Building the Bottlenecks: The Impact of Homebuilder Consolidation*

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Abstract

This paper investigates how rising concentration in the U.S. homebuilding industry undermines market efficiency through a resource-control channel. Exploiting 73 mergers as exogenous variation to local market structure, I find that consolidation leads to reduced new-home supply, higher new-home prices, and lower construction quality in markets where both merging builders previously operated (i.e., overlapping markets), relative to non-overlapping markets. The mechanism is evident in a sharp post-merger acceleration in the acquiring builders' own construction timelines in overlapping markets, even as the construction activity of other builders slows—highlighting dominant builders' prioritized access to limited inputs such as labor and materials with rising market share. I further find that dominant builders are able to fast-track their own new-home construction following natural disasters, crowding out homeowners with urgent repair needs and exacerbating reconstruction delays. Collectively, these findings suggest that consolidation enables large builders to reallocate limited resources for private efficiency gains, while distorting competitive dynamics and weakening community resilience.

Keywords: Homebuilder Consolidation, Housing Supply, Disaster Recovery

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1 Introduction

Persistent undersupply in the U.S. housing market has renewed attention on structural frictions that constrain new-home construction. Recent estimates indicate that the U.S. housing market is undersupplied by roughly 3.8 million homes[1], a shortfall that continues to put upward pressure on prices and exacerbate affordability challenges. Traditional explanations for sluggish housing production emphasize factors such as restrictive zoning regulations and land constraints. However, an emerging and underexplored structural shift may also be reshaping the dynamics of housing markets: the increasing concentration of the homebuilding industry.

The U.S. homebuilding industry has undergone significant consolidation over the past two decades. In 2023, the top 10 builders nationally account for approximately 44.7% of all new single-family home sales—up from just 9.4% in the early 1990s.[2] Some regional markets are even more concentrated. For example, in 2024, Lennar Corp. (the second-largest home builder in the US) alone supplied 41.9% of all new housing units in the Cape Coral–Fort Myers, FL metropolitan area. The increasing concentration potentially empowers dominant firms with strategic control over essential inputs to housing production, such as land inventories, labor and subcontractor networks.

To empirically identify the causal effects of builder consolidation, I examine 73 mergers and acquisitions (M&A) among the top 200 national homebuilders between 2004 and 2019. These mergers allow acquiring builders to take control of construction resources previously held by the target builders, such as land inventories, unfinished developments, and labor capacity. In local markets where both the acquirer and target operated before the merger, referred to as overlapping markets, these M&A events generate discrete, merger-induced jumps in the local market share of the mergers builder (i.e., the acquirer plus target). This setting provides a plausibly exogenous source of variation in post-merger market concentration across overlapping markets versus otherwise similar non-overlapping markets where no such change occurs. The key

[1] See https://www.investopedia.com/why-is-the-u-s-housing-market-short-by-nearly-4-million-homes-11695334

[2] See https://eyeonhousing.org/2025/07/top-ten-builder-share-rises-again-in-2024/

identification assumption is that these merger-induce shifts in local market concentration are not systematically correlated with contemporaneous changes in housing demand, construction costs, or other confounding factors.

One concern with this strategy is the possibility of selection effects, where acquirers may target firms based on expectations of future profitability in specific local markets. If such selection is correlated with unobserved market-level trends, the estimated effects of consolidation may be biased. To address this concern, I define overlapping markets using pre-merger information on the geographic activity of both acquiring and target builders. The presence of both firms in a given market is based on historical operations rather than post-merger decisions, making overlap status plausibly exogenous to the merger itself. This definition allows me to isolate variation in exposure to consolidation that is not directly driven by strategic targeting of local market conditions. I then implement a difference-in-differences (DiD) analysis at the market level, comparing changes in new-home construction, prices, and quality between overlapping and non-overlapping markets before and after each merger.

I find that, following a merger, new-home supply declines by 7.6% in overlapping markets relative to non-overlapping markets, and the median price per square foot of newly built homes rises by 6.7%. The merged builder itself is a primary driver of this supply contraction, cutting its own output by 24.3% in overlapping markets post-merge. Construction quality also deteriorates: using construction-permit filings shortly after completion as a proxy for repairs, the three-year (five-year) repair ratio, defined as the percentage of newly built homes that filed repair-related permits within three years and five years of construction respectively, increases by 0.009 (0.012) percentage points in overlapping markets, approximately 21.4% (22.2%) of the corresponding sample means.

These outcomes are not driven by cost-side pressures induced by mergers. Permit-level DiD analyses show that new-home construction costs per square foot, including labor and materials, remain statistically unchanged in overlapping markets post-merger, either for the market as a whole or for acquirer-owned construction. This rules out a cost-based explanation for the

baseline findings: the decline in new-home supply, the rise in prices, and deterioration in quality cannot be attributed to higher input costs or substitution into cheaper materials. Instead, the mechanism operates through differential control over inputs. Post-merger, average new-home construction durations in overlapping markets lengthen by 8.5%, yet acquiring builders complete their own projects 48% faster than their competitors. These asymmetric dynamics suggest that consolidating firms extract private operational gains by reallocating limited resources toward their own projects, while overall market efficiency deteriorates.

The combined evidence that acquiring builders can accelerate their own construction timelines while still reducing their housing supply in overlapping markets after the merger, along with higher new-home prices and unchanged construction costs, suggests a strategic exercise of market power through priority access to scarce construction resources, with little or no pass-through to consumers.

To further validate this resource-control mechanism, I examine the permit-level repair completion speed around the aftermath of major hurricanes in Florida, where permits identify whether work was performed by third-party contractors, the same scarce resource demanded by both builders and homeowners. The sudden, localized surge in repair demand creates intense competition for a limited pool of contractors, providing a stringent real-world stress test. This setting reveals how the market power of large builders affects not only competitors but also homeowners with urgent repair needs. Labor shortages are a significant bottleneck to post-disaster reconstruction, as evidenced by recent events such as the California wildfires.[3] While large builders may resume construction quickly by tapping extensive subcontractor networks, that advantage can come at the expense of individual homeowners competing for the same scarce labor, potentially slowing community recovery.

Focusing on Category-3-or-stronger hurricanes that made landfall in Florida between 2004 and 2022—Charley (2004), Wilma (2005), Irma (2017), and Ian (2022)—and comparing permits filed within six months before versus after landfall, I find that projects in high-concentration

[3]See https://www.wsj.com/business/the-battle-for-recovery-supplies-is-on-in-a-disaster-strewn-america-46d191bf.

metropolitan areas take 9.2% longer to complete (≈10 additional days) than comparable projects in low-concentration areas. Roofing permits, a critical and time-sensitive category, take 55.3% longer (≈32 additional days) in highly concentrated markets than in less concentrated markets. However, these delays are not universal: Builder-owned properties using third-party contractors are completed 62.8% faster in high-concentration markets following a disaster than comparable permits in low-concentration areas. These patterns confirm that large builders have the ability to prioritize their own projects during recovery, leveraging control over subcontractor capacity to accelerate internal work while crowding out homeowners and slowing community-wide reconstruction.

Collectively, these findings demonstrate that consolidation in the homebuilding industry has far-reaching implications that extend beyond standard supply and demand dynamics. This paper shows that greater market concentration not only suppresses new-home supply and raises prices, but also reduces construction quality and hinders post-disaster recovery for individual homeowners. The strategic reallocation of limited construction inputs enables dominant builders to influence local housing outcomes in ways that advance their own interests, often at the expense of affordability, quality, and community resilience. These results underscore that scrutinizing builder concentration is essential not only for improving housing-market efficiency but also for strengthening long-term disaster preparedness and promoting more equitable recovery.

Several studies link supply constraints to local land-use regulation. As a supplemental test, I examine whether the effects of mergers vary with local land-use restrictiveness. Ex ante, consolidation could either amplify supply frictions by compounding existing entry barriers, or offset those frictions by unlocking the construction potential of the merged builder, as increased size may facilitate compliance with complex regulatory requirements. To test these possibilities, I extend the baseline DiD model with a triple interaction between merger exposure, the post-merger period, and zoning restrictiveness, measured using the Wharton Residential Land Use Regulation Index (WRLURI, from Gyourko et al. 2008). The core results, which include re-

duced new-home supply, higher new-home prices, and increased repair incidence in overlapping markets following mergers, remain largely unchanged. The coefficients on the triple interaction terms are small in magnitude and statistically insignificant. These findings suggest that consolidation functions as an independent constraint on housing supply and that zoning reform alone is unlikely to neutralize the market power exercised by dominant builders.

This paper contributes to the ongoing discussion on the persistent undersupply of housing in the U.S. market. Traditional explanations emphasize geographic and regulatory constraints. For example, Saiz (2010) shows that cities with less developable land due to topography experience more constrained housing supply and greater price volatility. Similarly, Gyourko and Molloy (2015) identify restrictive zoning regulations and permitting delays as significant barriers to responsive housing supply. My paper highlights an additional and underexplored dimension: the role of increasing concentration in the U.S. homebuilding sector. Recent studies have begun to examine the role of industry structure in shaping housing market dynamics. Ahluwalia et al. (2022) explore how builder concentration affects local competition and supply responsiveness, reinforcing the importance of market structure as a key determinant of housing undersupply. Similarly, Quintero (2022) documents that markets dominated by a few large builders experience lower construction volumes and increased price volatility. I extend this line of research by utilizing mergers and acquisitions among large homebuilders as plausibly exogenous variation to local market concentration. Leveraging this empirical strategy, I provide causal evidence that consolidation results in lower housing supply, and I further demonstrate that this undersupply is largely driven by strategic reductions in new construction by the merged builder itself. I also show that consolidation can produce efficiency gains for dominant builders, such as faster project completion, but these gains come at the expense of competitors and households competing for limited construction resources. These findings complement recent work by D'Amico et al. (2024), who argue that restrictive land-use regulation fragments the industry and prevents firms from achieving economies of scale and productivity. While their study highlights the inefficiencies of

regulation-induced smallness, my results suggest that scale achieved through consolidation can also distort outcomes when it enables market power.

This paper also contributes to the broader finance and industrial organization literature on mergers and market power. Grullon et al. (2019) document that over 75% of U.S. industries have experienced increased concentration in recent decades, correlating with higher profit margins and more profitable M&A deals, suggesting that market power is becoming an important source of value. While horizontal mergers can yield synergies such as enhanced innovation Bena and Li (2014) and access to high-skilled labor (Chen et al., 2024), concerns persist regarding their impact on competition. This paper adds to the debate over the trade-off between efficiency gains and market power of industry consolidation. Broadly, merger retrospectives often find increased markups with limited productivity gains (Blonigen and Pierce, 2016). Kepler et al. (2023) find that firms often structure M&A deals to avoid antitrust scrutiny, leading to increased equity values and product prices, indicative of reduced competition. Similarly, Cunningham et al. (2021) introduce the concept of "killer acquisitions", where incumbents acquire innovative targets to discontinue their projects and preempt future competition. Extending this discourse to homebuilding, I show that consolidation not only alters housing-market dynamics but also degrades construction quality and weakens post-disaster recovery. Property-level tests indicate that any operational advantages enjoyed by consolidating builders are largely private—manifesting as faster timelines for acquirer projects without lower costs—while coming at the expense of competitors and even homeowners seeking repairs. These findings underscore the broader welfare implications of industry consolidation, particularly in sectors critical to societal well-being.

A growing body of research has shown that natural disasters have significant effects on economic growth (Cavallo et al., 2013; Hsiang and Jina, 2014; Strobl, 2011) and on housing markets more specifically (Boustan et al., 2020; Murphy and Strobl, 2009; Roth Tran and Wilson, 2020). On the post-disaster recovery side, prior studies have primarily focused on the financial sector, particularly the role of local banks in facilitating or constraining recovery (Cortés and Strahan,

2017; Gallagher and Hartley, 2024). This paper introduces a new perspective by examining the role of homebuilders—key economic actors who control critical resources that are essential for post-disaster rebuilding. I show that in highly concentrated builder markets, large firms may compete with individual homeowners for scarce post-disaster construction resources, such as contractors and labor, thereby exacerbating recovery delays. By highlighting this overlooked mechanism, the paper broadens the understanding of how industry structure can influence not just housing outcomes in steady-state periods, but also the speed and equity of disaster recovery.

2 Data Sources and Empirical Setting

2.1 Primary data sources

The main analysis in this paper relies on two data sources: (1) property-level sales and assessment data from Zillow, and (2) property-level construction permit data from Shovels.[4] Together, these datasets provide a comprehensive view of the full life cycle of newly built homes—spanning construction completion, initial sale, and subsequent repair activity. This section describes each data source in detail and outlines the sample construction process.

I use property sales data from Zillow's Assessor and Real Estate Database (ZTRAX), which contains detailed transaction-level information—such as transaction dates, sale prices, and buyer and seller names—as well as comprehensive property characteristics reported by local tax assessors, including property type, full address, year built, lot size, and building area. I rely on assessor data as of 2021 and merge it with transaction records using a unique parcel ID assigned to each property.

Construction permit data is sourced from Shovels, which offers detailed information on individual permits, including property addresses, permit categories,[5] filing and issue dates,

[4]See https://www.shovels.ai

[5]Permits are categorized as follows: addition, ADU (accessory dwelling unit), bathroom, battery, demolition, electric meter, electrical, EV (electric vehicle) charger, fire sprinkler, gas, generator, grading, heat pump, HVAC,

construction duration, job value (covering labor and material cost of construction), and the names of the permit owner and contractor. The sample period spans from 2000 to 2022.

2.2 Identifying shocks to builder concentration via mergers

Mergers between homebuilders provide an external shock to local market concentration, offering a quasi-experimental setting to identify the causal impact of builder concentration on construction-related outcomes such as housing supply, prices, and quality. By focusing on these discrete merger events, I isolate the effect of newly formed market power on housing market dynamics, rather than capturing broader local trends.

I obtain the list of large U.S. homebuilders from Builder Magazine (www.builderonline.com). This website publishes annual rankings of the top 200 national homebuilders based on yearly construction of new housing units from 2004 to 2024, along with each builder's total new housing supply and revenue. In addition, it provides annual rankings of the top 10 builders in each of the 50 largest metropolitan markets, including the number of new housing supply and market share for each builder. I combine the nationally ranked top 200 builders with the locally ranked top 10 builders in each metropolitan area. In total, the dataset comprises 1,474 unique builders that are influential at either the national or local level between 2004 and 2024. These leading builders are the most influential players in the homebuilding industries.

Panel A of Table 1 presents summary statistics for these metropolitan markets over the sample period. Each market is matched to its corresponding Core-Based Statistical Area (CBSA). Macro-level data for these metro areas are obtained from the U.S. Bureau of Economic Analysis. On average, 8,933 housing units are constructed annually in each of the 50 metro areas, with 57.8% of those units built by the region's top 10 builders. Figure 1 depicts the evolution of the average market share held by the top 10 builders across the 50 largest markets over time. This share has increased significantly—from 36% in 2005 to 78% in 2023—reflecting a sharp rise in industry concentration. The acceleration in concentration is particularly pronounced during

kitchen, new construction, plumbing, pool and hot tub, remodel, roofing, solar, and water heater. A single permit may be assigned to multiple categories.

periods of crisis, such as the aftermath of the 2008 financial crisis and the post-2020 pandemic period, suggesting that the homebuilding industry is becoming increasingly consolidated, especially in response to economic shocks.

Mergers between homebuilders are identified using merger and acquisition (M&A) records from the Securities Data Company (SDC) database. I identify 73 M&A transactions between 2004 and 2019 in which both the acquirer and the target are among the previously defined list of large builders. These transactions were executed by 34 unique acquiring firms, including 24 publicly traded homebuilders. To determine the geographic footprint of the builders involved in these deals, I first identify new home sales in the ZTRAX dataset, where new home sales are defined as the first recorded transaction of a housing unit within two years of construction. Then I perform a fuzzy match between seller names and the names of builders involved in the M&A transactions. This matching procedure yields 888,571 unique new home sales by 87 distinct builders between 1990 and 2020, spanning 46 states and 4,279 ZIP codes.

I then examine the impact of these mergers on ZIP-level housing markets, focusing on three key outcome variables: housing supply, housing prices, and the quality of new home construction. For housing supply, I consider both the total number of newly constructed residential units in each market—identified based on the built year of each property—and the number of new homes constructed by the merged builder (target plus acquirer). For housing prices, I use two measures: the Federal Housing Finance Agency (FHFA) House Price Index and the median price per square foot of newly sold homes, as recorded in the ZTRAX dataset. To assess construction quality, I calculate the proportion of new homes that filed repair-related permits[6] within three or five years of construction.

For each M&A deal, I analyze a window spanning four years before and four years after the year of M&A event, focusing on ZIP codes in which either the target or acquiring builder had previously constructed homes. Panel A of 1 reports summary statistics for ZIP-level markets around the M&A events. On average, each ZIP code in the sample records 201 new home

[6]I classify permits filed under the following categories as proxies for repairs rather than renovations: sprinkler, gas, HVAC, plumbing, and roofing.

constructions per year. Regarding construction quality, on average, 4.2% of new homes filed at least one repair-related permit within three years of construction, while 5.4% filed such a permit within five years. I also link the affected market to the Wharton Residential Land Use Regulation Index (WRLURI, Gyourko et al. 2008), which is survey-based measure of local residential land-use stringency. I use the 2006 version of the index, which predates most M&A events in my sample and captures persistent regulatory environments. WRLURI aggregates multiple dimensions of regulation, such as approval delays, density restrictions, and open-space requirements, into an overall standardized index so that zero equals the national mean (higher values indicate more restrictive regulation). Since WRLURI is reported at the municipality level, I aggregate to the county by taking the median across municipalities and then assign that value to ZIP codes within the county, which preserves ordinal variation while limiting sensitivity to outliers. The sample for the county-level WRLURI is -0.019, close to the national mean in the original municipal-level measure.

To examine potential efficiency gains induced by mergers, I analyze permit-level observations for new construction in ZIP codes affected by the M&A events. By linking owner names in building permits to seller names in ZTRAX deed records for the same property, I can identify the builder of each new home, including those constructed by the acquiring firm. Each new-construction permit reports two efficiency-relevant measures: (i) the job value, which is the combined cost of labor and materials, and (ii) the construction duration, measured as the number of days between the permit filing and completion (close) dates. Because construction scale mechanically affects both outcomes, I normalize these measures by living area using ZTRAX assessment data and construct cost per square foot and duration per square foot. Panel C of 1 reports summary statistics for the natural logarithms of these variables used in the tests. on average, the sample new homes take 0.08 days per square foot to build and cost $93 per square foot.

2.3 Repair permits around disaster events

According to a survey by the National Association of Home Builders, large homebuilders tend to rely more heavily on subcontractors to complete residential construction projects.[7] Increasing concentration in the homebuilding industry may crowd out local subcontractor resources that would otherwise be available to meet individual demand. This effect is particularly salient in post-disaster periods, when large homebuilders may prioritize their own new construction projects over property repairs, potentially delaying recovery for individual homeowners.

To examine the spillover effects of builder concentration on post-disaster recovery, I focus on hurricane events that have significantly impacted Florida in the past two decades. This focus is motivated by several factors: (1) Florida has a booming real estate market, with 13 metropolitan areas appearing at least once among the top 50 largest housing markets according to www.builderonline.com, which reports the market share of the region's top 10 builders—allowing for precise measurement of market concentration; (2) Florida has been struck by multiple major hurricanes over the years, providing a series of exogenous natural shocks; and (3) the state has comprehensive construction permitting records, with over six million residential permits documented in the Shovels dataset—making Florida the top state in terms of permit volume.

I focus on hurricanes that made landfall in Florida as at least Category 3 storms between 2004 and 2022. For each hurricane, I identify the most severely affected metropolitan areas as those where at least one county within the corresponding CBSA reported 10,000 or more hurricane-related insurance claims.[8] These heavily impacted areas are the most likely to experience surges in repair demand. I then restrict the sample to metro areas that also appear among the top 50 largest housing markets according to Builders Magazine in the event year. This selection process results in four major hurricane events in the final sample: Hurricane Charley (2004), Hurricane Wilma (2005), Hurricane Irma (2017), and Hurricane Ian (2022). For each

[7] See https://www.nahb.org/-/media/NAHB/news-and-economics/docs/housing-economics-plus/special-studies/2020/special-study-average-new-home-uses-24-different-subcontractors.pdf

[8] Insurance claims data are obtained from the Florida Office of Insurance Regulation.

event, I use the hurricane's landfall date in Florida as the event date and focus on residential construction permits filed within a six-month window before and after that date in the affected metro areas. Since construction activity is highly sensitive to the precise timing of the event, I construct relative event-month periods by measuring time in 30-day increments before and after the landfall date. Panel C of 1 presents summary statistics for these permits. In total, the sample includes 278,330 residential permits, of which 58,547 are roofing-only permits. Figure 2 displays the distribution of permit filings around the hurricane events, showing a marked increase in residential permit activity, particularly for roofing permits, following the disasters.

3 Homebuilder Concentration and Housing Market Dynamics

Increased concentration in the homebuilding industry reduces competitive pressure among builders, potentially influencing the housing market in several ways.

Table 2 reports results from linear regressions of the logarithm of the total number of new housing units(Log(# Housing)) and the growth rate of new housing units (G(# Housing)) on the market share of the top 10 builders (Top-10 share) across the 50 largest metropolitan markets, controlling for a range of covariates. The results indicate that both Log(# Housing) and G(housing) are negatively associated with Top-10 share. Specifically, column (2) shows that a 10-percentage-point increase in the Top-10 share is associated with a 9.3% decline in the total supply of new homes. Column (4) further shows that the same increase in concentration is associated with a 5.4-percentage-point reduction in the growth rate of new home supply.

Builder concentration also appears to correlate with housing prices. Figure 3 shows that the market share of the top 100 builders is strongly positively associated with both the median sale price of new homes and the average revenue per unit sold by these builders.[9] This pattern

[9]Median sale price data for new homes are obtained from the U.S. Census Bureau. Total revenue and total number of new housing units data are obtained from Builder Magazine. All three indexes use 2003 as the base year

suggests that increased concentration in the homebuilding industry may lead to reduced price competition, allowing dominant firms to command higher prices and extract greater revenue per unit.

To strengthen the causal interpretation of the relationship between builder concentration and housing market outcomes, I exploit variation generated by 73 mergers among large homebuilders, as detailed in Section 2.2. These mergers represent discrete and plausibly exogenous shocks to local market concentration, offering a quasi-experimental setting to study the effects of industry consolidation. Because the degree of geographic overlap between acquiring and target builders varies across deals, the resulting changes in local market structure are heterogeneous and unlikely to be driven by underlying trends in demand, gentrification, or demographic shifts. This setting allows me to isolate the impact of increased builder concentration on key housing market outcomes—such as supply, prices, and construction quality—while mitigating concerns about confounding local dynamics or slow-moving macroeconomic factors.

For each merger, I identify local housing markets at the ZIP-code level where at least one of the merging builders, either the acquirer or the target, had constructed and sold homes prior to the year of merger. I then compile ZIP-level data on housing supply, housing prices, and construction quality, as detailed in Section 2.2. To estimate the impact of increased builder concentration on these outcomes, I employ a series of staggered DiD models using the following specification:

$$\text{Outcome}_{i,j,t} = \beta_0 + \beta_1 \text{Post}_{i,t} \times \text{Overlapping market}_{i,j} + \beta_2 X_{i,j,t} + \epsilon_{i,j,t} \tag{1}$$

The dependent variable, $Outcomei, j, t$, represents the housing market outcome of interest—such as new home supply, price measures, or construction quality indicators—for merger i, ZIP code j, and year t (see Section 2.2 for definitions). The variable $Posti, t$ is a binary indicator equal to one for years following the completion of merger i, and zero otherwise. $Overlapping\ market_{i,j}$ is a binary variable equal to one if both the acquirer and the target had previously constructed

homes in ZIP code j prior to merger i, identifying local markets where the merger plausibly affects market concentration.

The vector of control variables, $X_{i,j,t}$, includes alternative combinations of the following fixed effects: deal × ZIP fixed effects and deal × year × county fixed effects. The deal × ZIP fixed effects account for time-invariant or slowly evolving ZIP-level characteristics—such as neighborhood demographics, historical land use policies, or pre-existing supply constraints—that may influence local housing outcomes. The deal × year × county fixed effects absorb time-varying shocks at the county level, including changes in local economic conditions, zoning regulations, and labor market dynamics. Interacting these fixed effects with the deal identifier ensures that the estimation compares changes within the same merger, thereby strengthening the identification strategy and mitigating confounding variation across unrelated mergers.

These overlapping ZIP-level markets constitute the treatment group, based on the assumption that mergers influence competition primarily in areas where both builders were previously active. The key identification assumption is that each merger generates a discrete and exogenous increase in the scale and market share of the Combined builder within overlapping ZIP codes. This shift is plausibly unrelated to contemporaneous local economic conditions and can causally affect the intensity of competition in the local housing market.

Since the merger sample is limited to transactions involving relatively large builders—defined as those ranked among the top 200 national builders or the top 10 builders in a regional metropolitan area—these events have the potential to substantially alter the competitive landscape at the local level. With increased market share, the acquiring builder is better positioned to exert control over critical local resources, including land, building materials, and labor. This enhanced market power may allow the merged builder to strategically optimize both cost efficiencies and pricing leverage, thereby magnifying the potential impacts of consolidation on housing supply, pricing dynamics, and construction quality.

To test the parallel trends assumption underlying the DiD design, I also estimate a dynamic version of Model 1. Specifically, I decompose the interaction term $Post_{i,t} \times overlappingMarket_{i,j}$

into a series of interactions between $overlappingMarket_{i,j}$ and event-year indicator variables. These indicators capture each year relative to the merger year, with year -1 (the year immediately preceding the merger) serving as the base group. This event-study specification allows me to examine the temporal dynamics of housing market outcomes before and after the merger and to assess whether pre-merger trends in overlapping and non-overlapping markets are statistically indistinguishable.

3.1 Homebuilder consolidation and housing supply

Leading homebuilders typically develop large-scale residential communities rather than isolated individual housing projects. Through mergers, acquiring builders often gain control of unbuilt lots previously owned by the target firm, allowing for more strategic and coordinated planning over land use, development timing, and resource allocation. In this subsection, I examine the impact of mergers on ZIP-level housing supply by estimating Equation 1.

Given that new housing supply is a count-based variable, Table 3 reports DiD estimates using a Poisson regression framework. Column (1) shows that, following a merger, the number of new housing units constructed in overlapping markets declines by 7.6% relative to non-overlapping markets. Subfigure (a) of Figure 4 presents the dynamic version of this effect. The subfigure confirms the parallel trends assumption: prior to the merger, housing supply trends in overlapping and non-overlapping markets move in parallel, with a noticeable divergence emerging only after the merger. These findings suggest that increased builder concentration will lead to a decline in new housing supply.

A substantial portion of this decline is driven by the post-merger behavior of the merged builder itself. Specifically, Column (2) of Table 3 shows that the combined builder reduces its housing production in overlapping markets by 24.3% following the merger, relative to the non-overlapping markets. Subfigure (b) of Figure 4 similarly supports the parallel trends assumption and reveals that the merged firm persistently restricts construction activity in overlapping markets after consolidation.

Together, these results provide compelling evidence that increased market power resulting from builder mergers can significantly reduce local housing supply—particularly through the behavior of the Combined builder, which sharply curtails its own construction activity in overlapping markets following the merger.

3.2 Homebuilder consolidation and housing price

In recent decades, housing affordability has emerged as a critical issue across the U.S. Home prices have surged in many metropolitan areas, often outpacing income growth and placing homeownership increasingly out of reach for large segments of the population. While much of the public and academic discourse has focused on demand-side drivers—such as population growth, low interest rates, and institutional investment—supply-side forces deserve equal scrutiny. The previous subsection demonstrated that rising homebuilder concentration leads to a reduction in housing supply. An equally important question concerns the implications of builder concentration for price dynamics. In this subsection, I examine how mergers among large homebuilders affect ZIP-level housing prices by estimating Equation 1.

Column (1) of Table 4 reports DiD estimates for the log FHFA house price index. The coefficient is economically small and statistically indistinguishable from zero, indicating no detectable change in the overall repeat-sales index for overlapping markets relative to controls. Subfigure (a) of Figure 5 shows flat pre-trends and no discernible post-merger break, consistent with this null effect. This muted response is expected: builders directly control only the flow of *new* construction, while the supply of existing homes—the dominant component of repeat-sales indices—is determined by incumbent home owners. Newly built homes account for a minority of the stock—about 28% of homes for sale in 2024 per Redfin. [10] Furthermore, new and existing homes are imperfect substitutes that operate in distinct, albeit linked, submarkets. New units command a price premium due to modern amenities and warranties, entering at the top of the "quality ladder" before gradually filtering down as they age (Sweeney, 1974; Weicher and

[10] https://www.redfin.com/news/q3-2024-new-construction-homes.

Thibodeau, 1988). As a result, aggregate housing price indices may only be marginally affected by changes in new housing supply.

The upward price trend is more pronounced in the market for newly built homes, where builders exercise direct control over both supply and pricing. Column (2) of Table 4 reports the DiD estimate for the log-transformed median price per square foot of new homes sold at the ZIP-level market. The results show that the median price per square foot of new homes increases by 6.7% in overlapping markets following a merger, relative to non-overlapping markets. This effect is statistically significant at the 5% level. Subfigure (b) of Figure 5 supports this finding, displaying a clear and sustained post-merger increase in new home prices in overlapping areas.

Taken together, the joint pattern of falling supply—particularly among the merged entities—, a sharp increase in new home prices, and a stable overall price index is consistent with merged firms exercising enhanced market power. Consolidation allows builders to tighten the flow of new supply and increase markups in the specific market segment they directly control, while the sheer size of the existing housing stock insulates the broader market from an immediate price impact.

3.3 Homebuilder consolidation and construction quality

The quality of new housing construction is a major concern for homebuyers. As homebuilder concentration increases, competitive pressure diminishes, reducing incentives for builders to maintain or improve construction quality. Evidence from various sources suggests that large national builders may compromise on construction standards. For example, D.R. Horton agreed to a $16.1 million settlement in 2024 to resolve claims of widespread construction defects—including roof and siding issues—affecting more than 200 homes in South Carolina.[11] Similarly, Lennar has faced lawsuits, such as a case in Florida where homeowners reported persistent stucco defects and inadequate repairs.[12] These cases highlight how increased builder size can potentially

[11] See https://sauderschelkopf.com/investigations/d-r-horton-construction-defect-lawsuit-investigation

[12] See https://sauderschelkopf.com/investigations/lennar-homebuilder-construction-defect-lawsuit-investigation

weaken quality control, raising broader concerns about construction standards in increasingly concentrated housing markets.

To explore the relationship between builder size and construction quality, I hand-collected customer complaints filed under the "Service or Repair Issues" category on the Better Business Bureau (BBB) website for each builder that constructed over 1,000 housing units in 2023. These complaints, which primarily reflect dissatisfaction with the construction quality of newly built homes, span a three-year window from April 2022 to April 2025. I then construct a complaint ratio by scaling the total number of complaints with the total number of new housing units constructed by each builder in 2023. Figure 6 plots the relationship between builder rank (with lower ranks corresponding to larger builders in terms of housing volume) and the complaint ratio. The figure shows a downward trend: larger builders tend to have higher complaint ratios, suggesting that construction quality declines with builder size.

To establish the casual link, this subsection further examines how mergers among large homebuilders affect construction quality, measured by the post-sale repair ratio in the local market, by estimating Equation 1.

Column (1) of Table 5 reports DiD estimates for the 3-year repair ratio at the ZIP level, defined as the proportion of new homes that file repair permits within three years of construction. The results show that, following a merger, the 3-year repair ratio increases by 0.009 in overlapping ZIP-level markets relative to non-overlapping markets—a statistically significant effect at the 1% level. This increase represents approximately 21.4% of the mean 3-year repair ratio, suggesting a substantial deterioration in short-term construction quality in more concentrated markets.

The pattern is similar for longer-term outcomes. Column (2) of Table 5 presents the DiD estimate for the 5-year repair ratio. The results reveal an increase of 0.012 in overlapping markets after a merger, compared to non-overlapping ones. This effect is statistically significant at the 1% level and represents roughly 22.2% of the mean 5-year repair ratio, underscoring a significant decline in longer-term construction quality in areas affected by builder consolidation.

Subfigures (a) and (b) of Figure 7 illustrate the dynamic patterns of the 3-year and 5-year repair ratios, respectively. Both plots show a post-merger increase in repair needs in overlapping markets, with no significant divergence in pre-trends, lending support to the parallel trends assumption.

These findings raise important concerns about construction quality in increasingly concentrated homebuilding markets. The observed rise in post-sale repair needs suggests that mergers among large builders may reduce incentives to maintain high construction standards. As a result, homeowners bear the consequences through more frequent and costly repairs.

3.4 The effect of consolidation on construction costs and durations

A central debate in industrial organization is the trade-off between efficiency gains and increased market power following M&A activity. Prior analysis reveals that builder consolidation leads to market-wide decrease in home supply, increase in home prices and deterioration in construction quality. The efficiency defense argues that consolidation allows firms to streamline operations, reduce costs, and deliver products more efficiently. If this channel exists, mergers between homebuilders should reduce construction costs per unit and shorten project durations.

To test the potential efficiency gains, I analyze permit-level data on new construction costs and durations around M&A events. Combining the stacked DID specification in Equation 1 with individual permit data, this approach captures project-level dynamics and tests whether post-merger construction patterns reflect efficiency improvements. I also include an *Acquirer dummy* and a triple interaction term *Post* $\times$ *Overlap market* $\times$ *Acquirer dummy* to examine whether acquirer-owned projects exhibit distinct efficiency changes relative to the broader market post-merger.

Columns (1) and (2) of Table 6 show that mergers do not lead to significant reductions in construction costs. The estimated effects on *Log(cost per sqft)* are close to zero and statistically insignificant in overlapping markets, both for the market overall and for acquirer-owned projects. This null result is crucial: it rules out a cost-based explanation for the baseline findings.

The decline in housing supply, rise in prices, and deterioration in quality cannot be attributed to higher construction costs or builders substituting into cheaper materials.

While costs remain unaffected, the evidence on project durations reveal a nuanced dynamic. Column (3) shows that in overlapping markets post-merger, average construction durations per square foot increase by about 8.5%. However, Column (4) shows that the triple interaction term, *Post* × *Overlap market* × *Acquirer dummy*, is -0.659 and highly significant (t = -2.68), indicating that acquirer-owned projects become nearly 48% faster relative to the treated market post-merger. In other words, acquirers realize a substantial private efficiency gain, but this improvement potentially comes at the expense of market-wide efficiency. This asymmetric efficiency changes suggest that acquirers, with increased market power, can leverage their expanded scale to better secure access to scarce inputs—such as inspectors, subcontractor labor and building materials. By effectively "jumping the queue", acquirers accelerate their own projects while leaving competitors to face resource shortages and delays.

This asymmetric pattern provides important context for the baseline findings. The combined evidence that acquiring builders can accelerate their own construction speed yet still reduce their own home supply in overlapping markets post-merger—all while enjoying higher new home prices and unchanged construction costs—demonstrates that consolidation enables a strategic exercise of market power. Efficiency gains, where they exist, remain private to the acquiring builder and are not passed through to consumers.

3.5 Zoning restrictions and the effects of builder consolidation

The extant literature on housing supply and affordability places a central focus on zoning regulations (e.g., Glaeser et al., 2005; Gyourko et al., 2021; Gyourko and Molloy, 2015). The interaction between these regulations and industry consolidation, however, is ambiguous. On one hand, mergers could amplify existing supply frictions. In markets with more restrictive zoning, where barriers to entry already limit competitive supply, consolidation may further constrain output by allowing dominant builders to more effectively ration supply. This suggests

that merger effects would be strongest in highly regulated markets. Conversely, mergers may have a muted effect in highly restrictive jurisdictions. Since binding zoning rules constrain all builders regardless of market structure, consolidation could have less of an impact. In this case, consolidation might instead have larger effects in relatively permissive markets, where, in the absence of market power, supply would otherwise be more responsive to demand shocks. This ambiguity makes the empirical test particularly valuable, as it allows us to determine whether the consequences of consolidation are amplified, muted, or independent of formal zoning restrictiveness.

To examine this question, I augment the baseline DiD specification with a triple interaction between merger exposure, the post-merger period, and local zoning restrictiveness, which is measured by Wharton Residential Land Use Regulation Index (WRLURI, 2006 version), a measure of zoning stringency developed by Gyourko et al. (2008). WRLURI is originally measured at the municipality level and aggregated to the county level using the median value across municipalities. Higher scores indicate more restrictive regulation.

Table 7 presents the empirical estimates. The baseline findings remain consistent: builder consolidation leads to a significant decline in housing supply at both the market and combined-entity levels (columns 1–2), an increase in new-home prices (column 4), and a rise in repair ratios (columns 5–6). These results reaffirm the core conclusion that builder consolidation reduces new construction, raises prices, and diminishes quality.

In contrast, the triple interaction term between merger exposure and the WRLURI is generally small in magnitude and statistically insignificant.[13] The coefficients are close to zero for supply and repair outcomes. While the interaction for new-home prices is positive, it lacks statistical significance. The only exception is in column 3, where the triple interaction is negative and statistically significant, suggesting slightly lower housing price growth in more restrictive counties. Overall, the evidence indicates that the effects of mergers do not systematically vary with zoning restrictiveness.

[13]Results are robust to using the 2018 WRLURI update from Gyourko et al. (2021).

These findings collectively suggest that the adverse consequences of builder consolidation are broad-based rather than confined to markets with especially restrictive zoning. This pattern highlights the importance of recognizing consolidation as an independent source of supply constraint. Even in markets with relatively permissive local regulations, concentration among builders can lead to output reductions and quality deterioration that parallel the effects of restrictive zoning. From a policy perspective, this underscores that reforms to land-use regulations, while crucial, may be insufficient to fully address the supply consequences of consolidation. Therefore, competition policy and merger review may also be necessary to preserve favorable housing market outcomes.

3.6 Homebuilder consolidation preference

So far, this section has provided evidence that increased homebuilder concentration—driven by mergers between large builders—leads to reduced housing supply, higher housing prices, and lower construction quality. These outcomes may ultimately benefit the remaining builders by allowing them to capture higher profit margins. This raises an important question: do acquiring builders intentionally target firms with overlapping market presence in order to achieve these synergy effects?

To explore the preferences of acquiring builders, I construct a panel dataset based on 73 sample merger deals involving 34 unique acquirers. For each deal, I treat all 34 builders as potential acquirers, regardless of whether they ultimately completed the transaction. For each deal-year observation, I identify whether the target operates in any ZIP-level market that overlaps with those of a given potential acquirer prior to the merger year. I define two measures of geographic overlap: (1) a binary overlap dummy, which equals 1 if the target shares at least one ZIP-level market with the potential acquirer; and (2) an overlap ratio, calculated as the number of overlapping ZIP codes divided by the total number of ZIP codes in which the potential acquirer operates.

I then estimate a logistic regression in which the dependent variable, $I_{M\&A}$, equals one if the target and acquirer completed a deal in a given year, and zero otherwise. This specification allows me to examine whether acquiring builders are more likely to pursue targets with greater geographic business overlap. The regression includes year fixed effects, acquirer fixed effects, and target fixed effects to control for time-varying macroeconomic factors and firm-level heterogeneity.

Table 8 presents the regression results. Across all specifications, both the overlap dummy and the overlap ratio are positively and significantly associated with the likelihood of a merger, with statistical significance at the 1% level. Column (2) shows that targets operating in overlapping markets with the potential acquirer are approximately 2.7 times more likely to be acquired. Column (4) indicates that a 10 percentage-point increase in the overlap ratio raises the odds of acquisition by 76% by the potential acquirer.

These findings suggest that larger builders strategically prefer to merge with firms that operate in overlapping markets, consistent with a motive to consolidate local market power.

4 Homebuilder Concentration and Disaster Recovery

Natural disasters routinely cause extensive property damage, resulting in billions of dollars in reconstruction needs. For example, the January 2025 Southern California wildfires destroyed or damaged over 18,000 homes and structures. In the aftermath of such events, the speed of recovery becomes a critical concern. While insurance coverage and logistical challenges are often emphasized, an important and understudied economic factor shaping recovery is the structure of the homebuilding industry. In the aftermath of major disasters, demand for independent contractors surges, often overwhelming local labor markets. Skilled contractors, such as roofers, framers, and electricians, become overextended, leading to long delays and elevated costs as homeowners and homebuilders compete for limited repair capacity. Following Hurricane Ian in 2022, for instance, many contractors raised prices significantly amid soaring demand, and even

well-insured homeowners in Florida experienced repair timelines extending from six months to over a year.[14]

Large homebuilders hold distinct advantages in accessing contractor resources. Operating at scale, they maintain expansive networks of subcontractors and possess the bargaining power to lock in labor and materials, even under tight market conditions. As a result, leading builders are well-positioned to quickly resume their own construction activity following a disaster. However, their efforts are typically directed toward ongoing development projects, such as new housing in master-planned communities, rather than dispersed repair work for individual homeowners. Given strong incentives to meet delivery schedules and financial targets, large builders may prioritize their own construction pipelines, indirectly limiting the availability of labor and materials for broader community recovery efforts.

This section examines the relationship between homebuilder concentration and post-disaster recovery speed by focusing on large metropolitan areas in Florida affected by four major hurricane events: Hurricane Charley (2004), Hurricane Wilma (2005), Hurricane Irma (2017), and Hurricane Ian (2022).

4.1 Permit completion time around disaster events

Specifically, I analyze the completion time of residential permits in impacted areas over a 12-month window—comparing permits filed within six months before each event to those filed within six months after. To quantify the effect of builder concentration on recovery delays, I estimate DiD models at the individual permit level using the following specification:

$$\text{Log(permit duration)}_{i,t} = \beta_0 + \beta_1 \text{Post}_t \times \text{High Concentration}_{j,t} + \beta_2 X_{i,t} + \epsilon_{i,t} \tag{2}$$

[14] See https://www.businessinsider.com/florida-homeowners-hurricane-ian-repairs-roof-contractor-materials-shortage-2022-12

The dependent variable, *Log(permit duration)*i, t, is the natural logarithm of the number of days between the issuance and completion of permit i, which is approved at time t. The variable *Postt* is a binary indicator equal to one for permits approved after the corresponding hurricane event, and zero otherwise. *High Concentration*$_{j,t}$ is a binary variable equal to one if, in the event year, the top 10 builders account for more than 80.9% of new housing supply in metropolitan area j where the permitted property is located. This variable identifies local markets in Florida characterized by high levels of homebuilder concentration around each hurricane event.

The vector of control variables, $X_{i,t}$, includes the following: *Log(permit work value)*, permit category fixed effects, year-month fixed effects, and event × ZIP fixed effects. Log(permit work value) is the natural logarithm of the reported dollar value of the permitted work and serves as a proxy for project complexity. Permit category fixed effects control for variation across different types of construction work (e.g., roofing, plumbing, electrical), enabling comparisons within similar permit types. Year-month fixed effects account for seasonality and broader time-varying macroeconomic conditions that may influence permit durations. Event × ZIP fixed effects capture heterogeneity in disaster severity and time-invariant ZIP-level characteristics within each disaster event, controlling for localized damage intensity and pre-existing local market conditions.

Table 9 reports the DiD estimates. Column (1) reports the results for all sample permits and it shows that metros with high homebuilder concentration takes 9.2% more time to finish in the post-disaster periods, compared to metros with low homebuilder concentration. The median construction duration is 104 days, meaning that the delay is about 10 days. Hurricanes would do much more disaster on exterior of properties such as roofing. 90% of sample permits citing "hurricane damage" is under the roofing category. Column (2) reports the DiD estimator for the roofing permits. It shows that metros with high homebuilder concentration takes 55.27% more time to finish in the post-disaster periods, compared to metros with low homebuilder concentration. The median construction duration is 58 days, meaning that the delay is about 32 days.

Natural disasters, particularly hurricanes, tend to cause extensive damage to the exterior of properties, especially roofs. Indeed, 90% of permits in the sample that explicitly cite "hurricane damage" fall under the roofing category. Column (2) reports DiD estimates restricted to roofing permits. The results indicate that, following a disaster, roofing projects in high-concentration markets take 60% longer to complete than those in low-concentration markets. With a median duration of 58 days for roofing permits, this implies an average delay of roughly 35 days.

I also estimate a dynamic version of Model 2 for roofing permits to assess the validity of the parallel trends assumption. Specifically, I decompose the interaction term Post $\times$ HighConcentration into a series of interactions between the HighConcentration indicator and event-month dummies covering the full sample period. Given that the median completion time for roofing permits is 34 days in the pre-disaster periods, permits issued up to one month prior to the hurricane event may also be affected by post-disaster disruptions. To address this concern, I set month -2 (i.e., two months before the event) as the base group. The estimated coefficients on the interaction terms are presented in Figure 8. The figure reveals an immediate surge in roofing permit duration in highly concentrated markets following the disaster, with no evidence of significant divergence in trends prior to the event. Moreover, the increase in duration persists and even intensifies over time in the post-disaster period.

4.2 Permit completion time for builder-owned contracts

In this subsection, I investigate whether permit completion times differ for builder-hire contracts—permits associated with properties directly owned by homebuilders but executed by third-party subcontractors in the aftermath of natural disasters.

Specifically, I identify a permit as a builder-hire contract if the listed permit owner is one of the leading builders in the sample, but the contractor associated with the permit differs from the owner, indicating that the builder hired an external subcontractor to perform the work. The sample includes 38,293 permits with non-missing information on both the permit owner

and contractor. Among these, 2,655 permits are associated with properties owned by sample builders, of which 1,421 were subcontracted to third-party contractors.

To assess whether the completion time for these permits is differentially affected by local market concentration, I re-estimate Model 2 by adding a triple interaction between the post-disaster indicator, the high-concentration market indicator, and an indicator for builder-hire subcontracted permits:

$$\begin{aligned}\text{Log(permit duration)}_{i,t} =& \beta_0 + \beta_1 \text{Builder Hire}_i \\ &+ \beta_2 \text{Post}_t \times \text{High Concentration}_{j,t} \\ &+ \beta_3 \text{Builder Hire}_i \times \text{High Concentration}_{j,t} \\ &+ \beta_4 \text{Builder Hire}_i \times \text{Post}_t \\ &+ \beta_5 \text{Builder Hire}_i \times \text{Post}_t \times \text{High Concentration}_{j,t} \\ &+ \beta_6 X_{i,t} + \epsilon_{i,t}\end{aligned} \tag{3}$$

Builder Hire$_i$ is a binary indicator equal to one if permit i is classified as a builder-hire permit. Table 10 presents the estimates from Model 3. The coefficient on the triple interaction term is -0.99, which is statistically significant at the 1% level. This result implies that builder-hire permits are completed 62.8% faster in regions with high homebuilder concentration following a disaster, compared to regions with lower concentration levels.

These findings suggest that contractors are more closely aligned with large builders in highly concentrated markets. Even during post-disaster recovery periods, when labor and material constraints are especially acute, projects initiated by large builders appear to be prioritized over those of individual homeowners. Since most of these builder-hire projects involve new construction rather than repairs, the preferential access to subcontractor resources may exacerbate delays for impacted homeowners seeking to restore their damaged properties.

5 Conclusion

Housing affordability and persistent undersupply represent significant challenges for the U.S. economy and its citizens. While traditional analyses often focus on geographic limitations and regulatory barriers, this paper has demonstrated that the increasing concentration within the U.S. homebuilding industry represents a critical, underexplored structural shift that fundamentally alters market dynamics and contributes to these challenges. The central channel operates through dominant builders' strategic control over key inputs, including land inventories, subcontractor networks, and construction labor, allowing them to prioritize internal projects while reallocating resources away from broader market needs.

Using exogenous variation in market structure from 73 mergers among the top 200 homebuilders between 2004 and 2019, I show that consolidation leads to reduced new-home supply, increased new-home prices, and lower construction quality in overlapping markets relative to non-overlapping markets post-merger. These effects are not driven by input cost changes. Instead, the merged builder strategically reduces output while accelerating its own construction timelines and capturing higher prices, even as competitors' projects slow down, consistent with private efficiency gains that come at the expense of overall market performance.

I further validate the mechanism using natural disasters as real-world stress tests of market capacity. Following major hurricanes in Florida, high-concentration markets experience significant delays in repair completion, particularly for urgent needs like roofing. Yet, builder-owned properties in those same markets are repaired substantially faster. These asymmetries underscore how large builders prioritize their own projects during periods of peak demand for construction resources, effectively crowding out individual homeowners and slowing the broader recovery process.

This study contributes to several important strands of the literature by identifying builder concentration as a key determinant of housing market outcomes, providing novel causal evidence on the effects of merger-induced concentration in the homebuilding sector, and introducing the role of homebuilders as significant and potentially complicating actors in post-disaster recovery

dynamics. The findings suggest that policy discussions aimed at addressing the housing crisis and improving disaster preparedness need to consider the structure of the homebuilding industry. Without confronting the strategic control that dominant builders exert over construction resources, public interventions may be undermined by private reallocation, leaving systemic vulnerabilities unaddressed.

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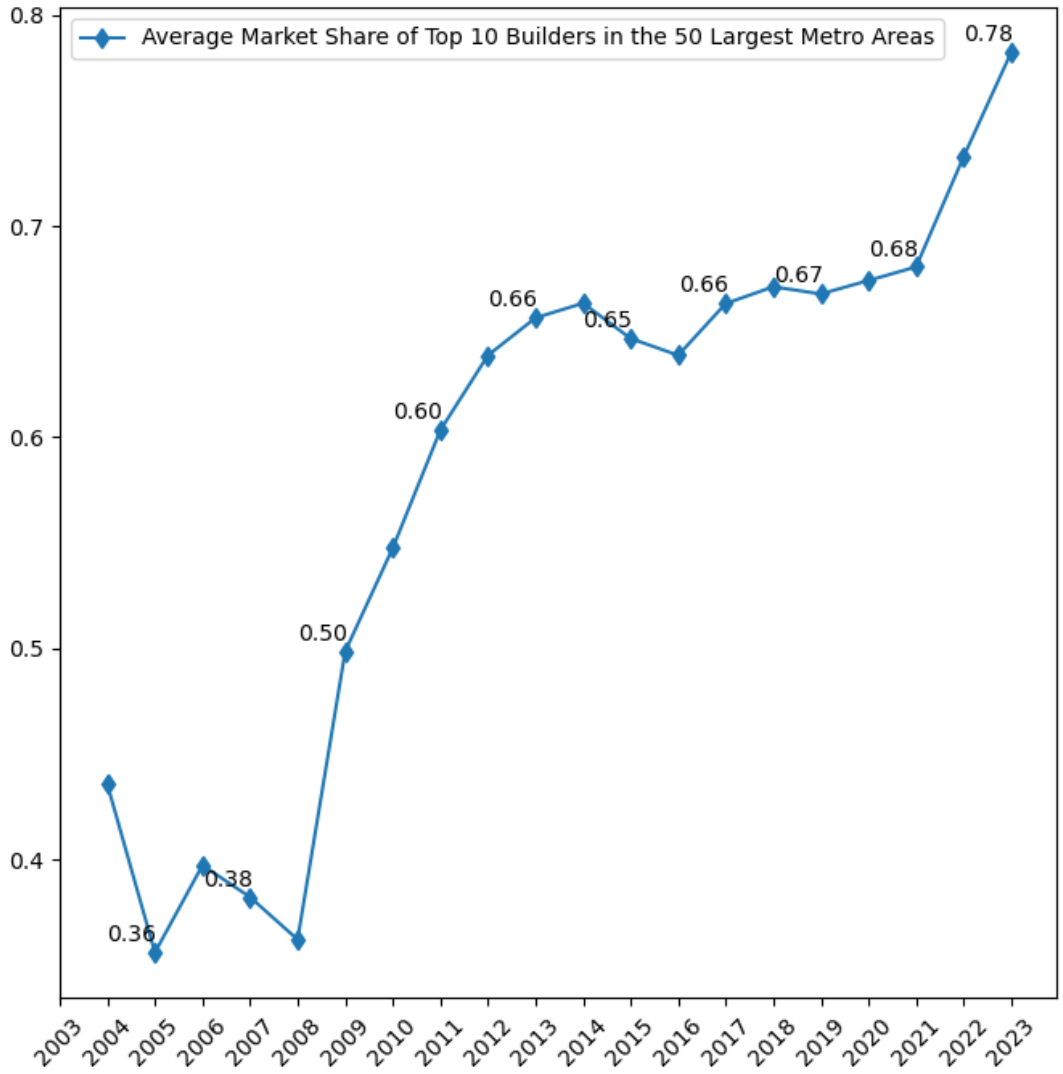
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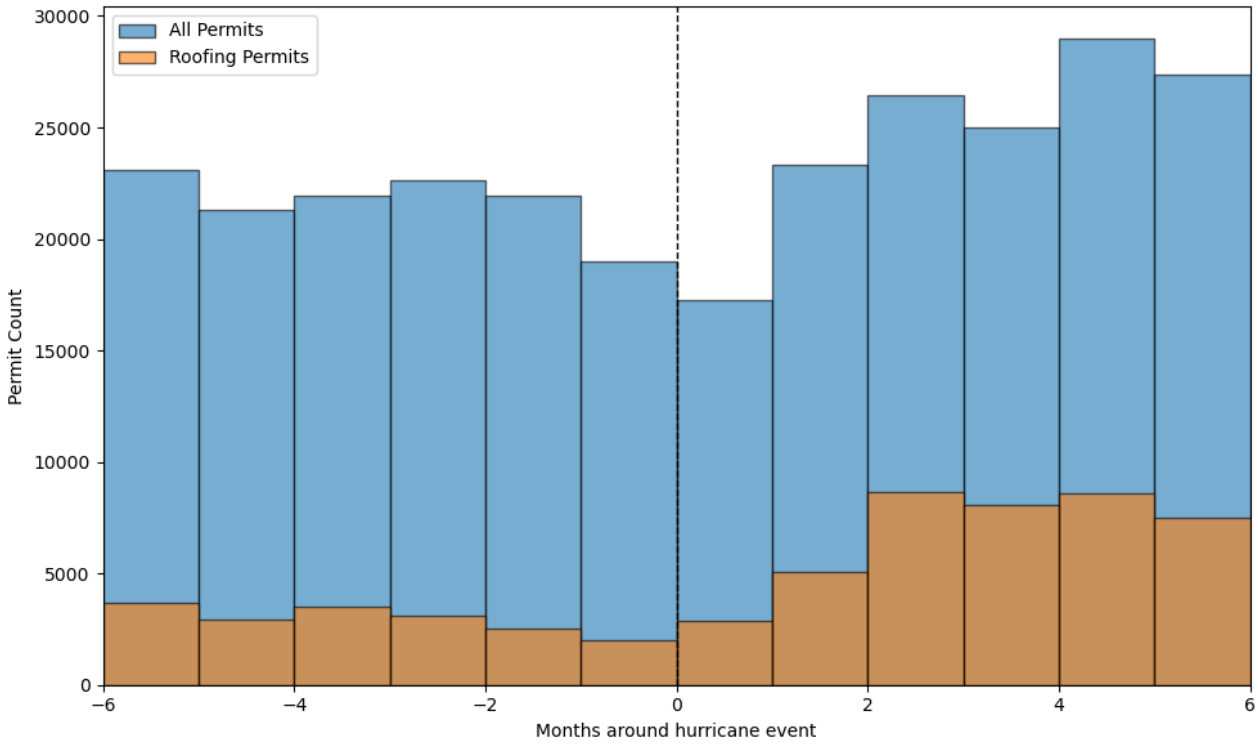
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Figure 1: Average market share of top 10 builders in the 50 largest metropolitan areas



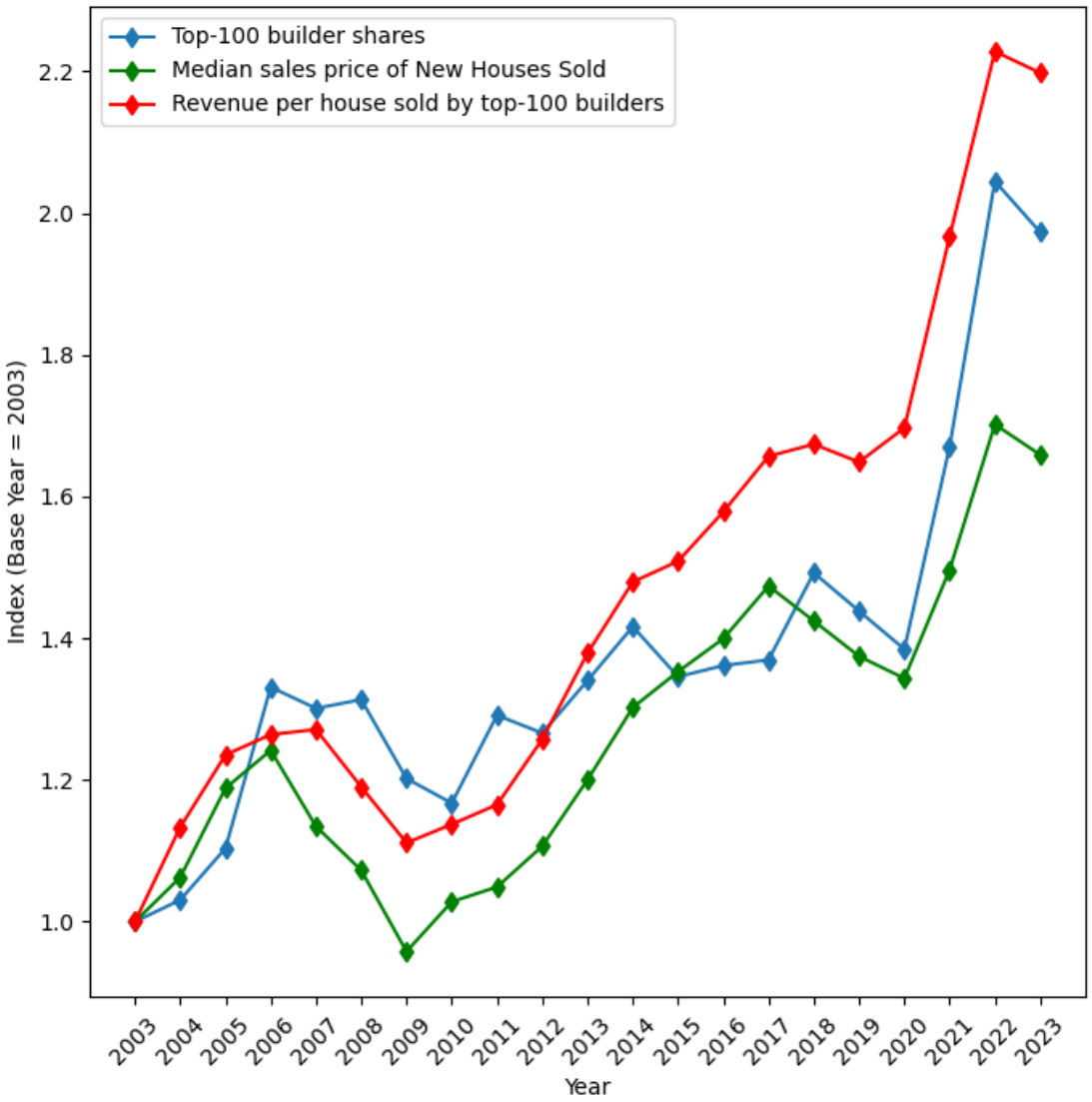
This figure illustrates the Average market share of top 10 builders in the 50 largest metropolitan areas published annually from Builder Magazine (www.builderonline.com).

Figure 2: Permit counts around hurricane events



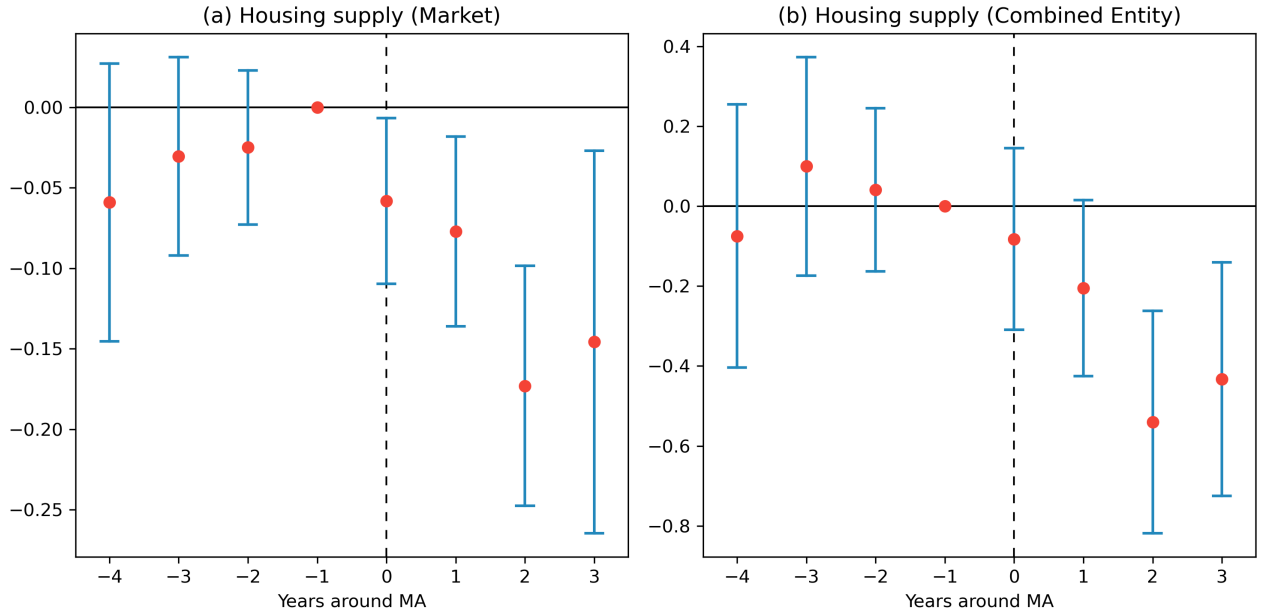
This figure plots the number of residential repair permits issued in the sample metropolitan areas within a six-month window before and after the four major hurricanes that made landfall in Florida. The blue bars represent total repair permits across all relevant categories, while the yellow bars represent permits filed specifically under the roofing category.

Figure 3: Builder concentration and prices of new houses



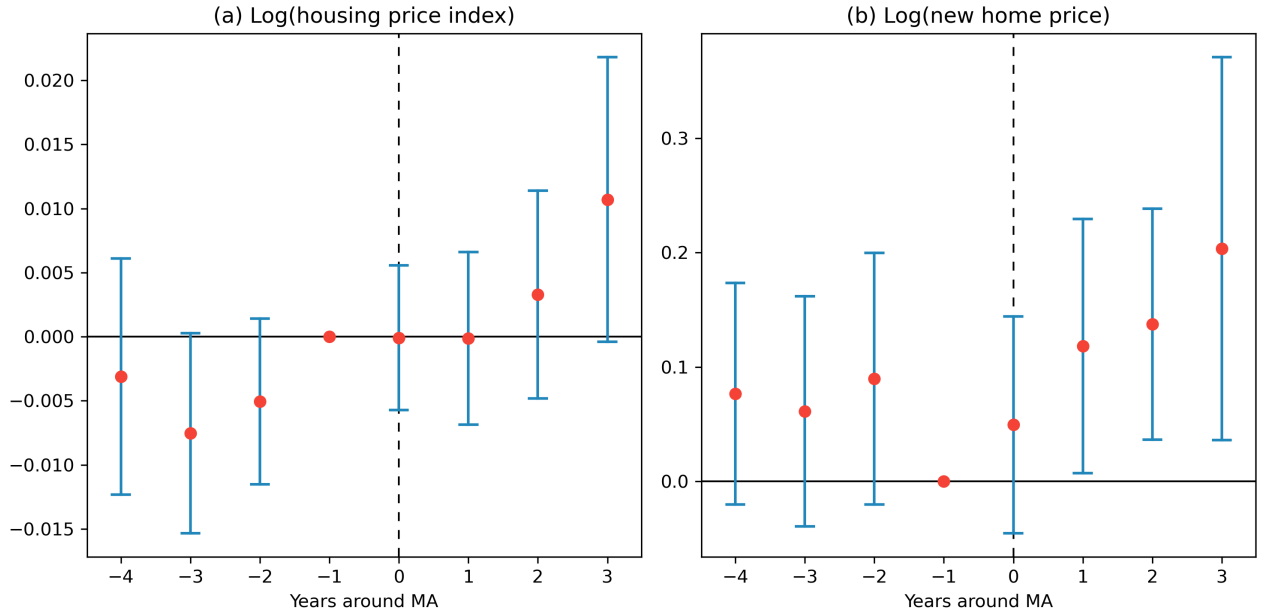
This figure plots indexed trends from 2003 to 2023 for the top 100 U.S. homebuilders, using 2003 as the base year. The blue line represents the average market share of the top 100 builders, sourced from Builder Magazine (www.builderonline.com). The green line shows the median sales price of new single-family houses sold, obtained from the U.S. Census Bureau. The red line displays the average revenue per unit sold by top 100 builders, also sourced from Builder Magazine. All three series are indexed to 2003 to facilitate comparison over time.

Figure 4: Difference in housing supply between overlapping and non-overlapping markets around mergers



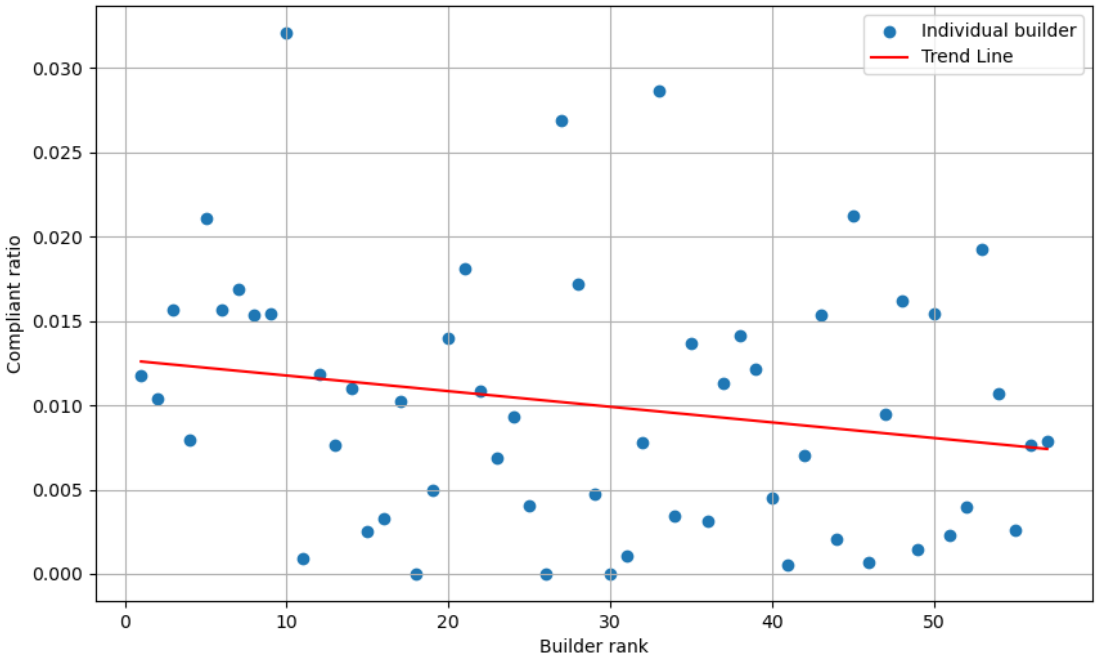
The figure shows the coefficient estimates from the dynamic version of Equation 1, examining differences in housing supply between overlapping and non-overlapping markets around homebuilder mergers. Panel (a) uses the total market-level new housing supply as the dependent variable. Panel (b) focuses on supply from the Combined builder (i.e., target plus acquirer). The horizontal axis refers to years from 4 years before to 3 years after the merger. Each node represents the coefficient on the interaction between the Overlapping Market indicator and the corresponding event-year dummy. The cap spikes denote 95% confidence intervals. The year immediately preceding the merger (Year -1) is used as the baseline in the regression.

Figure 5: Difference in housing prices between overlapping and non-overlapping markets around mergers



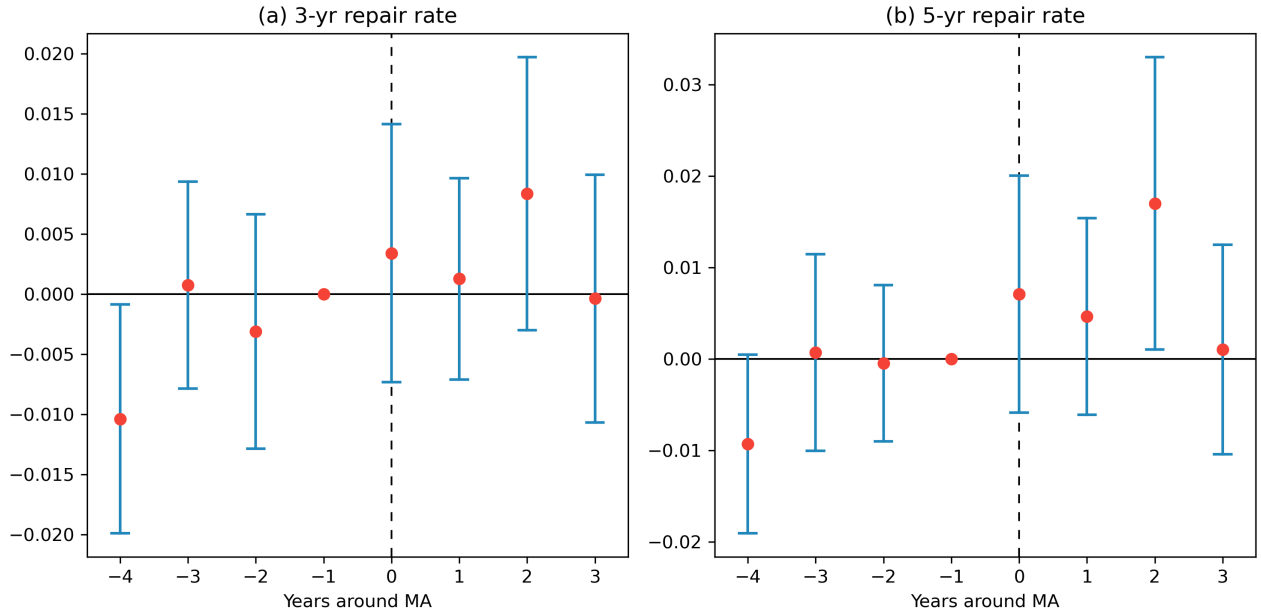
The figure shows the coefficient estimates from the dynamic version of Equation 1, examining differences in housing prices between overlapping and non-overlapping markets around homebuilder mergers. Panel (a) uses the natural logarithm of the housing price index as the dependent variable. Panel (b) uses the natural logarithm of the median price per square foot of newly built homes. The horizontal axis refers to years from 4 years before to 3 years after the merger. Each node represents the coefficient on the interaction between the Overlapping Market indicator and the corresponding event-year dummy. The cap spikes denote 95% confidence intervals. The year immediately preceding the merger (Year -1) is used as the baseline in the regression.

Figure 6: Buyer complaint ratio over construction quality



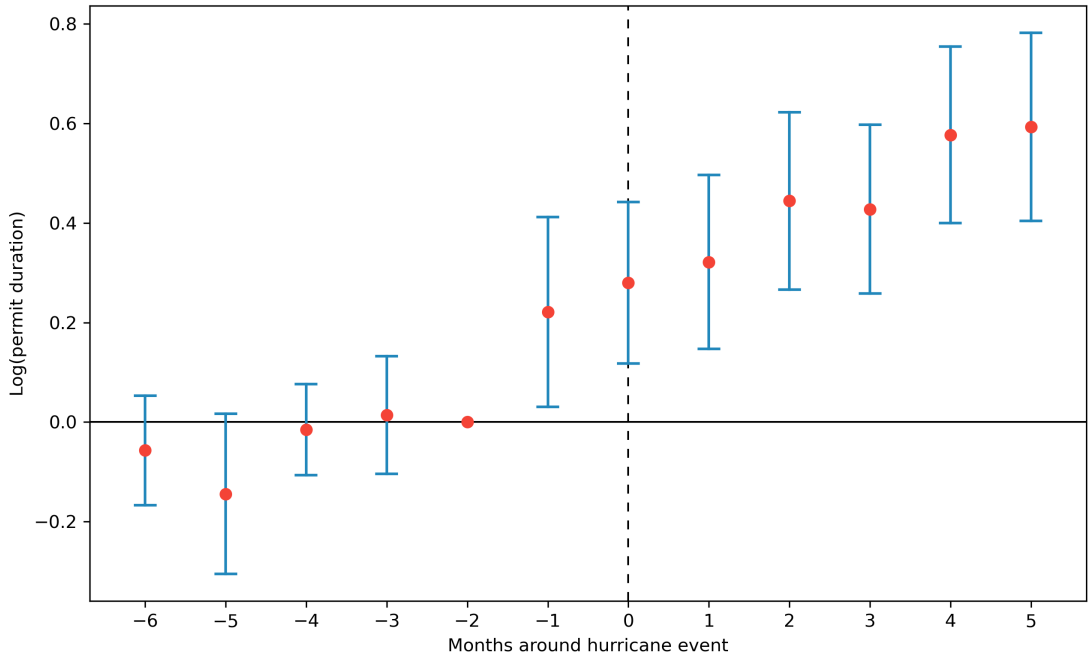
The figure plots the relationship between builder rank and buyer complaint ratio, based on complaints filed under the "Service or Repair Issues" category on the Better Business Bureau (BBB) website. The sample includes builders that constructed over 1,000 housing units in 2023. The complaint ratio is calculated as the total number of complaints filed between April 2022 and April 2025 divided by the number of housing units built in 2023 for each builder. Lower builder ranks indicate larger builders by construction volume. Each dot represents an individual builder, and the red line shows the fitted trend.

Figure 7: Difference in construction quality between overlapping and non-overlapping markets around mergers



The figure shows the coefficient estimates from the dynamic version of Equation 1, examining differences in construction quality between overlapping and non-overlapping markets around homebuilder mergers. Panel (a) uses the 3-year repair ratio, the proportion of homes filing repair-related permits within three years of construction in the sample markets, as the dependent variable. Panel (b) uses the 5-year repair ratio. The horizontal axis refers to years from 4 years before to 3 years after the merger. Each node represents the coefficient on the interaction between the Overlapping Market indicator and the corresponding event-year dummy. The cap spikes denote 95% confidence intervals. The year immediately preceding the merger (Year -1) is used as the baseline in the regression.

Figure 8: Difference in roofing permit duration around hurricane events



The figure shows the coefficient estimates from the dynamic version of Equation 2, examining the difference in roofing permit duration between high- and low-concentration markets around major hurricane events in Florida. The dependent variable is the natural logarithm of permit duration (i.e., days from issuance to completion). The horizontal axis refers to months relative to the landfall of the hurricane, ranging from 6 months before to 6 months after. Each node represents the coefficient on the interaction between the High Concentration indicator and the corresponding event-month dummy. The cap spikes denote 95% confidence intervals. Given that the median completion time for roofing permits is 34 days in the pre-disaster periods, permits issued up to one month prior to the hurricane event may also be heavily affected by post-disaster disruptions. To address this concern, The baseline period is set to month −2, two months before the disaster event.

Table 1: Summary statistics

Variable	N	Mean	SD	P25	P50	P75
Panel A: Annual statistics for the 50 largest U.S. metro housing markets						
# Housing	1031	8933.346	9097.428	3644.500	6125.000	10349.500
Log(# Housing)	1031	8.773	0.764	8.201	8.720	9.245
G(Housing)	945	-0.017	0.253	-0.162	0.003	0.137
Top-10 share	1031	0.578	0.204	0.430	0.590	0.743
GDP per capita	1031	59.459	14.700	50.265	58.153	66.944
Income per capita	1031	48.782	14.059	39.125	45.647	56.346
Log(population)	1031	14.536	0.907	13.848	14.576	15.208
Panel B: Annual statistics for ZIP-level housing market around homebuilder mergers						
# Housing (Market)	129023	201.582	257.534	34.000	106.000	261.000
# Housing (Combined builder)	72330	10.820	16.025	0.000	2.000	16.000
Log(housing price index)	127283	5.691	0.580	5.274	5.581	6.002
Log(new home price)	97736	4.799	0.652	4.458	4.802	5.168
3-yr repair rate	126131	0.042	0.103	0.000	0.000	0.029
5-yr repair rate	126131	0.054	0.121	0.000	0.000	0.046
WRLURI	129023	-0.019	0.459	-0.290	-0.025	0.265
Panel C: New-construction permit statistics around M&A events						
Log(cost per sqft)	1001359	4.536	0.432	4.351	4.678	4.816
Log(duration per sqft)	1001359	-2.505	0.549	-2.914	-2.541	-2.135
Panel D: Summary statistics for individual construction permits issued around hurricane events						
Top-10 share	278330	0.725	0.196	0.509	0.809	0.867
Log(permit duration)	278330	4.371	1.358	3.434	4.644	5.366
Log(permit work value)	278330	9.023	1.616	7.804	8.936	9.908
Log(roofing permit duration)	58547	4.078	1.150	3.296	4.060	4.787

Panel A reports annual summary statistics for the 50 largest U.S. metropolitan housing markets from 2004 to 2023. *# Housing* is the total number of new residential units constructed per year. *G(Housing)* is the annual growth rate of new housing supply. *Top-10 share* is the market share of the top 10 builders in each metro area, calculated based on new housing closings. *GDP per capita*, *Income per capita*, and *Log(population)* are obtained from the U.S. Bureau of Economic Analysis. Panel B summarizes annual ZIP-level housing market outcomes around the 73 mergers and acquisitions (M&A) involving large homebuilders. *# Housing (Market)* is the annual total number of new units constructed in a ZIP-level market. *# Housing (Combined builder)* is the annual number of homes built by the merged firm (acquirer plus target). *Log(housing price index)* is the natural logarithm of the FHFA ZIP-level house price index. *Log(new home price)* is the natural logarithm of the median price per square foot of newly built homes from ZTRAX. *3-yr repair rate* and *5-yr repair rate* are the proportions of new homes that filed repair-related permits within three and five years of construction, respectively. *WRLURI* is the Wharton Residential Land Use Regulation Index (released in 2008), originally measured at the municipality level and aggregated to the county level using the median value of municipalities within each county. Panel C reports summary statistics for individual new-construction permits issued within four years before and four years after the M&A events in affected ZIP codes. *Log(cost per sqft)* is the natural logarithm of the permit's reported job value (total dollar value of construction work, including materials and labor) divided by the property's square footage. *Log(duration per sqft)* is the natural logarithm of the permit's reported construction duration (in days) divided by the property's square footage. Panel D presents summary statistics for individual construction permits issued within six months before and after four major hurricanes in Florida. *Top-10 share* is the local market share of the top 10 builders based on the new housing supply in the year of the hurricane. *Log(permit duration)* is the natural logarithm of the number of days between permit issuance and completion for each individual permit. *Log(permit work value)* is the natural logarithm of the reported dollar value of the permitted construction work for each individual permit. *Log(roofing permit duration)* restricts the sample to roofing permits only. All variables in Panels B, C and D are winsorized at the 1st and 99th percentiles.

Table 2: Builder concentration and housing supply in top-50 metro markets

	Log(# Housing) (1)	Log(# Housing) (2)	G(# Housing) (3)	G(# Housing) (4)
Top-10 share	-1.054***	-0.888***	-0.536***	-0.542***
	(-5.87)	(-5.18)	(-5.62)	(-5.99)
GDP per capita		0.005		-0.008***
		(0.86)		(-2.80)
Income per capita		-0.007		0.004
		(-1.50)		(1.06)
Log(population)		2.210***		-0.155
		(5.95)		(-0.97)
Year FE	Y	Y	Y	Y
Metro FE	Y	Y	Y	Y
Observations	1031	1031	945	945
Adjusted R^2	0.917	0.931	0.536	0.543

This table presents results from regressions examining the relationship between builder concentration and housing supply across the 50 largest U.S. metropolitan housing markets. The dependent variables are the natural logarithm of the total number of new housing supply (*Log(# Housing)*) in columns (1) and (2), and the annual growth rate of new housing supply (*G(# Housing)*) in columns (3) and (4). The key independent variable, *Top-10 share*, is the market share of the top 10 builders in each metro area, based on annual housing supply. Control variables include *GDP per capita*, *Income per capita*, and *Log(population)*, all obtained from the U.S. Bureau of Economic Analysis. All regressions include year and metro fixed effects. Standard errors are clustered at the metro market level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Homebuilder concentration and housing supply

	# Housing (Market)	# Housing (Combined builder)
	(1)	(2)
Post × Overlapping market	-0.079***	-0.279***
	(-3.86)	(-3.36)
Deal × ZIP FEs	Y	Y
Deal × Year × County FEs	Y	Y
Observations	129023	72330
Pseudo R^2	0.881	0.592

This table presents Poisson regression estimates from Equation 1, examining the effects of homebuilder mergers on housing supply at the ZIP-level markets. The sample includes 73 M&A transactions between large U.S. homebuilders from 2004 to 2019. The dependent variable in column (1) is the total number of new housing units constructed annually in each ZIP-level market. Column (2) restricts the dependent variable to the number of units constructed by the merged builder (acquirer plus target). The key independent variable, *Post* × *Overlapping market*, is an interaction term equal to one for years after the merger in ZIP codes where both the acquirer and target builders operated prior to the merger, and zero otherwise. All regressions include deal × ZIP fixed effects and deal × year × county fixed effects. Standard errors are clustered at the year × county level. Z-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Homebuilder concentration and housing prices

	Log(housing price) (1)	Log(new home price) (2)
Post × Overlapping market	0.002	0.065**
	(0.89)	(1.97)
Deal × ZIP FEs	Y	Y
Deal × Year × County FEs	Y	Y
Observations	127283	97736
Adjusted R^2	0.997	0.772

This table presents OLS estimates from Equation 1, examining the effects of homebuilder mergers on housing prices in ZIP-level markets. The sample includes 73 M&A transactions involving large U.S. homebuilders between 2004 and 2019. The dependent variable in column (1) is the natural logarithm of the ZIP-level housing price index. Column (2) uses the natural logarithm of the median price per square foot of newly built homes as the dependent variable. The key independent variable, *Post* × *Overlapping market*, is an interaction term equal to one for years after the merger in ZIP codes where both the acquiring and target builders were previously active, and zero otherwise. All regressions include deal × ZIP fixed effects and deal × year × county fixed effects. Standard errors are clustered at the year × county level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Homebuilder concentration and construction quality

	3-yr repair rate (1)	5-yr repair rate (2)
Post × Overlapping market	0.009***	0.012***
	(2.78)	(2.66)
Deal × ZIP FEs	Y	Y
Deal × Year × County	Y	Y
Observations	126131	126131
Adjusted R^2	0.604	0.652

This table presents OLS estimates from Equation 1, examining the effects of homebuilder mergers on construction quality in ZIP-level markets. The sample includes 73 M&A transactions involving large U.S. homebuilders between 2004 and 2019. The dependent variable in column (1) is the 3-year repair rate, defined as the proportion of newly built homes that filed at least one repair-related permit within three years of construction. Column (2) uses the 5-year repair rate as the dependent variable. The key independent variable, *Post* × *Overlapping market*, is an interaction term equal to one for years after the merger in ZIP codes where both the acquiring and target builders were previously active, and zero otherwise. All regressions include deal × ZIP fixed effects and deal × year × county fixed effects. Standard errors are clustered at the year × county level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6: New-home construction cost and construction duration around M&A events

	Log(cost per sqft)		Log(duration per sqft)	
	(1)	(2)	(3)	(4)
Post × Overlap market	0.004	0.002	0.082***	0.083***
	(0.55)	(0.35)	(2.69)	(2.74)
Acquirer dummy		0.065***		0.024**
		(6.81)		(2.09)
Overlap market × Acquirer dummy		-0.006		-0.265***
		(-0.32)		(-3.48)
Post × Acquirer dummy		-0.001		0.044***
		(-0.06)		(3.55)
Post × Overlap market × Acquirer dummy		-0.032		-0.659***
		(-0.78)		(-2.68)
Deal × ZIP FEs	Y	Y	Y	Y
Deal × Year-month × County FEs	Y	Y	Y	Y
Observations	1001359	1001359	1001359	1001359
Adjusted R^2	0.656	0.657	0.477	0.477

This table reports OLS estimates from a stacked difference-in-differences (DID) specification examining permit-level new construction costs and construction durations around sample M&A events. *Log(cost per sqft)* is the natural logarithm of the permit's reported job value—defined as the total dollar value of construction work, including labor and materials—divided by the property's square footage. *Log(duration per sqft)* is the natural logarithm of the permit's reported construction duration (in days) divided by square footage. *Overlapping market* is an indicator equal to one for ZIP codes in which both the acquiring and target builders were active prior to the merger. *Post* is an indicator equal to one for permits issued after the year of the M&A event. *Acquirer dummy* equals one if the property under construction is owned by the acquirer associated with the corresponding M&A event. All regressions include deal × ZIP fixed effects and deal × year-month × county fixed effects. Standard errors are clustered at the year-month × county level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Homebuilder concentration, zoning restrictiveness, and housing outcomes

	# Housing (Market)	# Housing (Combined builder)	Log(housing price)	Log(new home price)	3-yr repair ratio	5-yr repair ratio
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Overlapping market	-0.076***	-0.268***	0.003	0.064**	0.008***	0.012***
	(-3.30)	(-3.04)	(1.29)	(2.05)	(2.75)	(2.61)
Post × Overlapping market × WRLURI	-0.027	-0.201	-0.009**	0.020	0.006	0.004
	(-0.62)	(-1.30)	(-2.45)	(0.26)	(0.92)	(0.65)
Deal × ZIP FEs	Y	Y	Y	Y	Y	Y
Deal × Year × County FEs	Y	Y	Y	Y	Y	Y
Observations	129023	72330	127283	97736	126131	126131
Pseudo R^2/ Adjusted R^2	0.881	0.592	0.995	0.772	0.604	0.652

This table reports estimates of Equation 1 with a triple interaction between merger exposure and zoning restrictiveness. The sample includes 73 M&A transactions between large U.S. homebuilders from 2004 to 2019. Columns (1)–(2) present Poisson regressions for housing supply at the market and combined-entity level; reported statistics are z-statistics, and model fit is measured by the Pseudo R^2. Columns (3)–(6) present OLS regressions for housing prices and repair ratios; reported statistics are t-statistics, and fit is measured by the adjusted R^2. The key independent variable, *Post* × *Overlapping market* × *WRLURI*, interacts the merger exposure indicator with the Wharton Residential Land Use Regulation Index (2006 version), aggregated from the municipality to the county level using the median value across municipalities. Higher WRLURI values indicate more restrictive zoning and land-use regulations. All regressions include deal × ZIP fixed effects and deal × year × county fixed effects. Standard errors are clustered at the year × county level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Builder M&A preference over market overlap

	$I_{M\&A}$ (1)	$I_{M\&A}$ (2)	$I_{M\&A}$ (3)	$I_{M\&A}$ (4)
$I_{Overlap}$	0.902***	1.000***		
	(3.23)	(2.64)		
Overlap ratio			2.912***	5.639***
			(2.70)	(2.75)
Year FE	N	Y	N	Y
Acquirer FE	N	Y	N	Y
Target FE	N	Y	N	Y
Observations	1811	1508	1811	1508
Pseudo R^2	0.022	0.081	0.008	0.082

This table presents logistic regression estimates examining whether acquirers prefer to merge with targets that operate in the same markets. The dependent variable, $I_{M\&A}$, equals one if a merger occurs between a given acquirer–target pair in a given year, and zero otherwise. Columns (1) and (2) use a binary overlap indicator, $I_{Overlap}$, which equals one if the acquirer and target operated in at least one common ZIP code prior to the merger year. Columns (3) and (4) use the overlap ratio, defined as the number of overlapping ZIP codes divided by the total number of ZIP codes in which the acquirer operates. Standard errors are clustered at the acquirer level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 9: Homebuilder concentration and disaster recovery

	Log(permit duration) (All permits) (1)	Log(permit duration) (Roofing permits) (2)
Post × High Concentration	0.088**	0.470***
	(2.51)	(7.23)
Log(Permit work value)	0.223***	0.134***
	(11.01)	(4.34)
Permit category FE	Y	N
Year-month FE	Y	Y
Event × ZIP FE	Y	Y
Observations	278,330	58,547
Adjusted R^2	0.375	0.326

This table reports estimates from Equation 2, examining the impact of homebuilder concentration on post-disaster permit completion times. The dependent variable in both columns is the natural logarithm of the number of days between permit issuance and completion. Column (1) includes all residential permits issued within six months before and after four major hurricanes in Florida between 2004 and 2022. Column (2) restricts the sample to roofing permits only. The key independent variable, *Post* × *High Concentration*, is an interaction term equal to one for permits approved after the hurricane in metropolitan areas where the top 10 builders accounted for more than 80.9% of new home supply in the event year, and zero otherwise. All regressions control for permit work value, year-month fixed effects, and event × ZIP code fixed effects. Column (1) additionally includes permit category fixed effects. Standard errors are clustered at the ZIP-code level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 10: Builder-owned contracts and disaster recovery

	Log(permit duration)
Builder Hire	-0.276***
	(-2.89)
Post × High Concentration	0.096***
	(2.81)
Builder Hire × High Concentration	0.050
	(0.22)
Builder Hire × Post	0.312**
	(2.19)
Builder Hire × Post × High Concentration	-0.99***
	(-3.90)
Log(permit work value)	0.222***
	(10.95)
Permit category FE	Y
Year-month FE	Y
Year × ZIP FE	Y
Observations	278,330
Adjusted R^2	0.375

This table presents estimates from Equation 3, examining whether builder-owned contracts are prioritized during post-disaster recovery in highly concentrated markets. The dependent variable is the natural logarithm of the number of days between permit issuance and completion. The key variable, *Builder Hire*, is a binary indicator equal to one for permits where the builder is the owner of the associated residential property and the listed contractor is a third party. *Post* × *High Concentration* captures general delays in high-concentration areas after disasters. The triple interaction term, *Builder Hire* × *Post* × *High Concentration*, identifies whether builder-owned permits are completed faster after disasters in highly concentrated markets. Controls include permit work value, permit category fixed effects, year-month fixed effects, and year × ZIP fixed effects. Standard errors are clustered at the ZIP-code level. T-statistics based on robust standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.