brands to the parent's captive are not counted. In Panel B, a firm with several relationship types counts in each column.

Table C.2: Public Builders' Captive and Joint-Venture Lenders

Builder	Lender	HMDA loans (000s) 2018–2021 (1)	HMDA loans (000s) 2022–2025 (2)	Capture rate (%) (3)
Panel A. Wholly owned captives				
D.R. Horton	DHI Mortgage	162.0	247.2	78
Lennar	Lennar Mortgage	132.9	171.5	84
PulteGroup	Pulte Mortgage	64.3	68.5	86
NVR	NVR Mortgage Finance	63.0	64.0	86
Taylor Morrison	Taylor Morrison Home Fund.	29.1	29.5	–
M.D.C. Holdings	HomeAmerican Mortgage	19.5	23.2	76
M/I Homes	M/I Financial	19.4	23.1	89
Century	Inspire Home Loans	17.4	22.7	82
Toll Brothers	TBI Mortgage	13.8	15.0	38
Hovnanian	K. Hovnanian Am. Mortgage	13.7	12.6	79
Panel B. Joint ventures (mortgage partner)				
KB Home	KBHS Home Loans (Guaranteed Rate[a])	28.1	34.5	87
Dream Finders	Jet HomeLoans (FBC Mortgage)	2.4	12.8	–
Green Brick	First Continental Mortgage	–	2.2	–
William Lyon Homes	Stearns venture	2.0	–	–
Four builders[b]	loanDepot ventures	–	–	–

Notes: Columns (1)–(2): originated first-lien purchase loans under the lender's LEI, in thousands, using 2018–2023 LEI designations carried forward to 2024–2025. Column (3): share of the builder's closings financed by its lender, from the latest 10-K for fiscal 2022–2024. A dash marks an inactive relationship or an unreported rate. Tri Pointe Connect, wholly owned from 2024, is not in the crosswalk. [a]KB Home owns 50 percent; partner Stearns until March 2021. [b]Dream Finders owned 49.9 percent through 2022 and 60 percent in 2023, and Jet HomeLoans has been wholly owned since July 2024. [c]Meritage, LGI Homes, Tri Pointe (through 2023), and Smith Douglas (from 2025): loanDepot funds these loans and reports them under its own LEI.

Table C.3: Affiliated-Lender Originations in Builder Filings and HMDA, 2018–2023

Builder	10-K	HMDA	Ratio
Century Communities	32,211	27,528	0.85
D.R. Horton	287,431	279,679	0.97
KB Home[a]	47,299	44,586	0.94
Lennar[a]	234,100	208,739	0.89
PulteGroup	105,544	97,197	0.92
Taylor Morrison	42,174	39,463	0.94
Total	748,759	697,192	0.93

Notes: Originated loans, summed over years with both counts. [a]Fiscal year ends in November.

Table C.4: LLMA Delinquency Sample

	All loans (1)	Captive loans (2)
LLMA loans linked to new-home deeds, 2018–2024	379,440	146,088
Originated 2018–2022	319,275	117,621
Captive, or unaffiliated bank or independent mortgage company	164,224	117,621
Known 12-month outcome	97,217	68,020
Subdivision, builder, and CBSA identified	74,114	56,526
Loan and property controls observed	70,568	53,396
Debt-to-income ratio observed	56,187	42,252
ZIP-code price change and note rate observed	50,277	38,174
Estimation samples in Table 8		
Panel A: CBSA × quarter fixed effects	50,180	38,135
Panel B: Subdivision × quarter and builder fixed effects	29,502	26,275

Notes: Each row applies its restriction to the loans in the row above. Both estimation samples start from the 50,277 loans in the preceding row and exclude fixed-effect groups that contain a single loan. Captive loans are loans from the selling builder's wholly owned or joint-venture lender.