

Working Paper

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Price Rigidities in the Market for New Homes[†]

Anna Emilie Iden Plamen Nenov Sonja Plaku

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Abstract

We study pricing and liquidity in the market for new housing using rich project-level and transaction-level data from Norway. We provide evidence that points to prices of new homes adjusting substantially more sluggishly than prices in the existing-home market. A central empirical fact is that the relative price growth of new versus existing homes comoves positively with inventory-to-sales ratios in the new-housing market. In the cross-section, we further show that higher initial prices are associated with longer selling durations, delayed project starts, and higher cancellation probabilities. We interpret these findings through a simple theoretical framework with imperfect substitutability between new and existing housing and rigid prices for new homes. The model is consistent with the observed joint dynamics of relative prices, sales, and inventories under housing-demand shocks, while alternative flexible-price mechanisms or other shocks cannot generate these comovements. Overall our findings suggest that price rigidities among developers amplify housing-demand shocks and may contribute to persistent fluctuations in residential investment and housing supply.

JEL Classification: R31, E32, D22

Keywords: Housing markets; Price rigidity; Housing supply; Residential investment;

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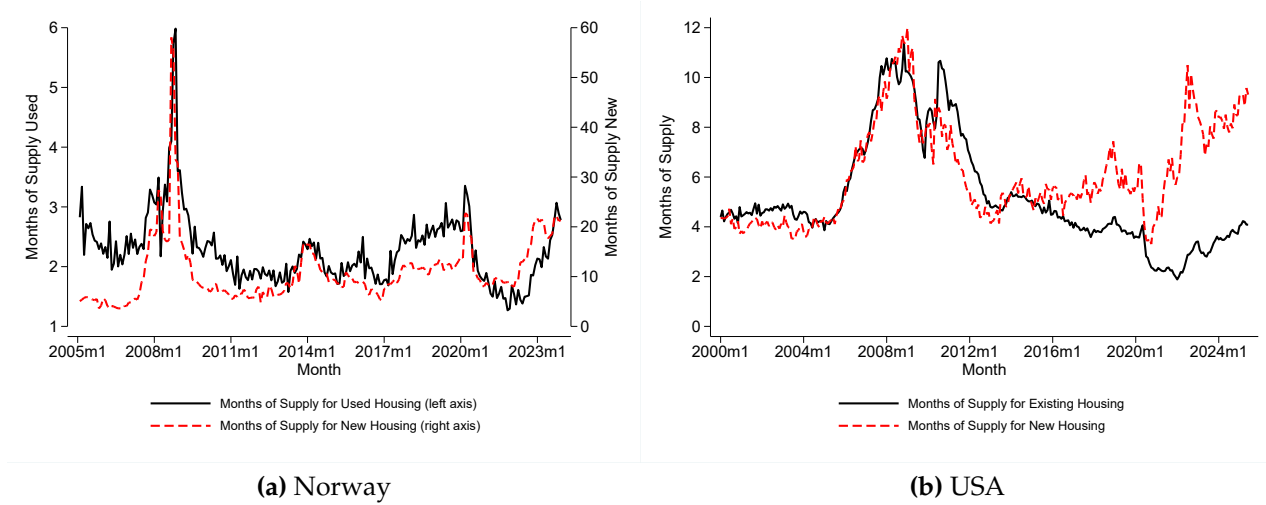
1 Introduction

Housing markets play a central role in macroeconomic fluctuations, household balance sheets, and the transmission of monetary policy. While a large literature studies the dynamics of house prices and residential investment, considerably less attention has been paid to the pricing behavior of developers in the market for newly built homes. This paper attempts to fill this gap by presenting new empirical evidence on pricing and liquidity in the market for new homes using rich project level and transaction data from Norway. We argue that the evidence, both in the time-series and in the cross-section points strongly towards pricing rigidities in the market for new homes.

A central empirical fact we document in our paper is the time-varying gap in relative price growth between new and existing housing. If prices in both market segments adjusted flexibly to common housing-demand shocks, relative price growth should not move systematically with market liquidity. In the data, however, the relative price of new and existing homes varies strongly over the housing cycle. Periods of weaker sales activity and lower liquidity in the new-housing market coincide with relatively higher prices for new homes. This pattern is visible both in aggregate time-series data and in the cross-section in project- and transaction-level evidence. At the transaction level, we further document a positive relationship between first-sale prices and time-on-market for apartments, a pattern that is difficult to reconcile with frictionless pricing models but consistent with sluggish price adjustment by developers.

Figure 1 illustrates the sharp difference between the liquidity volatility of new and existing housing markets in Norway, especially compared to the corresponding patterns in the United States. In Norway, the inventory-to-sales ratio or the so called “month of supply” for new homes – a commonly used liquidity measure in real estate – is much more volatile than the corresponding measure for existing homes. This difference is substantially larger than in the United States, where the liquidity of new and existing homes moves more similarly over time. The Norwegian pattern suggests that adjustment in the new-housing market occurs disproportionately through quantities and sales durations rather than through prices. In particular, when demand weakens, developers appear to maintain prices, leading to slower sales and a sharp increase in months of supply.

We study these patterns using several complementary sources of data. Our main data source is unique longitudinal project-level data that track residential development projects from the beginning of sales activity until completion or cancellation. These data contain detailed information on listed prices, sales, inventories, project starts, and project characteristics. We combine these data with aggregate price and liquidity measures for



Notes: Data for Norway is based on own calculations from ECON New Boliger and Eiendomsverdi. Data for the US is based on data from the US Census and the National Association of Realtors.

Figure 1: Months of supply of new vs. used/existing housing for Norway vs. the USA.

the existing-housing market. For cross-sectional evidence, we further use transaction-level data from the Norwegian Land Register, which allow us to compare the first sale of newly built units with subsequent resale transactions.

We document three sets of empirical facts. First, new-home prices display substantially more downward rigidity than existing-home prices. The distribution of quarterly price growth for newly built housing has much less mass below zero than the corresponding distribution for existing homes. Second, the relative price growth of new versus existing housing comoves negatively with new-home sales and positively with the inventory-to-sales ratio. In other words, new homes become relatively more expensive precisely when they become more difficult to sell. Third, using the project- and transaction-level data, we show that higher initial prices are associated with longer selling periods, delayed project starts, and higher cancellation probabilities. For apartments, units that remain unsold for longer after completion are eventually sold at higher prices, consistent with dynamic selection under rigid initial pricing.

To interpret the evidence, we build a simple theoretical model that links housing demand, housing supply, and price-setting frictions in the market for new homes. Households demand both new and existing housing, which are imperfect substitutes. Existing homes are supplied in fixed quantity and their prices clear the market each period. New homes are supplied by housing entrepreneurs who face construction lags and make supply decisions before demand is realized. We compare two pricing regimes: one in which

new-home prices adjust flexibly ex post and one in which prices are set in advance and cannot fully adjust to realized demand conditions.

The framework delivers clear predictions. Under fully flexible prices for new housing, aggregate housing-demand shocks do not generate systematic comovement between the relative price of new homes and measures of new-home liquidity. By contrast, when new-home prices are rigid, negative demand shocks reduce sales and increase inventories while leaving posted prices relatively high. The model therefore predicts negative comovement between the new-used relative price and sales or the share of new-home transactions, together with positive comovement between the relative price and the inventory-to-sales ratio. Alternative shocks, such as shifts in relative preferences for new housing or construction-cost shocks, cannot simultaneously generate these patterns. The observed joint dynamics of relative prices and inventory-to-sales therefore provide a diagnostic for pricing rigidities in the new-housing market.

Taken together, our findings suggest that sticky prices interact with housing-demand shocks to generate economically meaningful effects on market liquidity and residential investment. If developers respond to weaker demand mainly by selling fewer units, delaying projects, or withdrawing supply rather than by reducing prices, then negative demand shocks may have persistent effects on future housing supply. This mechanism in turn has important implications for macroeconomic policy, particularly in light of recent debates on housing affordability in industrialized economies. In particular, it suggests that tighter monetary policy may reduce construction activity and future housing supply with a lag, potentially contributing to higher housing costs in the medium run even if demand pressures initially decline.

Related literature. This paper connects to several strands of the housing literature, spanning housing supply and development, price setting and market frictions, and behavioral and informational explanations for price setting in the housing market.

A large literature in macro-housing studies how supply-side frictions shape housing dynamics and the macroeconomy. Early quantitative frameworks emphasize the role of construction lags, and land constraints in explaining the volatility of residential investment and its interaction with the business cycle (Davis and Heathcote, 2005). Oh and Yoon (2020) and Oh et al. (2024) emphasize the importance of time-to-build and time-to-develop as key frictions that influence residential investment. Related empirical work documents large heterogeneity in supply elasticities across regions and countries, often attributed to regulation or land-use constraints (Caldera Sánchez and Johansson, 2013; Glaeser and Gyourko, 2018). More recent work highlights additional frictions operating on the supply

side, including financing constraints and development delays. For example, [Gabrovski and Ortego-Marti \(2025\)](#) show that credit frictions faced by developers can substantially amplify house price fluctuations. Our paper complements this literature by focusing not on quantities or long-run elasticities, but on price-setting behavior in the new-housing market itself. We argue that in some housing markets pricing rigidities among developers constitute an additional supply-side friction that shapes how demand shocks translate into prices, sales, and inventories.

A closely related recent contribution is [Gabrovski and Gross \(2025\)](#), who use data from the U.S. Survey of Construction to document a U-shaped relationship between new-home prices and the timing of sale relative to construction. The paper proposes a search-theoretic model in which developer credit frictions, together with the option to customize pre-sold homes, help account for these pricing patterns. Our analysis complements theirs by arguing for sluggish adjustment of developers' posted prices and showing how it generates systematic relationships between relative prices, sales, inventories, and selling times. Together, the two papers highlight distinct but complementary roles for developer financing and price-setting frictions in shaping new-housing market dynamics.

A second and distinct literature studies the microeconomics of price setting in housing. Search-theoretic models highlight how behavioral and information frictions can generate slow-moving house price adjustments and persistent inventory dynamics ([Merlo and Ortalo-Magné, 2004](#); [Merlo et al., 2015](#)). A large empirical literature attributes housing market sluggishness to behavioral biases and financial constraints among household sellers. Seminal work shows that loss aversion and equity constraints lead homeowners to set higher asking prices and delay sales when facing nominal losses ([Genesove and Mayer, 1997, 2001](#)). Subsequent research documents similar patterns across settings and links them to reference dependence and anchoring ([Anenberg, 2011](#); [Bokhari and Geltner, 2011](#); [Andersen et al., 2022](#); [Bracke and Tenreyro, 2021](#)). These mechanisms help explain price stickiness, transaction volume fluctuations, and the persistence of inventory during downturns. Informational frictions, in the form of sluggish incorporation of information by sellers ([Anenberg, 2016](#)), may also play a role. Related theoretical work shows that strategic complementarities in sellers' pricing decisions can amplify small frictions into substantial aggregate momentum ([Guren, 2018](#)).¹ While much of this literature focuses on existing-home markets and household sellers, our paper shifts attention to professional developers and their pricing decisions rather than owner-occupied sellers.

¹Frictions and agency problems between the realtor and seller may also impact owner-occupier pricing behavior ([Anundsen et al., 2026](#)).

2 Data and institutional background

2.1 Institutional background

In the Norwegian market for newly built homes, transaction prices are typically posted rather than negotiated.² In contrast to the market for existing homes, where prices are commonly determined through bidding rounds, developers generally offer units at fixed listed prices.³ This practice is partly related to financing arrangements between developers and their banks, which often rely on standardized pricing structures and pre-sale requirements. While exceptions can occur, negotiations are relatively uncommon and are usually limited to projects with a large number of unsold completed or nearly completed units. Even in such cases, buyers are more likely to negotiate over additions or upgrades to the unit rather than over the transaction price itself. Price negotiations also appear to be more common in the highest-priced market segments and in the market for cabins and holiday homes.

Another important institutional feature is that buyers are generally unable to bypass other potential buyers by offering a higher price. Developers typically allocate units according to waiting lists or order of reservation rather than through competitive bidding. This reflects developers' preference for standardized contracts and simpler administrative procedures. In some cases, however, especially for particularly attractive or unique units within a project, developers may auction individual units to the highest bidder.

The pricing of units within a project also differs from the pricing process in the resale market. Once a buyer has entered into a contract, the agreed transaction price is normally fixed and is not adjusted before completion and transfer of ownership. At the same time, developers retain the ability to revise the listed prices of unsold units throughout the sales period of a project. Such price revisions are often associated with important project milestones, for example when the minimum number of pre-sold units required to initiate construction has been reached. In practice, upward revisions of listed prices are considerably more common than downward revisions. When prices are reduced, buyers who previously entered contracts at higher prices are typically not compensated for the difference.

The financial structure of transactions in the new-home market also has several institutional particularities. Standard practice at the national level involves an up-front payment equal to approximately 10 percent of the purchase price, with the remaining amount paid

²The information in this section is based on interviews with realtors who specialize in intermediating new housing transactions in Norway.

³See [Anundsen et al. \(2024\)](#) for institutional details on the market for existing home.

upon completion and transfer of the unit. However, practices vary across regions and projects. In some cities, such as Bergen and Hamar, contracts without up-front payments are more common. Similarly, projects that are close to completion may also be sold with no initial payment requirement. Developers may nevertheless require additional up-front payments when buyers order upgrades or customized additions to the unit.

If a project is withdrawn from the market after some units have already been sold, buyers are normally reimbursed for their up-front payments together with accrued interest. If the project is later relaunched, previous buyers generally do not receive price discounts relative to new buyers, although they may be given priority access before the project is marketed publicly again. The role of up-front payments also differs across developers, with some developers using these payments to reduce or service construction loans during the development phase.

2.2 Data

Our analysis combines several data sources that allow us to track pricing and sales dynamics in the new and existing housing markets at a high level of detail. The core dataset consists of unique longitudinal project-level data from Norway obtained from ECON Nye boliger between 2002 and 2023. These data follow residential development projects from the beginning of sales activity until completion or cancellation at a bimonthly frequency, enabling us to observe the full lifecycle of projects. The dataset covers developments with at least 15 housing units and provides nearly complete coverage of the apartment segment. Importantly, it includes detailed project characteristics and list prices per square meter, which allows us to construct a consistent project-level list-price index. Geographic coverage starts with Oslo and gradually expands to other cities in Norway. Therefore, for our aggregate-level analysis we will be focusing on the Oslo housing market, which is the dominant housing market in Norway in terms of size and volume of transactions.

For our cross-sectional analysis we also use transaction-level data from the Norwegian Land Register between 2010 and 2021, merged with household-level tax records. We identify new housing transactions as the first sale of a housing unit from a firm to an individual. We therefore abstract from first sales between firms. Table A.1 in the Appendix shows household characteristics associated with the purchase of new vs. existing homes. Buyers of new units in Norway tend to be older, wealthier, and be part of households without children. They are also less likely to be first-time buyers and more likely to purchase apartments, reflecting the fact that new housing construction in Norway tends to be tilted towards apartment units rather than houses.

Finally, we use aggregate data for the existing-housing market from Eiendomsverdi

and Eiendom Norge, which provide measures of prices and liquidity for exiting homes.

3 Aggregate evidence

In this section we present a number of aggregate-level facts about the dynamics of new vs. used house prices in the capital city Oslo. For this purpose we use the ECON Nye Boliger project-level data to construct a hedonic list price index for new homes. Details on the construction of the index and its validation is presented in the Appendix.

3.1 Time-series co-movements

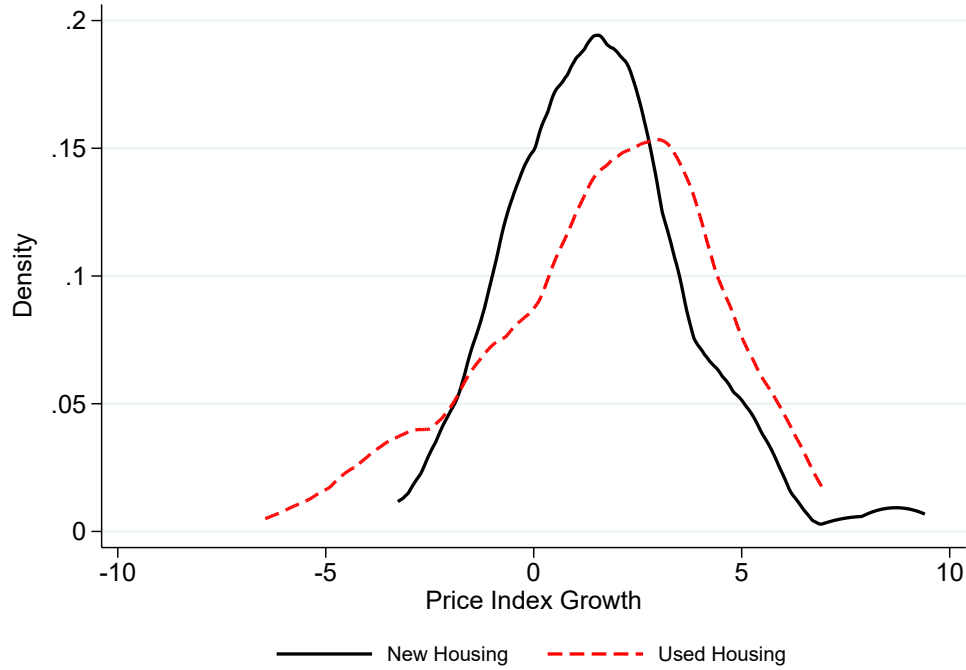
Fact 1: Prices of new homes rarely move down. Figure 2 shows the distribution of quarterly price growth of new vs. used housing prices for Oslo, Norway. There is much less mass below zero price growth for new housing compared to used housing, suggestive of downward price rigidity. New housing also tends to have lower price growth overall, suggestive of sluggish upward adjustments as well. Both of these facts are consistent with the institutional details from Section 2.1 and the use of posted prices in the sales of new housing in Norway.

Fact 2: There is substantial variation in the relative price of new. vs used housing. Figure 3 plots the difference in the 12-month growth of new vs. used housing in Oslo, $\Delta p_t^{new} - \Delta p_t^{used}$. We call this measure the price (growth) gap between new and used housing. The price gap reflects the growth in the relative price of new and used housing, with a positive price gap implying an increasing relative price of new over used housing and vice versa.⁴

As the figure shows, the price gap fluctuates substantially over time in Oslo, with a standard deviation of around 8%. The mean price growth gap is however close to 0, which reflects the fact that new and used house prices track each other over time, so the relative price is stable in the long run.

Fact 3: The market liquidity for new homes is lower and substantially more volatile than for used home. As already shown in Figure 1 in the Introduction, the market liquidity for new homes in Norway, measured via months of supply of the inventory-to-sales ratio, is on average both lower and more volatile than the market for existing homes. This is

⁴See Figure A.5 for a plot of the 12-month growth of new vs. used housing in Oslo. The price gap is the difference between these two time series.

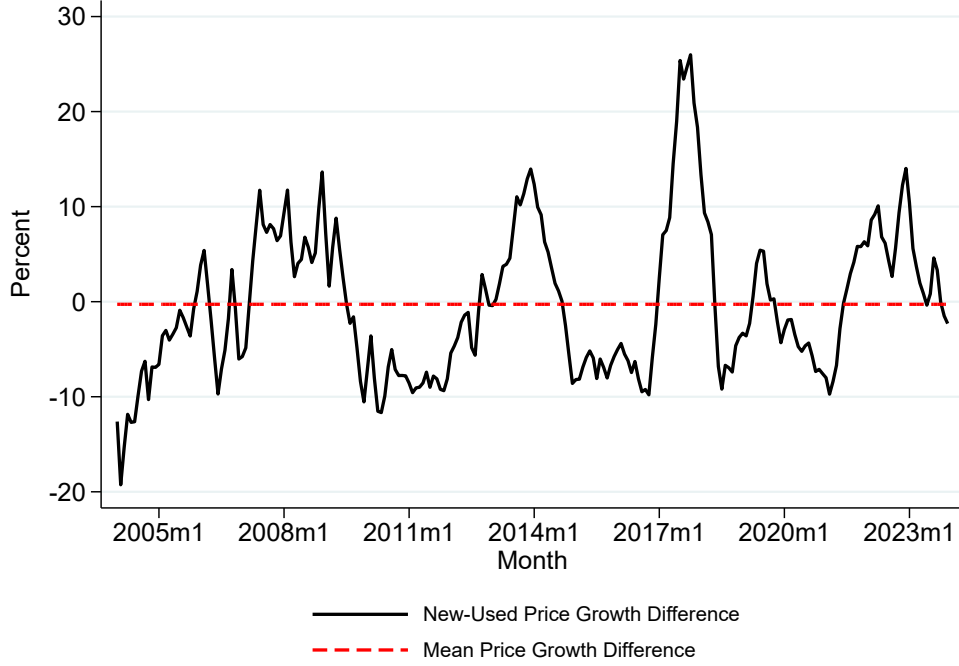


Notes: The k-density plots estimate quarterly price growth for the municipality of Oslo. The new price index is the index constructed via a hedonic regression using the ECON Nye Boliger Data.

Figure 2: Quarterly price growth in new vs. used housing for Oslo, Norway.

in stark contrast to the US, where the two market segments behave much more similarly in terms of liquidity, at least until 2016. Since some of these differences could be due to compositional effects and differences in construction intensity across housing markets, Figure 4 further illustrates this point by showing that it holds for one housing market, namely the Oslo housing market. In terms of actual numbers the average months of supply for new housing in Oslo during 2005-2023 is around 9.5 months with a standard deviation of 7.3 months, compared to 1.4 months and a standard deviation of 0.7 months for used housing. Nevertheless, the two series are highly correlated with periods or relative illiquidity coinciding across the two markets. The relative illiquidity increase is much larger in the market for new homes, which is reflected in the larger coefficient of variation (0.77 compared to 0.51 for used homes).

In the Appendix (Figure A.6) we also show that the liquidity of new housing differs somewhat by whether the projects have not been started yet or whether they have been started or completed. Specifically, the illiquidity of not-started projects is more volatile and less persistent, which is consistent with developers being able to withdraw non-started projects from the market when housing market conditions deteriorate. In contrast they are not able to withdraw units for sale from projects that are already started or even completed.



Notes: This graph shows the difference between the 12 month changes in new and used house prices in Oslo as well as the average value of these changes. Data source: ECON Nye Boliger and Eiendomsverdi.

Figure 3: Price growth gap ($\Delta p_t^{new} - \Delta p_t^{used}$) in new and used housing for Oslo, Norway

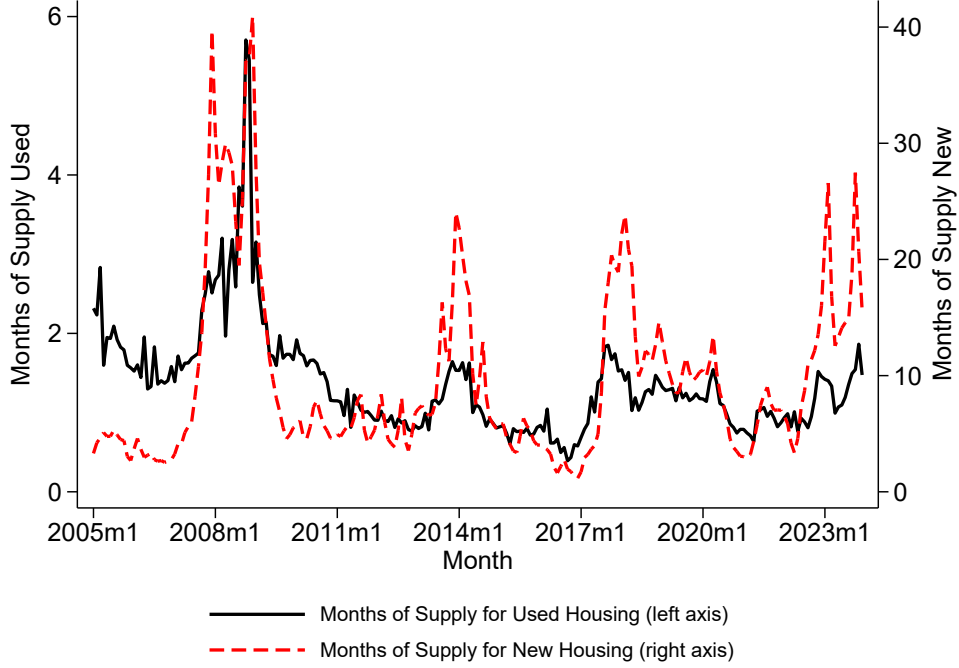
These units are also substantially more illiquid compared to existing used housing.

Fact 4: There is a positive correlation between the relative price gap and market illiquidity. Figure 5 plots both the relative price gap between new and used housing and months of supply for new housing. Higher illiquidity of new homes coincides with new homes being relatively more expensive than used homes and vice versa. The correlation correlation is 0.54. Two related facts, which we show in the Appendix (Figures A.7 and A.8) are that relative price gap also comoves negatively with the share of new home sales, and with housing market activity, measured by total number of sales.

3.2 Local projections analysis

In addition to the contemporaneous time-series comovements, we also estimate dynamic forecasting regressions or local projections (Jordà, 2005) of the type:

$$\Delta_h y_t = \alpha_h + \beta_h \Delta p_t^{used} + \gamma_h X_t + \varepsilon_t^h,$$

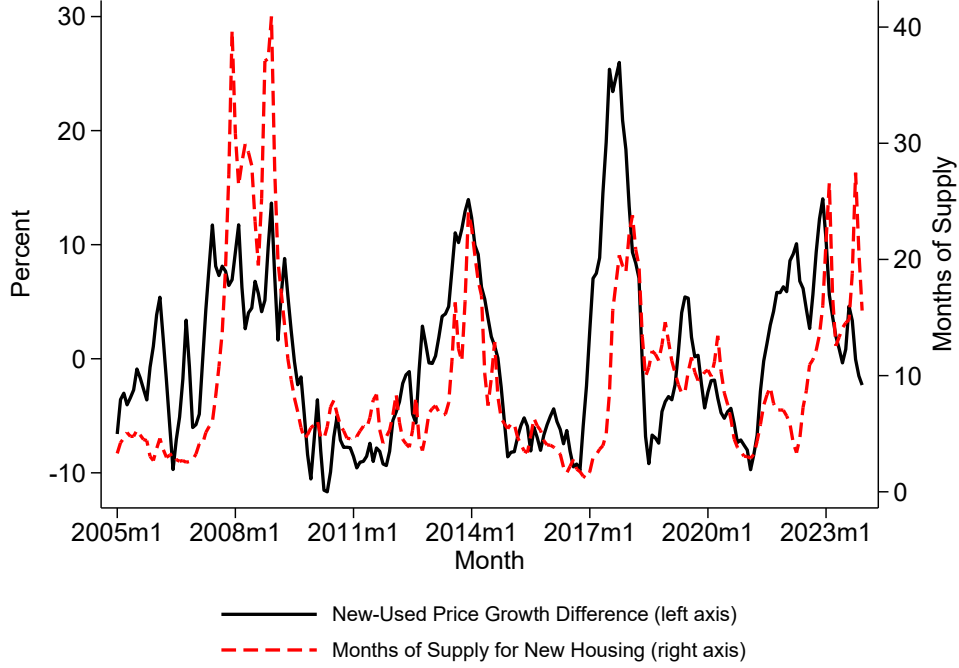


Notes: The months of supply are computed as the ratio of unsold units in previous month over sold units in the current month, for new and used housing units. For new units, we first transform the bimonthly sales into a monthly series by dividing the bimonthly sales by 2 and interpolating. Data sources: ECON Nye Boliger and Eiendomsverdi.

Figure 4: Months of supply for new vs. existing homes for Oslo, Norway.

for $h = \{0, 1, 2, \dots\}$, where $\Delta_h y_t$ is the change in outcomes y between $t - 1$ and $t + h$, Δp_t^{used} is the quarterly change in the real used house price between $t - 1$ and t . We also consider asymmetries by looking at the response to a positive vs. negative innovation in used house prices. Figure 6 shows the resulting impulse responses. There is substantial asymmetry (Figure 6(b)) in the response of the new house prices to an innovation in the used house price with a significant delay in adjustment in response to a negative shock compared to a positive shock. New prices appear essentially irresponsive to the innovation in used prices for about one year. There is also pronounced momentum in both responses. As a result the relative price gap (Figure 6(c)) changes substantially more in response to a negative innovation in the used price (essentially by the size of the used price adjustment), compared to a positive innovation. These dynamics are consistent with the downward rigidity and relatively small average price growth for new house prices that we showed in Figure 2.⁵

⁵Perhaps unsurprisingly given these price responses, in the Appendix (Figure A.9) we show that the a positive relative price gap forecasts a statistically significant decline in residential investment up to two years ahead.



Notes: The difference in new vs used house prices is difference between the 12 month changes in new listed and used house price indices in Oslo. The new inventory-to-sales is computed as the ratio of unsold units in previous month over sold units in the current month, for new units in Oslo. To compute sales, we first transform the bimonthly sales into a monthly series by dividing the bimonthly sales by 2 and interpolating. Data sources: ECON Nye Boliger and Eiendomsverdi.

Figure 5: Relative price gap and new inventory-to-sales for Oslo, Norway.

4 Cross-sectional evidence

In this section we provide two sets of additional facts, which are consistent with pricing rigidities in the market for new homes. First, we use the panel dimension of our project-level data to show how initial pricing in terms of list price per square impacts the selling dynamics of a project. Second, we use transaction level data to estimate a first-sale price premium/discount for a housing unit and how it varies with a proxy for the time on market of that first sale.

4.1 Project-level analysis

We use the panel structure of our ECON Nye Boliger project data to examine the relationship between initial project pricing and a range of subsequent project outcomes. In particular, we study how initial pricing is associated with time-on-market, measured as the number of months between the start and end of sales; time-to-project-start, measured as the number of months between the beginning of sales and the start of construction; and



Figure 6: Dynamic responses to innovation in used house price

the probability that a project is ultimately canceled. These outcomes capture several key dimensions of project performance and provide evidence on how initial pricing decisions relate to subsequent sales dynamics and project viability.

To address potential omitted-variable bias, we estimate specifications with a rich set of fixed effects and project-level controls. The empirical models include flexible controls for project size separately by project type, thereby allowing the relationship between project scale and outcomes to differ across market segments. In addition, we include postal-code fixed effects, municipality or postal-code by quarter-of-sales-start fixed effects, and fixed effects for both developers and realtors. Together, these controls account for a broad range of local market conditions, project characteristics, and firm-specific factors that may jointly influence pricing and project outcomes. Standard errors are double clustered at the municipality and quarter levels.

Table 1 presents the estimated effects. Projects with higher initial listing price take longer to complete sales, take longer to be started, and are more likely to be canceled. In terms of magnitudes, an increase in the initial list price per square meter of 10% is associated with an increase in the sale time of around 1.5 months, an increase in the time to project start of around 0.4 months, and an increase in the probability of cancellation of around 1%. These effects are robust across different specifications, suggesting that they are not driven by omitted factors. The effects on the delayed project start are consistent

with developers seeking to pre-sell a certain share of units before proceeding with the construction. Overall these results are consistent with rigidities in pricing, with the initial list price of a project determining the sales price in subsequent sales. A higher posted price for a unit leads to a lower probability that the unit will sell within a certain amount of time, consistent with standard intuition on the link between posted prices and time on market from directed search models of the housing market transaction process (see e.g. [Anundsen et al. \(2025\)](#)).

4.2 Transaction data analysis

Next, we use transaction-level data for housing in the Oslo Metropolitan Area.⁶ We look at time on market since completion defined as the time difference (in months) between the formal completion date of a unit and the transaction date registered in the land register. We then examine how the price of the unit in the first purchase varies with the time-on-market. Importantly we control for unit fixed effects, so that we focus on units that transact at least twice, once as a new unit and subsequently as an used unit. We also control flexibly for time trends, including at a granular local housing market level, defined by 3-digit postal codes, heterogeneity in local seasonality patterns (see [Nenov et al. \(2016\)](#)), as well as property age to account for age-related depreciation, as well as heterogeneity age-depreciation by 3-digit postal code. Therefore, our empirical design isolates the first-time sale premium or discount for a housing unit and how that premium or discount varies with the time-on-market of the housing unit during the first sale.

Figure 7 presents the estimated coefficients on different bins of time on market since completion with the bin with less than 2 months serving as the baseline. Due to important and sizable heterogeneity, we split units by type into apartments and houses (small and single-family houses). For apartments, there is a positive and increasing relationship between time on market since completion and the initial sale price for a unit. The effect is sizable with a unit that sells more than 4 years after completion selling at a premium of more than 5%. In contrast there is a decreasing relationship between time on market since completion and the initial sale price for houses with a house selling after 18 months of more selling at a discount of 10% or more. Put differently, for the first-time sale premium in Oslo, there is positive duration dependence for apartments and negative duration dependence for houses.

What can explain the positive duration dependence for apartments? Similar to the effect of the initial list price on time on market for projects, an initial mispricing of a unit

⁶This includes Oslo and surrounding municipalities.

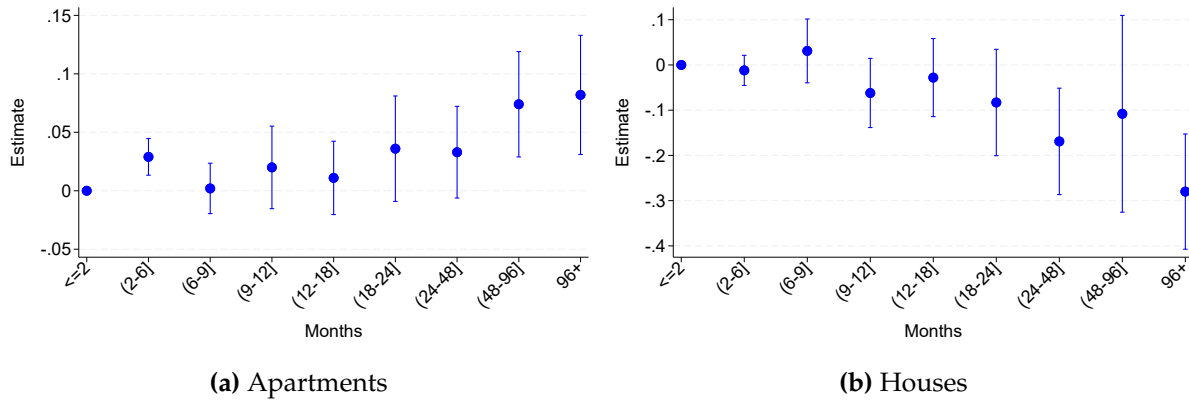
Dep. var.: Project time-on-market				
	(1)	(2)	(3)	(4)
$\log price/m^2$	14.810** (1.748)	15.767** (1.896)	14.379** (1.859)	12.204** (3.879)
Size-Project Type FE	No	Yes	Yes	Yes
Postal Code FE	Yes	Yes	Yes	Yes
Municipality-Quarter FE	Yes	Yes	No	No
Postal Code-Quarter FE	No	No	Yes	Yes
Broker FE	No	No	No	Yes
Developer FE	No	No	No	Yes
R^2	0.561	0.562	0.607	0.765
Observations	5,009	5,009	3,728	2,656
Dep. var.: Time-to-project-start				
	(1)	(2)	(3)	(4)
$\log price/m^2$	3.331** (0.760)	3.533** (0.805)	4.108** (1.009)	4.571** (1.108)
Size-Project Type FE	No	Yes	Yes	Yes
Postal Code FE	Yes	Yes	Yes	Yes
Municipality-Quarter FE	Yes	Yes	No	No
Postal Code-Quarter FE	No	No	Yes	Yes
Broker FE	No	No	No	Yes
Developer FE	No	No	No	Yes
R^2	0.465	0.466	0.536	0.758
Observations	4,379	4,379	3,151	2,179
Dep. var.: Project is cancelled				
	(1)	(2)	(3)	(4)
$\log price/m^2$	0.107** (0.033)	0.103** (0.031)	0.154** (0.047)	0.209** (0.067)
Size-Project Type FE	No	Yes	Yes	Yes
Postal Code FE	Yes	Yes	Yes	Yes
Municipality-Quarter FE	Yes	Yes	No	No
Postal Code-Quarter FE	No	No	Yes	Yes
Broker FE	No	No	No	Yes
Developer FE	No	No	No	Yes
R^2	0.639	0.641	0.678	0.816
Clusters	85	85	83	81
Observations	6,763	6,763	5,177	3,786

Notes: The table shows regression of the project time on market on the price/m2 of the project. Postal codes refer to 3-digit postal codes. Standard errors are double clustered on municipality and quarter. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 1: Effects on Project-Level Dynamics

together with price rigidity in the list price would imply that more overpriced units would tend to stay on the market longer and take a longer time to sell but sell for a higher price eventually. Therefore, the positive duration dependence for apartments is consistent with a dynamic selection process due to initial mispricing and rigid pricing by developers.

The negative duration dependence for houses, on the other hand is consistent with structural duration dependence, whereby a longer time-on-market lowers the reservation price of the seller. We discuss the heterogeneity in the duration dependence between apartments and houses further in Section 6.



Notes: The graph shows point estimates from the regression of log price on the time of purchase in months by type of housing unit. We control for fixed effects for month, age, age category $\times$ 3-digit postal code, quarter $\times$ 3-digit postal code, quarter-in-year $\times$ 3-digit postal code.

Figure 7: Price effects by time of first purchase relative to completion for Oslo.

5 Theoretical framework

In this section we build a simple equilibrium model of the housing market with imperfect substitutability between new and used housing to illustrate how pricing rigidities for new housing can generate the aggregate comovements documents in Section 3.1. The main implication of this analysis is that the positive comovement between the relative price of new vs. used housing and the inventory-to-sales ratio can only arise due to the combination of housing demand shocks and rigid pricing for new housing. Other shocks (relative demand shock, supply shocks) or pricing regimes (flexible prices) cannot generate this positive correlation.

5.1 Model set-up

There are two types of agents: households, and housing entrepreneurs. There are also two types of housing: existing/used housing, whose stock is denoted by O and newly built housing, whose stock is denoted by N . We will denote the price of used housing by p_O and the price of new housing by p_N . p_O is determined by a standard market clearing condition

$$O_d(s) = O, \quad (1)$$

which holds in every state s of this economy. p_N will either be determined by a market clearing condition (flexible prices) or ex ante by a free-entry condition (sticky prices).

Households. We assume that households derive utility from housing services generated by both used and new housing, and moreover, that these two types of housing are *imperfect* substitutes. Specifically, we assume that total housing services are a CES aggregate of the consumption of used and new housing, namely

$$H = ((1 - \lambda) O^\rho + \lambda N^\rho)^{1/\rho},$$

where for $\rho \leq 1$. The elasticity of substitution between the two types of housing is given by $\sigma = \frac{1}{1-\rho}$. When $\rho = 1$, the two assets are perfect substitutes. When $\rho = 0$, they are neither substitutes, nor complements (Cobb-Douglas preferences). When $\rho \in (0, 1)$, they are gross substitutes, while for $\rho < 0$, they are gross complements. Below we will work with $\rho \in (0, 1)$, which is the empirically relevant case according to our empirical evidence. In addition to used housing, households are endowed with Y units of a consumption good, which they can either consume or spend on housing. Their utility function is given by

$$U(C, H) = C + \gamma v(H), \quad (2)$$

where v is an increasing and concave function of H , and γ is a scaling parameter that impacts the marginal rate of substitution between total housing services and consumption. The demand for housing by the household therefore is determined from the following problem

$$\begin{aligned} \max_{C, O_d, N_d} & C + \gamma v\left(\left[(1 - \lambda) O_d^\rho + \lambda N_d^\rho\right]^{1/\rho}\right) \\ \text{s.t.} & C + p_O O_d + p_N N_d = Y + p_O O. \end{aligned} \quad (3)$$

For tracability, we will assume that household endowments Y are sufficiently large, so that there is full satiation of their demand for housing services in equilibrium.⁷

Housing entrepreneurs. Housing entrepreneurs for simplicity derive utility only from the consumption good and are risk neutral. There is a time-to-build lag for newly built housing, so that the stock of newly built housing is pre-determined in a previous period. In addition the entrepreneur faces a strictly convex construction cost $\chi c(N)$, from producing N units of new housing, which is assumed to be funded at an international interest rate of R . For simplicity, we assume that the housing entrepreneur has some consumption endowment and that she repays in full in all states of the world. Here, χ is a cost/supply shifter (as is R).

We assume that there is free entry of housing entrepreneurs subject to a fixed entry cost $F > 0$. We will denote the equilibrium mass of active entrepreneurs by e . We also assume that the housing entrepreneurs are perfectly competitive at the time of investment and that they make zero profits in expectation. We assume that all housing entrepreneurs are symmetric and get an equal share of the demand for new housing. Finally, at the time of investment, housing entrepreneurs may possibly face uncertainty about the households' preference for housing services. Specifically, $\gamma = \gamma_H$ with probability $0 < q \leq 1$, and $\gamma = \gamma_L < \gamma_H$ with probability $1 - q$.

Definitions. We define sales of new housing by N . Moreover, we define the share of new sales by $N/(O + N)$. Finally, we define the inventory-to-sales ratio for new housing as N_s/N .

5.2 Characterization

We will consider two version of the model: 1) a flexible prices model, in which the price of new housing is determined in each state of the world, and 2) a sticky prices model, in which the price of new housing is determined ex ante at the time of investment, prior to the realization of shocks.

In the Appendix we characterize the household's housing demand (Lemma 1). As is standard given the CES preferences we work with, holding the total housing services H constant, a higher price of housing of any given type implies a lower relative demand for that type of housing. Therefore, the relative demand for used and new housing is a

⁷We make this assumption for technical reasons, since the case of constrained household demand does not give additional new economic insights.

function of the relative price of new and used housing:

$$\frac{\lambda}{1-\lambda} \left(\frac{N_d}{O_d} \right)^{\rho-1} = \frac{p_N}{p_O}. \quad (4)$$

Flexible prices

With flexible pricing, the price of new housing is determined by the market clearing condition⁸

$$N_d(s) = N_s, \quad (5)$$

which holds in every state s of this economy. Also, each housing entrepreneur chooses how much new housing to produce by solving

$$\max_{\tilde{n}} E[p_N(\gamma)] \tilde{n} - \chi c(\tilde{n}) R - F, \quad (6)$$

where the expectation is over γ .

Let n_s denote the quantity of new housing that solves Eq. (6). n_s satisfies the first-order condition

$$c'(n_s) = \frac{E[p_N(\gamma)]}{\chi R}. \quad (7)$$

Free entry by entrepreneurs in turn implies that

$$E[p_N(\gamma)] = \frac{\chi c(n_s) R + F}{n_s}. \quad (8)$$

Combining the two conditions, we get

$$c'(n_s) = \frac{c(n_s) + F/\chi R}{n_s}. \quad (9)$$

Next we characterize equilibrium house prices and sales in the flexible price case.

Proposition 1. *The flexible price equilibrium of this economy is characterized by a constant relative price of new vs. used housing in the high vs. low housing demand state,*

$$\frac{p_N^H}{p_O^H} = \frac{p_N^L}{p_O^L}.$$

Moreover, sales of new housing, the share of new sales, and the inventory-to-sales ratio for new housing are constant across the different demand states.

⁸The equilibrium with flexible prices is defined in the Appendix.

Proof. See the Appendix. □

Sticky prices

Next, we assume that there are price rigidities, so that the price of new housing is predetermined at the time of investment and need not clear the market for new housing ex post.⁹ Therefore, a housing entrepreneur make investment decisions by maximizing

$$\max_n p_N E[n(\gamma, p_N)] - \chi c(n) R - F, \quad (10)$$

where the expectation is over γ , which impacts the amount of new housing sold by an entrepreneur. Let n_s denote the optimal supply of new housing that solves Eq. (10).

Remark: With a predetermined price and demand uncertainty, excess supply can arise in the low-demand state, while excess demand could in principle arise in the high-demand state. To avoid explicitly modeling rationing of households, we focus on an equilibrium in which new-housing supply is exactly absorbed in the high-demand state, $N_d(\gamma_H) = N_s$, while there is excess supply in the low-demand state. This condition, together with zero expected profits, pins down the equilibrium mass of entrepreneurs and the ex-ante price.

Given symmetry across housing entrepreneurs, the total supply of new housing is given by

$$N_s = en_s.$$

Zero profits imply the following condition for p_N .

$$p_N = \frac{\chi c(n_s) R + F}{E[n(\gamma, p_N)]}. \quad (11)$$

Finally, the equilibrium mass of active entrepreneurs e is determined by a market clearing condition for new housing in the high demand state (see Remark 1 above)

$$N_d(\gamma_H) = N_s = en_s. \quad (12)$$

Next we characterize equilibrium house prices and new housing supply in the sticky price case.

Proposition 2. *The sticky price equilibrium of this economy is characterized by a higher relative*

⁹The equilibrium definition for the economy with sticky prices is given in the Appendix.

price of new vs. used housing in the low demand state compared to the high demand state

$$\frac{p_N}{p_O^L} > \frac{p_N}{p_O^H}.$$

Moreover, sales of new housing, and the share of new sales, are higher in the high demand than the low demand state, while the inventory-to-sales ratio for new housing is higher in the low demand state than the high demand state.

Proof. See the Appendix. □

Therefore, with sticky prices, we should expect the relative price of new and used housing to comove negatively with sales of new housing, N , and the share of new sales. Finally, there is a positive comovement with the inventory-to-sales ratio for new housing. None of these co-movements would be present in the case of flexible prices for new housing.

5.3 Other shocks

Shocks to relative preferences for new and used housing. Suppose that rather than preference shocks for total housing services, γ , there are instead (ex post) shocks to the relative preference for new housing only, i.e. shocks to the parameter λ in the household preferences. As before, suppose there are two state, a high and a low demand state, with $\lambda_H > \lambda_L$. We characterize the behavior of relative prices, new sales and new sales share and inventory-to-sales for new housing in the following Proposition

Proposition 3. *The flexible price equilibrium with demand shocks for new housing is characterized by a higher relative price of new vs. used housing in the high vs. low demand state,*

$$\frac{p_N^H}{p_O^H} > \frac{p_N^L}{p_O^L}.$$

Moreover, sales of new housing, the share of new sales, and the inventory-to-sales ratio for new housing are constant across the different demand states.

Proof. See the Appendix. □

Therefore, with shocks to relative preferences for new and used housing, the relative price is *positively* correlated with housing demand. At the same time the relative price difference between new and existing housing would not co-move with the sales of new housing, the share of new housing out of total housing or the inventory-to-sales ratio for new housing.

We can also consider ex ante shocks to the relative preferences for housing. In that case, firms would respond to the anticipated change in the demand for new housing by also adjusting supply. Therefore, there will be a positive co-movement of relative prices and the share of new houses sold and no co-movement with the inventory-to-sales ratio for new housing.

Cost/supply shocks Suppose that instead of preference shocks there are (ex ante) supply shocks given by different values of χ , a high cost state (χ_H) and a low cost state (χ_L).

Proposition 4. *The flexible price equilibrium with cost shocks for new housing is characterized by a higher relative price of new vs. used housing in the high vs. low cost state,*

$$\frac{p_N^H}{p_O^H} > \frac{p_N^L}{p_O^L}.$$

Moreover, sales of new housing, and the share of new sales are lower in the high cost state, while the inventory-to-sales ratio for new housing is constant across the different cost states.

Proof. See the Appendix. □

6 Discussion – why are developers’ prices sticky?

As discussed in the Introduction, a growing literature documents substantial rigidities in retail list prices across a range of markets. Existing explanations often emphasize behavioral mechanisms, including reference dependence and loss aversion, whereby sellers are reluctant to reduce nominal asking prices even when market conditions weaken. While such mechanisms may plausibly explain pricing behavior among owner-occupiers selling their homes, they are less naturally applicable to professional housing developers. Developers are sophisticated and repeat-market participants that operate within formal financing and contracting arrangements, suggesting that alternative mechanisms may play a more important role in generating sticky prices in the market for newly built housing.

One potential explanation arises from financial frictions and the structure of developer financing. Housing development projects are typically financed through a combination of equity and construction loans, with lenders often imposing explicit or implicit revenue targets tied to pre-sales and expected project valuations. Within such arrangements, lowering prices may have consequences that extend beyond lower contemporaneous profits. Price reductions can weaken collateral values, jeopardize financing conditions, or increase

leverage pressures, particularly for highly indebted developers. Equity and leverage constraints may therefore generate incentives that resemble loss aversion in practice, even in the absence of behavioral biases. When housing demand weakens, financially constrained developers face a difficult trade-off: lowering prices may support sales volumes but risk triggering financing stress, while maintaining high prices preserves valuations and financing conditions at the cost of lower demand and slower sales. In this environment, price rigidity can emerge as an equilibrium response to financing constraints rather than purely behavioral considerations.

Another mechanism relates to dynamic pricing incentives and the Coase conjecture (Coase (1972), Stokey (1981), Gul et al. (1986)). The classic Coase conjecture states that a durable-goods monopolist becomes its own future competitor because the inability to commit not to lower prices in the future reduces buyers' willingness to pay today, ultimately pushing prices toward competitive levels. New housing markets share several features with this framework. Housing is a durable good, and developers – particularly developers of apartment projects – often possess substantial local market power within narrowly defined geographical markets. In many local markets, developers effectively operate as temporary monopolists over a set of highly differentiated housing units. Moreover, because projects are developed gradually over time, developers compete not only with other developers and sellers of used housing in adjacent locations but also with their own future unsold inventory.

These dynamic considerations may create strong incentives for developers to establish reputations for price non-negotiability. If buyers expect developers to reduce prices in response to weak demand or long selling durations, potential buyers may optimally delay purchases in anticipation of future discounts. Maintaining rigid prices can therefore serve as a commitment device that sustains buyers' willingness to transact early in the sales process. Such reputation-building incentives may be particularly important in apartment developments, where projects are large, sales periods are extended, and developers repeatedly operate within the same local markets. In this sense, sticky prices may arise not because developers fail to respond to market conditions, but because maintaining pricing credibility is itself valuable.

The heterogeneity in duration dependence documented in Section 4.2 is broadly consistent with this interpretation. In particular, the upward-sloping duration dependence observed for apartments relative to a downward-sloping duration dependence for houses aligns more naturally with the Coase-based mechanism than with purely financial explanations. Developers of apartment complexes are often large firms operating sizable multi-stage projects involving hundreds of units, making them more likely to possess local

market power and stronger incentives to maintain reputations for stable pricing. In contrast, house developers are typically smaller-scale firms that operate in more competitive local environments and are less likely to behave as local monopolists. At the same time, these smaller developers may also face tighter financing constraints.

7 Concluding comments

This paper presents new evidence on pricing rigidities in the market for newly built housing in Norway. Using unique longitudinal project-level data combined with transaction-level information, we document a number of facts that are consistent with pricing rigidity in the market for new homes. The results indicate that new-home prices adjust considerably more slowly than prices in the resale market, even in the presence of substantial changes in market conditions and selling durations. The findings further suggest that institutional features of the housing development sector – including financing arrangements, market structure, and dynamic pricing incentives – play an important role in shaping price-setting behavior in housing markets.

The results also have broader implications for housing-market dynamics and macroeconomic policy. If prices in the new-home market are rigid downward, negative housing demand shocks may primarily adjust through lower construction activity rather than through lower prices, potentially generating persistent effects on residential investment and future housing supply. In this environment, tighter monetary policy may reduce housing supply growth with substantial lags, potentially contributing to higher housing costs in the medium run even if demand pressures initially weaken. More generally, the findings highlight the importance of incorporating industrial organization and financial frictions into macroeconomic analyses of the housing development sector.

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Online Appendix for “Price Rigidities in the Market for New Homes”

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A Theory appendix

We first define the equilibrium with flexible prices.

Definition 1. Suppose that the price of new housing is determined ex post. Given the structure of the economy and endowments of Y, O , and the interest rate R , a (flexible price) housing market equilibrium for this economy consists of a set of house prices for existing and new housing p_O and p_N , demand for existing and new housing $O_d(\gamma)$ and $N_d(\gamma)$, a mass of active housing entrepreneurs e and supply of new housing for each housing entrepreneur, n_s , such that

1. $O_d(\gamma)$ and $N_d(\gamma)$ solve the household's problem, Eq. (3).
2. n_s solves the housing entrepreneur's problem, Eq. (6).
3. The markets for used and new housing clear, Eq. (1) and Eq. (5).
4. The equilibrium mass of active entrepreneurs e is determined by free entry, Eq. (8).

Next, we define the equilibrium with sticky prices.

Definition 2. Given the structure of the economy and endowments of Y, O , and the world interest rate R , a housing market equilibrium for this economy consists of a set of house prices for existing and new housing p_O and p_N , demand for existing and new housing $O_d(\gamma)$ and $N_d(\gamma)$, a mass of active housing entrepreneurs e and supply of new housing for each housing entrepreneur, n_s , such that

1. $O_d(\gamma)$ and $N_d(\gamma)$ solve the household's problem, Eq. (3).
2. n_s solves the housing entrepreneur's problem, Eq. (10).
3. The market for used housing clears, Eq. (1).
4. The market for new housing clears in the high demand state, Eq. (12).
5. The price of new housing is determined by the zero profit condition, Eq. (11).

Lemma 1. *The household's demand for different types of housing, N_d and O_d , satisfies the following conditions*

$$p_O = \gamma v'(H) (1 - \lambda) \left[(1 - \lambda) + \lambda \left(\frac{N_d}{O_d} \right)^{\frac{1-p}{p}} \right]^{\frac{1-p}{p}}, \quad (\text{A.1})$$

and

$$p_N = \gamma u'(H) \lambda \left[\lambda + (1 - \lambda) \left(\frac{N_d}{O_d} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}. \quad (\text{A.2})$$

The relative demand for housing is given by:

$$\frac{\lambda}{1 - \lambda} \left(\frac{N_d}{O_d} \right)^{\rho-1} = \frac{p_N}{p_O}. \quad (\text{A.3})$$

Proof. The household solves

$$\begin{aligned} \max_{C, O_d, N_d} & C + \gamma v \left(\left[(1 - \lambda) O_d^\rho + \lambda N_d^\rho \right]^{1/\rho} \right) \\ \text{s.t.} & C + p_O O_d + p_N N_d = Y + p_O O. \\ & C \geq 0. \end{aligned} \quad (\text{A.4})$$

Given the large endowment assumption, we can disregard the non-negativity constraint on C . Denoting by μ the multiplier on the investor's budget constraint, the first-order conditions with respect to C , O_d , and N_d are, respectively,

$$\begin{aligned} \mu &= 1, \\ \gamma v'(H) H^{1-\rho} (1 - \lambda) (O_d)^{\rho-1} &= \mu p_O, \\ v'(H) H^{1-\rho} \lambda (N_d)^{\rho-1} &= \mu p_N. \end{aligned}$$

Combining the second and third first-order conditions and substituting for $\mu = 1$, we get

$$\frac{\lambda}{1 - \lambda} \left(\frac{N_d}{O_d} \right)^{\rho-1} = \frac{p_N}{p_O}. \quad (\text{A.5})$$

Additionally, we can write each of the first-order conditions for existing and new housing demand as

$$p_O = \gamma v'(H) (1 - \lambda) \left[(1 - \lambda) + \lambda \left(\frac{N_d}{O_d} \right)^\rho \right]^{\frac{1-\rho}{\rho}}, \quad (\text{A.6})$$

and

$$p_N = \gamma u'(H) \lambda \left[\lambda + (1 - \lambda) \left(\frac{N_d}{O_d} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}. \quad (\text{A.7})$$

□

Proof of Proposition 1

By Lemma 1, in the high housing demand state ($\gamma = \gamma_H$), we have that the relative price of existing and new housing is

$$\frac{\lambda}{1-\lambda} \left(\frac{N_s}{O} \right)^{\rho-1} = \frac{p_N^H}{p_O^H},$$

while the price levels are given by

$$p_O^H = \gamma_H v'(H) (1-\lambda) \left[(1-\lambda) + \lambda \left(\frac{N_s}{O} \right)^\rho \right]^{\frac{1-\rho}{\rho}}, \quad (\text{A.8})$$

and

$$p_N^H = \gamma_H u'(H) \lambda \left[\lambda + (1-\lambda) \left(\frac{N_s}{O} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}. \quad (\text{A.9})$$

In the low housing demand state ($\gamma = \gamma_L$), we have the same relative prices of existing and new housing as in the high demand state, namely

$$\frac{\lambda}{1-\lambda} \left(\frac{N_s}{O} \right)^{\rho-1} = \frac{p_N^L}{p_O^L},$$

while the price levels are given by

$$p_O^L = \gamma_L v'(H) (1-\lambda) \left[(1-\lambda) + \lambda \left(\frac{N_s}{O} \right)^\rho \right]^{\frac{1-\rho}{\rho}}, \quad (\text{A.10})$$

and

$$p_N^L = \gamma_L u'(H) \lambda \left[\lambda + (1-\lambda) \left(\frac{N_s}{O} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}. \quad (\text{A.11})$$

Therefore, given that supply N_s is predetermined, it readily follows that the relative prices are unchanged in the low vs. high housing demand states. Finally, note that substituting for p_N^H and p_N^L into Eq. (7), we find that the equilibrium mass of active housing entrepreneurs e satisfies

$$\chi c'(n_s) R = [q\gamma_H + (1-q)\gamma_L] u'(H) \lambda \left[\lambda + (1-\lambda) \left(\frac{en_s}{O} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}.$$

That the new housing sales, the new sales share and the inventory-to-sales ratio are constant follows readily from N_s being predetermined.

Proof of Proposition 2

First, we characterize the problem of housing entrepreneurs. We conjecture that there is only excess supply in the low housing demand state $\gamma = \gamma_L$ (see Remark in the body), housing entrepreneurs will anticipate that they can influence their revenues only in the high demand state, which would be reflected in their production decisions. Specifically, the marginal revenue from the perspective of a housing entrepreneur would only be qp_N rather than p_N , which would imply a lower supply of housing as a reaction to the excess supply in the low demand state. Therefore, the supply of new housing, n_s for a single housing entrepreneur solves the first-order condition

$$c'(n_s) = qp_N/\chi R = q \frac{c(n_s) + F/\chi R}{qn_s + (1-q)N_d(\gamma_L, p_N)/e'}$$

where the second equality uses the free entry condition (Eq. (11)), together with the assumption that in the excess supply state housing entrepreneurs are treated equally.

In the high housing demand state ($\gamma = \gamma_H$) there is no rationing, and we have market clearing $N_d = N_s$. This pins down the relative price of existing and new housing at

$$\frac{\lambda}{1-\lambda} \left(\frac{N_s}{O} \right)^{\rho-1} = \frac{p_N}{p_O^H},$$

so that

$$p_O^H = p_N \frac{1-\lambda}{\lambda} \left(\frac{N_s}{O} \right)^{1-\rho}.$$

Moreover, the equilibrium mass of active housing entrepreneurs e is pinned down by

$$\chi c'(n_s) R = q\gamma_H u'(H) \lambda \left[\lambda + (1-\lambda) \left(\frac{en_s}{O} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}. \quad (\text{A.12})$$

In the low housing demand state ($\gamma = \gamma_L$), we have that $N_d = N_d^L < N_s$, where N_d^L is implicitly pinned down by

$$p_N = \gamma_L u'(H) \lambda \left[\lambda + (1-\lambda) \left(\frac{N_d^L}{O} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}.$$

In that case, the price of existing housing is pinned down via the relative price

$$p_O^L = p_N \frac{1-\lambda}{\lambda} \left(\frac{N_d^L}{O} \right)^{1-\rho}.$$

In either case, the supply of new housing by a housing entrepreneur solves

$$c'(n_s) = q \frac{c(n_s) + F/\chi R}{qn_s + (1-q)N_d^L/e},$$

and the price of new housing solves

$$p_N = \frac{\chi R c(n_s) + F}{qn_s + (1-q)N_d^L/e}.$$

Finally, in the fixed price case, the relative price ratio in the high vs. low demand state is

$$\frac{p_N^H/p_O^H}{p_N^L/p_O^L} = \left(\frac{N_s}{N_d^L} \right)^{\rho-1} < 1,$$

since $N_s \geq N_d^L$ and $\rho \in (0, 1)$. Finally, the comparison $N_s \geq N_d^L$ implies the results for the new sales, new sales share and the inventory-to-sales ratio.

Proof of Proposition 3

With flexible prices it is straightforward to show that in the high demand state for new housing ($\lambda = \lambda_H$), the relative price is

$$\frac{\lambda_H}{1 - \lambda_H} \left(\frac{N_s}{O} \right)^{\rho-1} = \frac{p_N^H}{p_O^H},$$

while in the low demand state ($\lambda = \lambda_L$),

$$\frac{\lambda_L}{1 - \lambda_L} \left(\frac{N_s}{O} \right)^{\rho-1} = \frac{p_N^L}{p_O^L},$$

Notice that in this case, the relative price difference is

$$\frac{p_N^H/p_O^H}{p_N^L/p_O^L} = \frac{\lambda_H}{1 - \lambda_H} / \frac{\lambda_L}{1 - \lambda_L} > 1.$$

The results for new sales, new sales share and the inventory to sales ratio follow from the predetermined supply for new housing.

Proof of Proposition 4

By Eq. (9), we have that n_s will be lower in the high cost state. Moreover, by the equation

$$\chi c'(n_s) R = \gamma u'(H) \lambda \left[\lambda + (1 - \lambda) \left(\frac{en_s}{O} \right)^{-\rho} \right]^{\frac{1-\rho}{\rho}}, \quad (\text{A.13})$$

the mass of active entrepreneurs and the total supply N_s of new housing would also be lower in the high cost state. Therefore, there will be two levels of equilibrium supply for new housing, N_s^H and N_s^L with $N_s^H < N_s^L$, depending on the cost χ .

Comparing the relative price across the two cost states yields

$$\frac{p_N^H / p_O^H}{p_N^L / p_O^L} = \left(\frac{N_s^H}{N_s^L} \right)^{\rho-1} > 1.$$

Finally, the behavior of new sales, the share of new sales and the inventory-to-sales ratio follows directly from the comparison of N_s^H and N_s^L .

B Data appendix

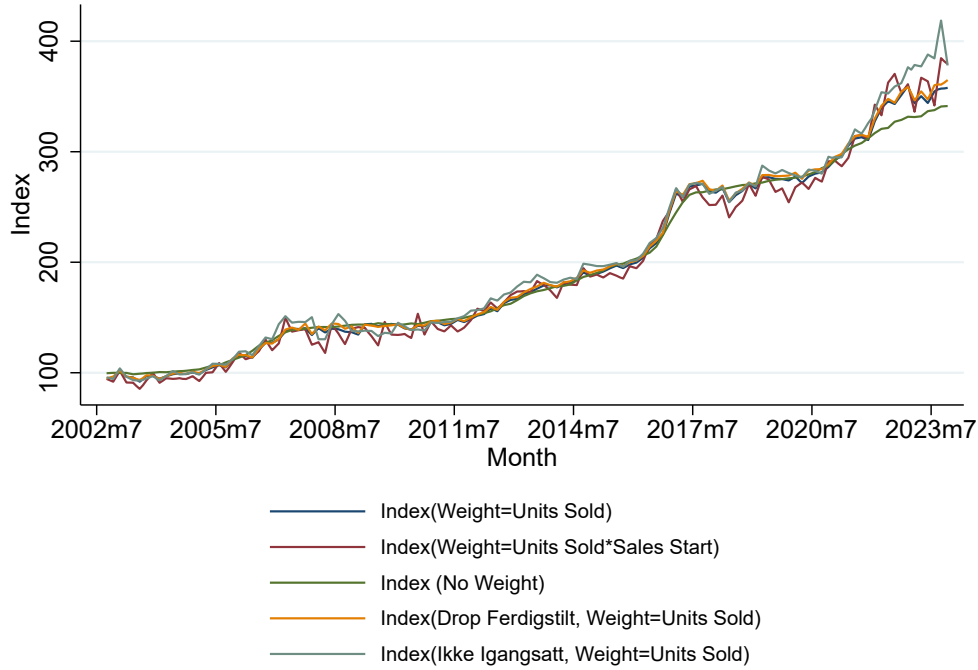
	Buyer of New	Buyer of Used
Gross Financial Wealth	1,800,208	1,055,709
Bank Deposits	635,213	405,817
Gross Total Wealth	4,485,937	3,085,229
Debt	1,477,842	1,284,298
Net Wealth	3,008,094	1,800,931
Earnings	643,475	623,386
Income	931,805	806,181
Age	45.7	40.7
Has Kids	0.28	0.35
Two Adults Under 45	0.12	0.15
Two Adults Between 45 and 64	0.10	0.07
Two Adults Over 64	0.12	0.06
Single Under 45	0.16	0.20
Single Between 45 and 64	0.08	0.08
Single Over 64	0.07	0.04
First Time Buyer	0.27	0.31
House	0.31	0.51
Nr. of Rooms	3.5	3.6
Size	96.5	114.4
<i>N</i>	120,860	724,456

Notes: Data sources: population register and tax register data from SSB and transaction data from the Land register for the period 2011-2020. The sample is restricted to transactions of housing units greater than $10m^2$. Buyer of new is defined as a buyer of a unit that is sold for the first time by a firm.

Table A.1: Financial and Demographic Characteristics by Buyer Type

B.1 List price index construction

We construct a new-home list price index using a hedonic regression framework designed to account for compositional differences across projects and locations. Specifically, we estimate a regression of the logarithm of listed price per square meter on project type-by-location fixed effects together with a flexible functional form for project size, measured by the number of units in the project. Municipality-by-month fixed effects are then extracted and converted back into price levels using the standard retransformation adjustment based on the regression RMSE. Relative to a conventional hedonic house price model, the specification can be interpreted as imposing a unit elasticity with respect to dwelling size by modeling prices in terms of price per square meter. Finally, municipality-level indices are aggregated to the national level using rolling two-year sums of municipality sales as weights.

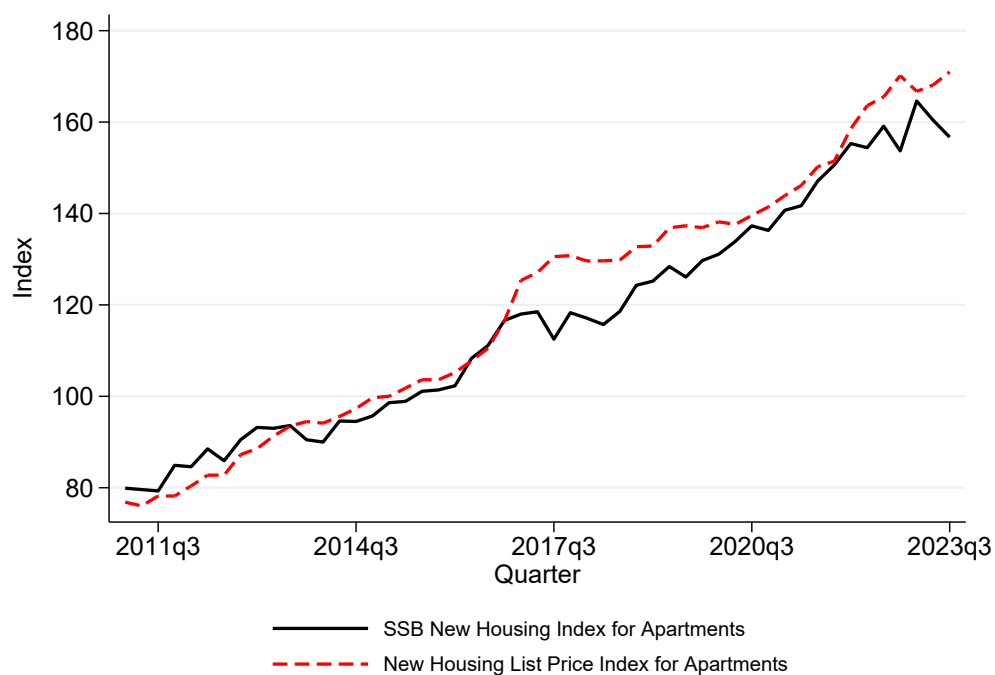


Notes: The list price index is constructed using bimonthly project-level data from ECON Nye Boliger. It is based on a hedonic regression of list prices per square meter on project characteristics for new projects. Each observation is weighted by either the number of sales in each period or number of sales in each period once the sale starts. We also check for cases when the projects are not started, or the finished projects are removed. One of the indices is estimated such that the observations are not weighted. The time fixed effects are then inverted to create a bimonthly index, which is interpolated to monthly frequency and seasonally adjusted using an X-11 seasonal filter.

Figure A.1: List price index for new housing - robustness.

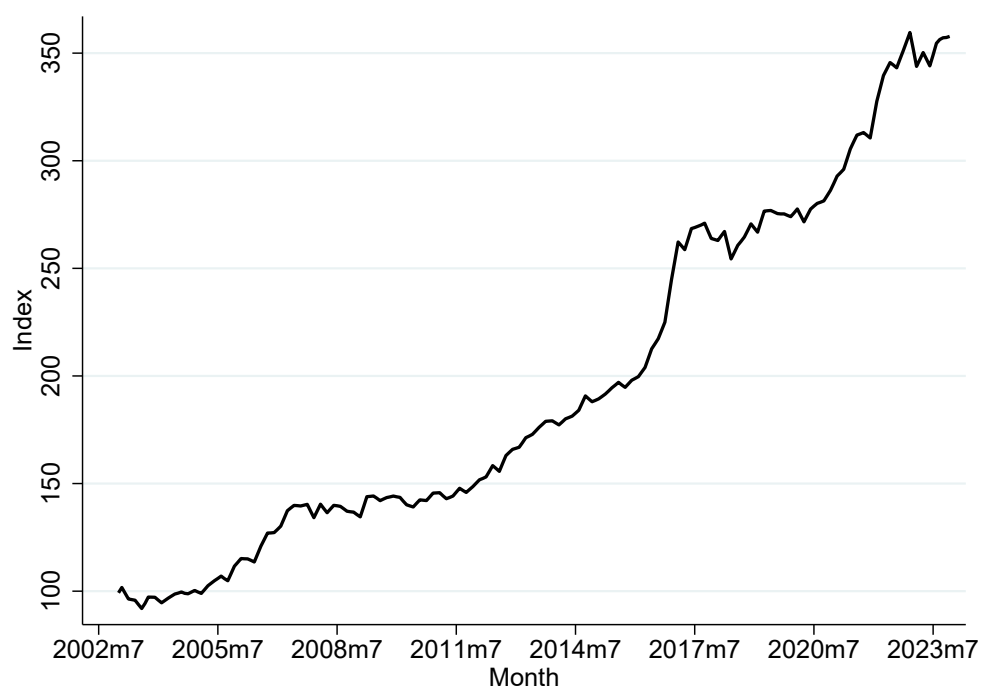
To address concerns related to stale listing prices, we consider several alternative weighting schemes and sample restrictions, including weighting observations by the number of sales (which we use as our baseline index), overweighting periods around project launch, excluding completed projects, restricting the sample to projects that have not yet started construction, and equal weighting. The resulting indices are all very similar to our baseline (see Figure A.1). We also compare our list price index to a new apartments index constructed by Statistics Norway, with the two indices being broadly similar (see Figure). Figure A.3 shows the baseline list price index we use in Section 3, while Figure A.4 compares the new vs used house price index.

B.2 Aggregate evidence – additional facts



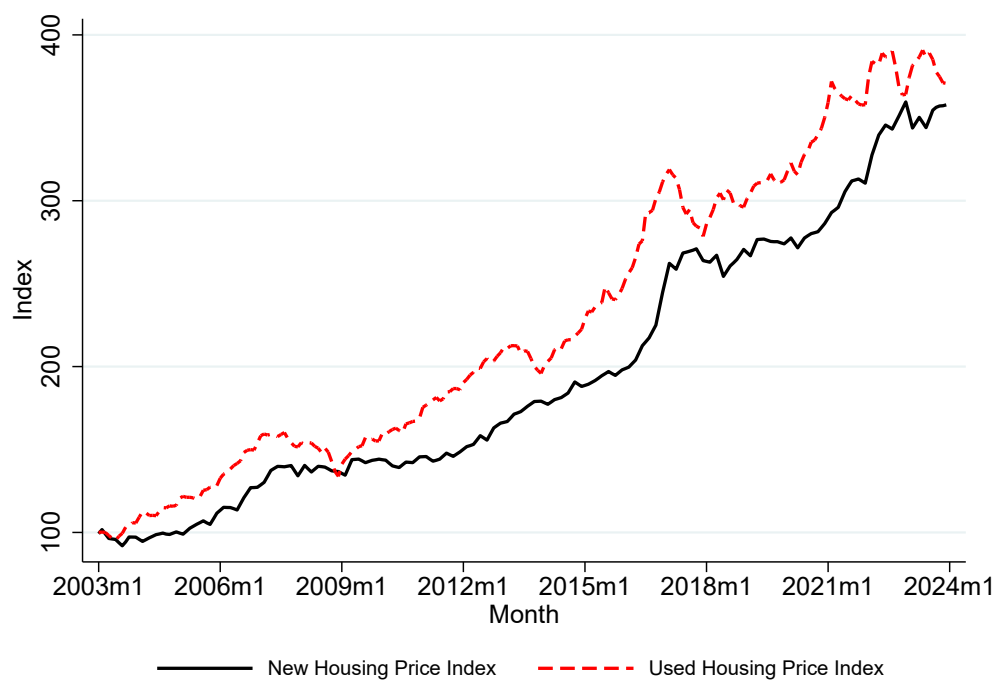
Notes: The graph compares the new price index for apartments constructed with the ECON Nye Boliger data with the SSB price index for new apartments in Norway. Note that the new price index uses list prices, while SSB index uses transacted prices.

Figure A.2: Comparison of new housing list price index vs. Statistics Norway price index for Apartments.



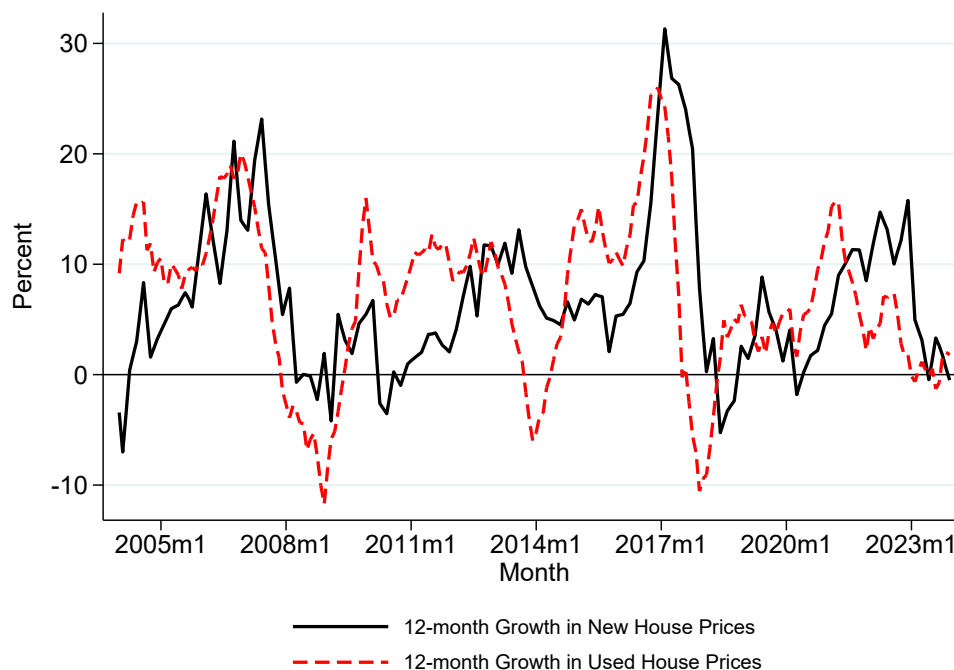
Notes: The list price index is constructed using bimonthly project-level data from ECON Nye Boliger. It is based on a hedonic regression of list prices per square meter on project characteristics for new projects, where each observation is weighted by the number of sales in each period. The time fixed effects are then inverted to create a bimonthly index, which is interpolated to monthly frequency and seasonally adjusted using an X-11 seasonal filter.

Figure A.3: List price index for new housing in Oslo.



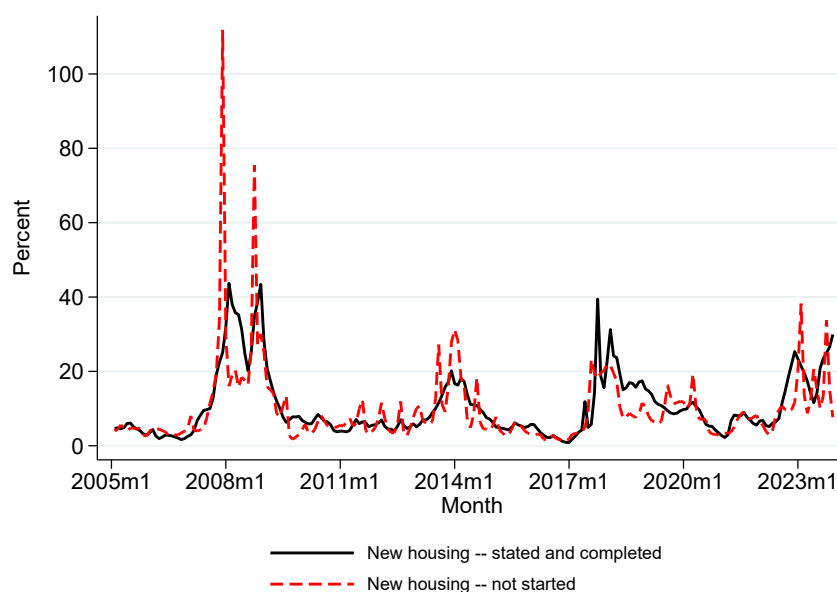
Notes: The list price index is constructed using bimonthly project-level data from ECON Nye Boliger. It is based on a hedonic regression of list prices per square meter on project characteristics for new projects, where each observation is weighted by the number of sales in each period. The time fixed effects are then inverted to create a bimonthly index, which is interpolated to monthly frequency and seasonally adjusted using an X-11 seasonal filter. The used housing price index is from Eiendom Norge.

Figure A.4: New vs. used housing price indices for Oslo, Norway.



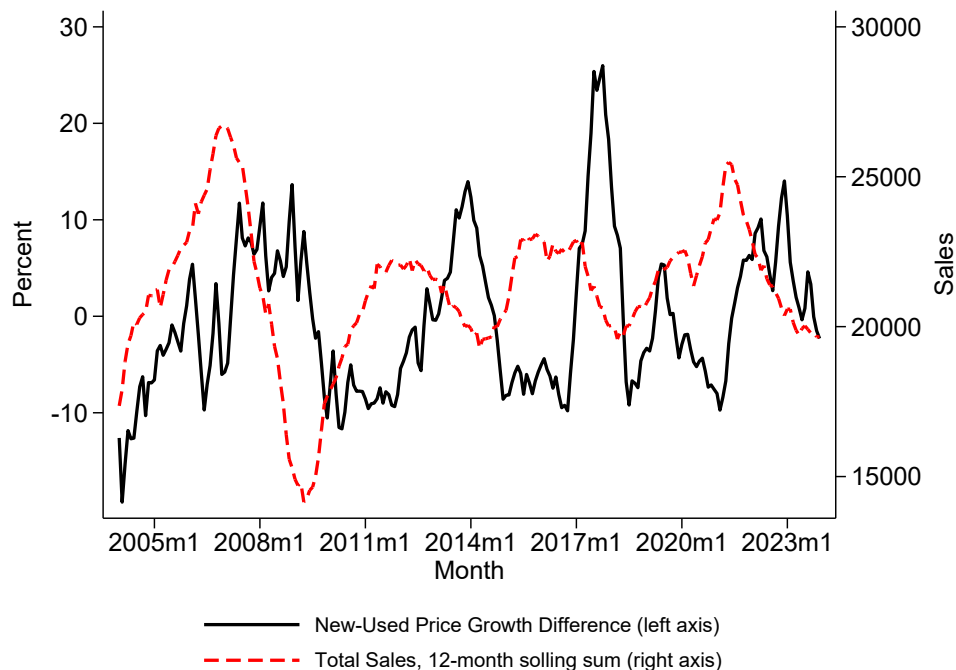
Notes: New house prices are based on a list price index constructed, using bimonthly project-level data from ECON Nye Boliger. It is based on a hedonic regression of list prices per square meter on project characteristics for new projects, where each observation is weighted by the number of sales in each period. The time fixed effects are then inverted to create a bimonthly index, which is interpolated to monthly frequency and seasonally adjusted using an X-11 seasonal filter. The used housing price index is from Eiendom Norge.

Figure A.5: 12-month Growth of New vs. Used Housing Prices for Oslo, Norway.



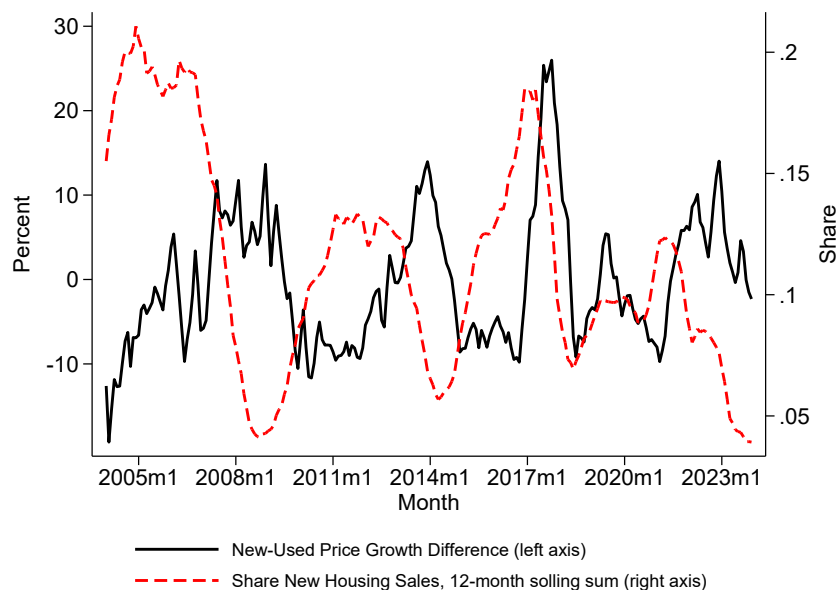
Notes: The months of supply are computed as the ratio of unsold units in previous month over sold units in the current month, for new unstarted (ikke Igangsatt) and started or completed (Igangsatt/Ferdigstilt) projects. To compute sales, we first transform the bimonthly sales into a monthly series by dividing the bimonthly sales by 2 and interpolating. Data sources: ECON Nye Boliger.

Figure A.6: Months of supply (inventory-to-sales) by new project status for Oslo, Norway.



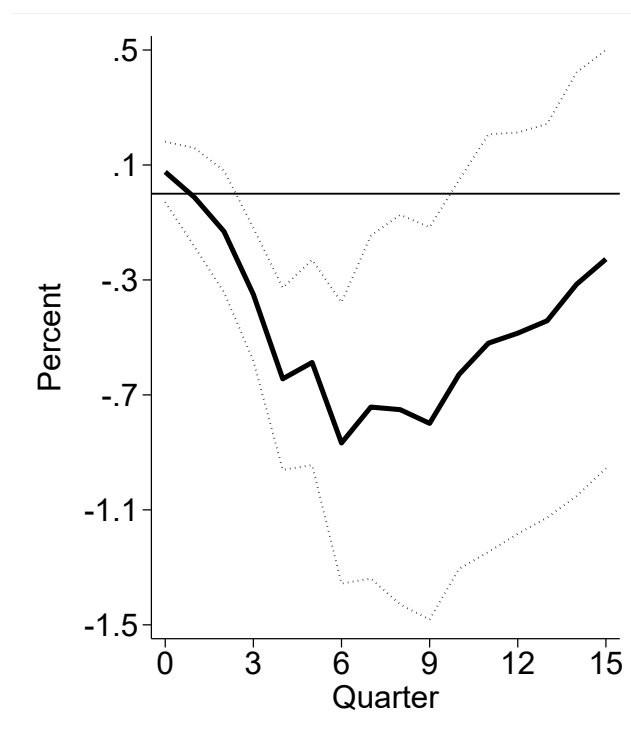
Notes: The difference in new vs used house prices is difference between the 12 month changes in new listed and used house prices in Oslo. Total sales are a 12-month rolling sum of monthly total sales. Data sources: ECON Nye Boliger and Eiendomsverdi.

Figure A.7: Relative Price Gap and Total Sales for Oslo, Norway.



Notes: The difference in new vs used house prices is difference between the 12-month changes in new listed and used house prices in Oslo. New sales share is the ratio of a 12-month rolling sum of new sales and totals sales. Data sources: ECON Nye Boliger and Eiendomsverdi.

Figure A.8: Relative Price Gap and Share of New Home Sales for Oslo, Norway.



Notes: The graph shows the coefficient estimates from a local projection regressions regressing the log change in real housing investment on the quarterly difference of the 12-month price growth between new and used housing. The regression includes three lags of the independent and quarterly changes of the dependent variable. The confidence bands are 95% bands from Newey-West standard errors with 3 lags.

Figure A.9: Relative Price Gap Innovations and Housing Investment