WHY ARE HOME PRICES ACROSS IDAHO CITIES RISING FASTER THAN THE NATIONAL AVERAGE?

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WHY ARE HOME PRICES ACROSS IDAHO CITIES RISING FASTER THAN THE NATIONAL AVERAGE?

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EXECUTIVE SUMMARY

Many economists view the housing market as one of the crucial indicators of the overall health of an economy. When the economy is approaching a recession, the real estate market is usually among the first sectors to slow down and among the first to recover during a boom. If this assessment is accurate, then the sudden rise in Idaho's housing market prices during the past three years should raise concerns about the future and well-being of the state's economy. The average value of single-family homes in the state has increased by about 173% since the third quarter of 2011, compared with nearly 80% nationally. Within the state, discussions about potential sources of this growth have been centered primarily around out-of-state migration inflows and inadequate supply of new housing. However, multiple studies have shown the recent rise in home prices across the nation has not been limited to the impact of these two factors alone. Consequently, this study explores one factor that has significantly impacted home values but received considerably less attention: namely, existing housing inventory. Inventory of existing housing can be defined as the total volume of unique, active, and previously-occupied home listings. The volume of these listings acts as a signal to prospective buyers and sellers about the relative tightness of the market, response to these signals ultimately impacts the prevailing housing market prices.

This report examines the impact of existing housing inventory on home prices while controlling for other confounding factors. These factors include income, labor market, population growth, demographics, and crime rates. The study hypothesizes that a negative change in existing housing inventory leads to a rise in home prices. Idaho's declining housing inventory has provided a signal to the market that the supply of housing is running low. In turn, increased competition amongst buyers to bid a winning offer has led to higher market prices. To test this hypothesis, a Spatial Durbin Model (SDM) of 49 Idaho cities was estimated using data from 2011 to 2020. This model is particularly useful in this analysis because it enables the estimation of spillover effects. These effects measure the extent to which a specific change taking place in one city is transmitted to the neighboring cities. In addition, this report provides an exploration into the sources of Idaho's declining existing housing inventory.

The report findings show a statistically significant relationship between existing housing inventory and prices, aligning with research expectations. The results are summarized as follows:

- Compared to all selected variables, existing housing inventory has the greatest impact on home prices. These suggests that Idaho's recent housing market boom has significantly been driven by declining housing inventory than population or income growth.
- There is an inverse relationship between existing housing inventory and price. A 1% decrease in housing inventory during one year is associated with a 0.5% rise in housing prices during the following year.
- Spillover effects are larger than direct effects. One year following a 1% decrease in existing housing inventory in a given city, housing prices within the same city increase by 0.059%, while price in the neighboring cities increase by 0.45%.
- The recent decline in Idaho's existing housing inventory has been driven by a decline in homeowner and renter mobility. This means that the supply of existing housing is declining as a result of households owning or renting longer than they did in the past.

One important policy implication from this report is that attempts aimed at addressing Idaho's spiraling housing market prices will require supply-side strategies. Any effective strategies should focus on increasing and diversifying the supply of housing across Idaho's cities, particularly those that have been severely affected. These include strengthening production of entry-level homes — given that this is where demand is greatest, with a large cohort of Millennials currently seeking to enter the market.

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1

Introduction

Housing markets across the U.S. are once again booming. During the last decade, housing markets across the nation have continued to grow to record highs. Figure 1.1 shows that national home prices — as measured by the Federal Housing Finance Agency's House Price Index (FHFA-HPI) — have increased by 80% between 2010 and 2021. Idaho's housing market has historically followed national trends, with growth levels typically below the national average. However, the past three years have seen Idaho's home prices rise at a faster rate than the national average, surpassing it for the first time in 2019. Every year since then, Idaho's housing market has consistently ranked amongst the fastest-growing in the nation. Idaho's House Price Index shows home values have appreciated by nearly 173% since rebounding from the 2007/2008 global financial crisis. There is some evidence that this growth has not been uniform across the state — some cities such as Boise have seen higher than average growth rates while others have only experienced slight growth. The data shows that a vast majority of the recent growth has been driven by changes in Idaho's major metropolitan statistical areas.

So why are housing prices on the rise again? Specifically, why have prices appreciated at a much faster rate in Idaho during the past three years? Any empirical exploration into these questions is complicated by the lack of high-quality data to perform microstudies. There are no recent studies specifically addressing this topic in the context of Idaho. At the national level, studies using aggregated data have primarily attributed the rise in housing prices to the effects of household preferences, migration, and housing supply policies (Desilva et al., 2012; Glaeser and Gyourko, 2018; Howard and Liebersohn, 2021; Khater et al., 2021; Mussa et al., 2017). More recent studies have also found that the COVID-19 pandemic has shifted the housing demand from high-population density neighborhoods to low-population density areas (Liu and Su, 2021). In contrast to these studies, the current report offers an alternative perspective on the dynamics of the housing market. This report argues that the decline in existing housing inventory has generated upward pressure on the overall housing market prices. Existing housing inventory refers to the volume of unique, active, and previously-occupied single-family home listings on the

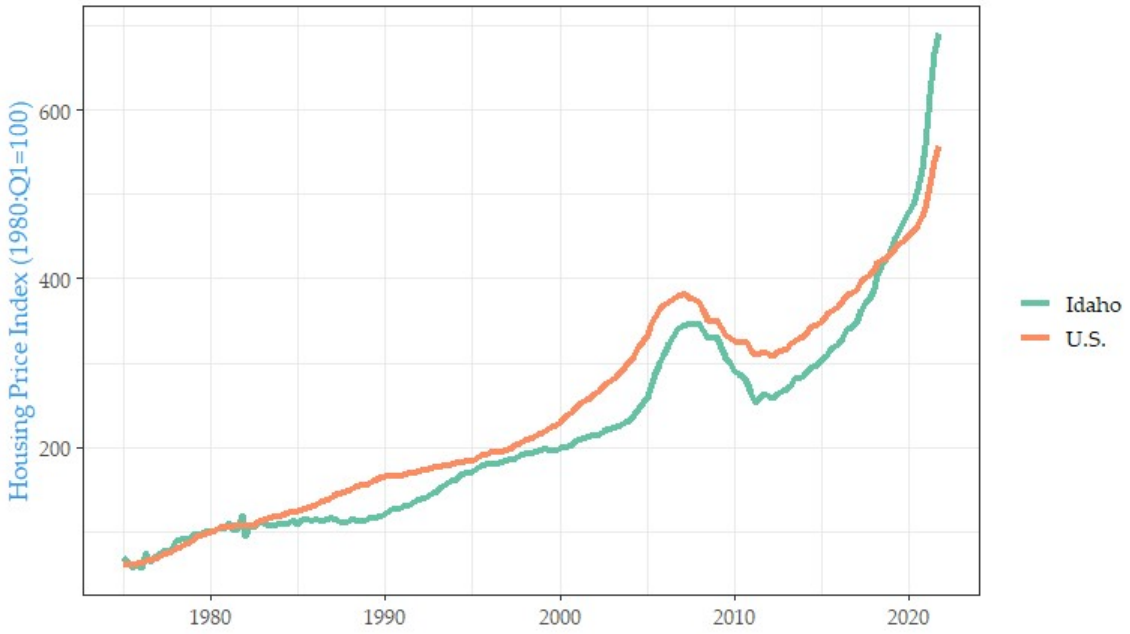

Figure 1.1: Quarterly Trends In Housing Prices, 1975 - 2021

market during a given period. Housing inventory can also be interpreted as representative of the supply of housing (Howard and Liebersohn, 2021; Liu and Su, 2021). Existing homes play a crucial role in a well-functioning housing market. The majority of housing market transactions involve the exchange of existing homes. Recent data shows that nearly 90% of all homes sold across the nation were previously occupied[1]. Existing homes also provide affordable, entry-level housing alternatives for buyers and renters alike.

The research hypothesis in this study is that a decline in housing inventory has a positive effect on the level of home prices. Assuming nothing else changes, a decline in existing housing inventory acts as a signal that the housing supply is declining, which ultimately leads to a rise in market prices. The underlying mechanism can be explained as follows: When fewer homes are listed on the market, on one hand, the perceived housing supply shortage gives sellers a competitive advantage to bargain for higher prices. On the other hand, potential buyers are faced with competition to offer the best bid. The combined effect of these market responses leads to prices increasing and homes selling much faster than normal. Figure 1.2 provides evidence of the relationship between housing inventory and price. The graph shows the percentage change in prices and housing inventory between 2019 and 2020 for all cities in the sample. The fitted line supports the view that a decline in housing inventory is associated with a rise in housing prices.

[1]This estimate is based on data from Redfin.

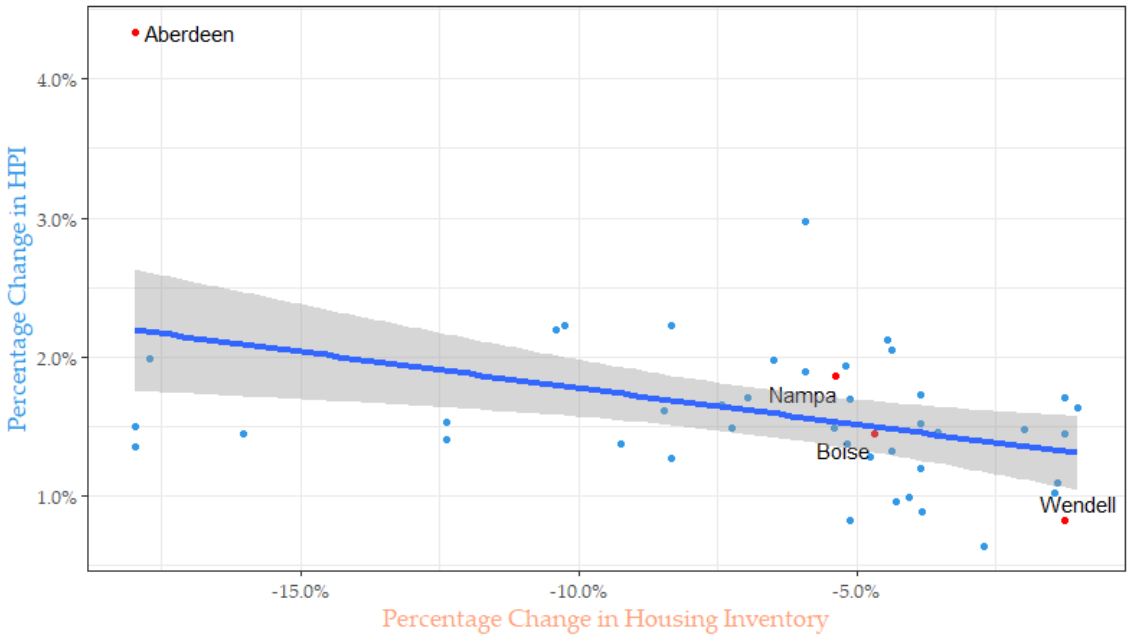

Figure 1.2: Relationship Between Housing Inventory and Price, 2020

Given the recent developments in Idaho's housing market, this report seeks to uncover the reasons behind the state's precipitous appreciation in home prices. To establish the effect of existing housing inventory on prices, this analysis uses panel data of 49 cities across Idaho from 2011 to 2020. On average, these cities account for more than 56% of Idaho's total population, making them a fair representation of the state's total resident population. A Spatial Durbin Model (SDM) is used to decompose the total effects into direct and indirect effects — spillover effects. The analysis controls for other factors that may cause variations in housing prices: namely, income, population growth, unemployment, migration flows, supply of newly-constructed homes, and crime rates. While it seems plausible that a decline in existing housing inventory may lead to a rise in prices, this analysis argues that location and time are equally important. Housing prices are significantly dependent on the location of the market in question and the prices in other surrounding or nearby markets. For example, when potential homebuyers are faced with declining housing options, — due to low inventory — mobility across areas enables buyers to search for housing options outside of their own market, thus increasing demand in other areas. Furthermore, given the costly and lengthy home purchasing process, there is no reason to believe that changes in the supply of housing will immediately affect home prices. The empirical approach employed in this report is particularly suitable for simultaneously accounting for spatial and temporal variations across housing markets.

The purpose of this report is two-fold. First, it tests the hypothesis that a decline in existing housing inventory is positively related to a rise in housing price levels. Secondly, it accounts for the factors contributing to the recent decline in Idaho's existing housing inventory. The rest of the report is organized as follows: Section 2 reviews the literature; Section 3 details the data and econometric model used; Section 4 provides estimated results and discussion; and Section 5 provides a conclusion and policy implications of the study.

2

Literature Review

Much of the literature on the housing market has used both theoretical and empirical methods to uncover the underlying dynamics. From a theoretical standpoint, the value of a home is determined by the changes in its demand and supply. The law of demand suggests that the quantity of buyers will increase as home prices decrease. On the other hand, the law of supply suggests that the quantity of houses available for sale will increase as home prices increase. The market is said to be in equilibrium when the market price is at a level where the quantity demanded is equal to the quantity supplied. However, the housing market does not always operate at equilibrium. This is due to the complex nature of the market which is caused by issues such as imperfect information and future expectations (Armona et al., 2019). In addition to its internal complex structure, the housing market is also affected by macroeconomic and financial conditions.

Empirical research into the housing market has similarly associated changes in residential housing prices with the effects of demand and supply. On the supply side, some studies argue that regulatory requirements have constrained the supply of housing and increased the cost of construction, thus, causing housing prices to rise (Glaeser and Gyourko, 2018; Gyourko and Molloy, 2015). Saiz, 2010 also suggests that geographic constraints coupled with restrictive residential land-use regulations are highly correlated with high housing prices. Although these studies have provided a wealth of insight in the discussion, they are primarily focused on constraints to new housing construction, largely understating and at times ignoring the effects of the supply of existing homes. On the demand side, studies that use microspatial data — e.g. neighborhoods and census tracts — find that a rise in immigration suppresses housing prices (Desilva et al., 2012). Conversely, studies that use macrospatial data — e.g. MSA and state — argue that immigration inflows are associated with rising home prices and rent due to the resulting flight of residents, particularly white and older residents (Mussa et al., 2017; Saiz, 2007; Xu et al., 2020). These results suggest that the impact of migration on the housing market could be taking place at a relatively faster pace on the macrospatial level than at the microspatial level. More recent studies have also shown that the COVID-19 pandemic has shifted demand away from high-density areas

to neighborhoods with low density, thus increasing prices (Liu and Su, 2021).

Considering these studies and others, the drivers behind Idaho's housing market prices could similarly be ascribed to the dynamics of housing demand and supply. Recent discussions around Idaho's housing market suggest that the recent growth has been fueled by high demand and low supply (Boise Regional Realtors, 2022; Shirah Matsuzawa, 2021). The general argument is that home prices are going up due to migration inflows from other states. The presumption is that out-of-state migrants have higher purchasing power and are thus able to bid up home prices in the state. While this aspect of the local housing market is undoubtedly relevant in the discussion, demographic changes alone are not adequate to explain the dramatic shift in Idaho's housing markets. Consequently, this analysis focuses on another aspect that could potentially explain Idaho's housing market dynamics: namely, the inventory of existing homes. Existing homes — or the lack thereof — have been mostly ignored as a potential source of the housing market supply-demand imbalances. This is surprising given that existing homes play a crucial role in any housing market. Current homeowners searching for alternative housing amenities or relocating for whatever reason, provide an abundant supply of homes on the market. Existing homes provide low-cost, entry-level housing options for those with limited purchasing power, making them practical tools for addressing housing affordability. Data from Redfin indicates that on average, existing homes sales account for nearly 90% of the total annual homes sold in the U.S. Given that existing home, inventories have been on the decline across Idaho, it is reasonable to expect this change could have also affected prices.

3

Data and Methodology

3.0.1. Area of Study

Appendix A shows the geographic distribution of the 49 cities in the sample. Most of these cities are in the southern part of the state. They range from the smallest city of Hagerman with a population of nearly 1,000 to the largest city of Boise with an estimated resident population of more than 200,000. These cities represent about 56% of Idaho's total population, making the sample somewhat representative of the state's entire population.

3.0.2. Data Sources

The selection of both the period under study and the variables are limited by the availability of city-level data. The study uses panel data comprising 32 rural and 15 urban Idaho cities from 2011 and 2020. Since city boundaries may change over time, the study uses the most recent boundaries and interpolates the limits back to the 2011 data. All data was collected at the city level. The analysis uses data from multiple publicly-accessible sources. Data on housing inventories were collected from Redfin. Any missing observations were supplemented with data from Zillow and the National Association of Realtors. The rest of the data was collected from Federal Housing Finance Agency, U.S. Census Bureau's five-year American Community Survey, and Idaho State Police's Uniform Crime Reporting database. Appendix B presents the summary statistics of the data used in this study.

3.0.3. Econometric Model

The study uses a Spatial Durbin Model (SDM) to estimate the dynamics in Idaho's housing market. Before estimating the model, this analysis firstly addresses the problem of reverse causality. The main assumption in this study is that changes in housing inventory causes a rise in prices. However, it is reasonable to expect changes in prices to cause inventory. For example, if housing prices are going up, more homeowners could be enticed to sell, thus increasing the volume of inventory. To focus only on the effect of housing inventory on prices, an instrumental-variable ap-

proach is implemented. The first stage instruments inventories on the proportion of homeowners and renters who remained in the same house from the previous year. The second stage estimation uses predictions obtained in the first stage to estimate the following model specification,

$$\Delta log(\mathbf{H}_{i,t}) = \rho \mathbf{W} log(\mathbf{H}_{i,t}) + \mathbf{S}_{i,t-1} \cdot \delta_1 + \mathbf{X}_{i,t-1} \cdot \delta_2 + \mathbf{W}\mathbf{S}_{i,t-1} \cdot \beta_1 + \mathbf{W}\mathbf{X}_{i,t-1} \cdot \beta_2 + \Delta\mu_{i,t} \quad (3.1)$$

where $\mathbf{H}_{i,t}$ represents the log-transformed vector of the change in the dependent variable in city i at time t. The coefficient ρ reflects the spatial interdependence in the data. It measures the impact of changes in housing prices in a specific city on prices in neighboring cities. $\mathbf{S}_{i,t-1}$ represents a vector of housing inventory lagged by one year. The associated coefficient, δ_1, measures the direct effect of changing housing inventory in the current year, on the level of home prices in the following year. $\mathbf{X}$ represents a vector of lagged controls including income, migration inflows, unemployment, population growth, and crime rate. β_1 and β_2 correspond to the parameters that measure indirect effects, while δ_1 and δ_2 are parameters that measure the direct effects. $\mathbf{W}$ is a matrix of spatial weights that describes the arrangement of spatial units. This analysis classifies two cities as neighbors if any of these two conditions are satisfied: (a) they share the same border (b) they are located in share the same border. Given the spatial distribution of the selected cities shown in Appendix A, this classification implies that all cities in the sample have at least one neighbor.

4

Results and Discussion

Before presenting the final results, Appendix B presents the results from the first-stage regression of existing housing inventory. The estimated coefficients are statistically significant and pass the standard instrument validity tests. Homeowner-immobility has an estimated coefficient of -3.274. This implies that when the share of homeowners who remained in the same house from a year ago increases by 1%, the volume of housing inventory declines by about three units. Renter-immobility has the greatest effect on inventories, suggesting that a 1% rise in renter mobility in one year is correlated with a drop in housing inventory by about five units the following year. The estimated results show that fewer homes are going on the market due to declining homeowner and renter mobility. Potential reasons why household mobility is declining could be due to the aging population[1]. Another reason could be that while the housing market has increased homeowner equity and made selling seem attractive, it has also made it harder to subsequently buy another home.

Following Elhorst (2014) and LeSage and Pace (2009), the second-stage estimation begins by establishing the existence of spatial interdependence in the housing market, thus determining the appropriate model specification. The next step is to determine a suitable treatment of the spatial and time effects as either fixed or random. Multiple tests were performed to ensure appropriate model selection and specification. $\mathbf{R}^2$ values are reported to assess model performance. Log-likelihoods and Wald statistics are also provided for testing the joint significance of the estimated parameters. The bottom of Table 4.1 presents the model specification tests, which all suggest that a spatial model with fixed entity effects is more suitable for modeling the housing market dynamics in Idaho.

Table 4.1 provides results from the estimated lagged spatial model of the housing market with controls. The spatial coefficient, ρ, is positive and highly significant, suggesting that the spatial specification is appropriate for modeling Idaho's housing market. The estimated coefficient implies that a rise in housing prices in one city is associated with a rise in prices in neighboring

[1]According to data from the U.S. Census, Idaho's share of homeowners aged 55 and above has increased by from 44.4% to 2010 to 53.2% in 2020.

cities. The findings also reveal that changes in existing housing inventory have a negative and statistically significant effect on home prices. Assuming everything else remains unchanged, this implies that one year following a 1% decline in existing housing inventory in a particular city, housing prices within the same city increase by 0.059%. The spillover effects — indirect effects — of existing inventory are much greater than the direct effects. This suggests that when existing housing inventory declines in one city, the impact of that change on housing prices is greatest in surrounding cities. When existing inventory falls by 1% in one city from one year to another, prices in the neighboring cities increase by 0.45%. Overall, home prices across Idaho cities increase by 0.52% following a percentage drop in housing inventory during the previous year. One possible explanation for higher inventory spillovers could be the effect of crowding out. When home-buyers are faced with limited housing options in one city, they will begin searching for options within the nearest, surrounding cities. Ultimately, this leads to higher prices in the surrounding cities due to increased demand. Compared to other variables in the model, the findings show that existing housing inventory has the greatest effect on housing price levels. A 1% growth in total population in one year leads to a 0.0024% rise in housing prices in a particular city and a 0.0053% increase in surrounding cities the following year. This suggests that Idaho's housing market prices are largely driven by the level of existing housing inventory. Therefore, the recent housing market boom is likely due to the decline in the supply of existing homes, rather than population or migration growth.

Similar to Desilva, Pham, and Smith (2012), this study finds that Idaho's housing market is responsive to changes in demographic characteristics. A 1% rise in the share of white residents leads to a 0.009% increase in housing prices, while a similar increase in black residents is followed by a 0.015% drop in prices in surrounding cities. The results also reveal that the effects of migration on housing price levels vary depending on the origination of migrants. The effects of migrants originating from outside of Idaho are only limited to the city they settled in, while migrants coming from other parts of the state only affect prices in neighboring cities. When the share of out-of-state migrants increases by 1% in a particular city during one year, housing prices increase by 0.005% the following year. A similar rise in migrants coming from other cities within Idaho leads to a 0.017% rise in prices in neighboring cities. The results also show that income is positively correlated with home prices while unemployment and crime rates have a negative relationship. This means cities with high-income levels tend to have higher housing prices while those with higher unemployment and crime rates tend to have lower prices.

Table 4.1: Idaho Spatial Housing Model Estimation

	SDM with instrumental variables		
	Direct effect	Indirect effect	Total effect
ρ	0.552***		
Inventory$_{t-1}$	-0.0586*	-0.452***	-0.515***
	(0.0235)	(0.131)	(0.140)
log(Per capita Income)$_{t-1}$	0.0937*	0.569**	0.663**
	(0.0416)	(0.216)	(0.243)
Within State inflows$_{t-1}$	0.00303	0.01724*	0.01754*
	(0.00190)	(0.00882)	(0.00725)
Out of State inflows$_{t-1}$	0.00595*	0.0244	0.0304
	(0.00259)	(0.0164)	(0.0182)
Unemployed rate$_{t-1}$	-0.00330***	-0.0231**	-0.0353**
	(0.00146)	(0.00913)	(0.00972)
log(Total Population)$_{t-1}$	0.242***	0.533*	0.775**
	(0.0399)	(0.241)	(0.257)
non-Hispanic White$_{t-1}$	0.00151*	0.00933*	0.0198*
	(0.000832)	(0.00492)	(0.00687)
non-Hispanic Blacks$_{t-1}$	-0.00783	-0.146**	-0.178*
	(0.0123)	(0.0245)	(0.0879)
log(Murder rate)$_{t-1}$	-0.00746*	-0.0137	-0.00624
	(0.00313)	(0.0183)	(0.0198)
No. of observations		392	
No. of Cities		49	
R^2		.815	
Log-likelihood		536.963	
Time-Fixed-Effects		Yes	
Hausman test, χ^2		31.61***	
Wald test, $H_0 : \beta_1 = \beta_2 = 0$		166.38***	
Wald test, $H_0 : \rho = 0$		124.87***	
Wald test, $H_0 : \beta = -\rho\delta$		11.73***	

Notes: The asterisks (*) denotes the statistical significance of the estimated coefficients, *** significant at 1%, ** significant at 5%, and significant at 10%. Standard errors are in parentheses. Housing Price Index is the dependent variable

5

Conclusion

The housing market prices in Idaho and much of the nation has increased significantly during the past decade. Previous studies have shown that growth observed at the national level has been due to changes in household preferences, migration, and housing supply policies. The objective of this report is to establish the relationship between existing housing inventory and prices in Idaho's housing market. The hypothesis being tested is that a negative change in housing inventory leads to a positive response in price levels. Assuming nothing else changes, a decline in housing inventories sends a market signal that the housing supply is low, which in turn causes a rise in demand followed by prices. To account for the spatial dependence in the housing market across neighboring cities, a Spatial Durbin Model (SDM) is estimated. The model was estimated in a Two-Stage procedure.

The estimated results show a strong, inverse relationship between existing housing inventory and prices. A 1% decrease in existing housing inventory in a particular city is associated with a 0.5% rise in housing prices within the same city. The findings also show that spillover effects are larger than direct effects. A 1% decrease in a particular city is associated with a 0.059% rise in housing prices within the same city, while prices increase by 0.45% in the neighboring cities. The findings show that existing housing inventory has the greatest effect on housing price levels, suggesting that Idaho's recent housing market boom is more likely due to the decline in the supply of existing homes, rather than population or migration growth. The results also show evidence that fewer homes are going on the market in Idaho due to declining homeowner and renter mobility.

One crucial implication of this report is that policy efforts aimed at addressing Idaho's spiraling housing market prices will require supply-side strategies. Any effective strategies must focus on increasing and diversifying the supply of housing across Idaho's cities, particularly those with high demand and price growth. These include strengthening the production of entry-level homes — given that this is where demand is greatest, with a large cohort of Millennials seeking to enter the market.

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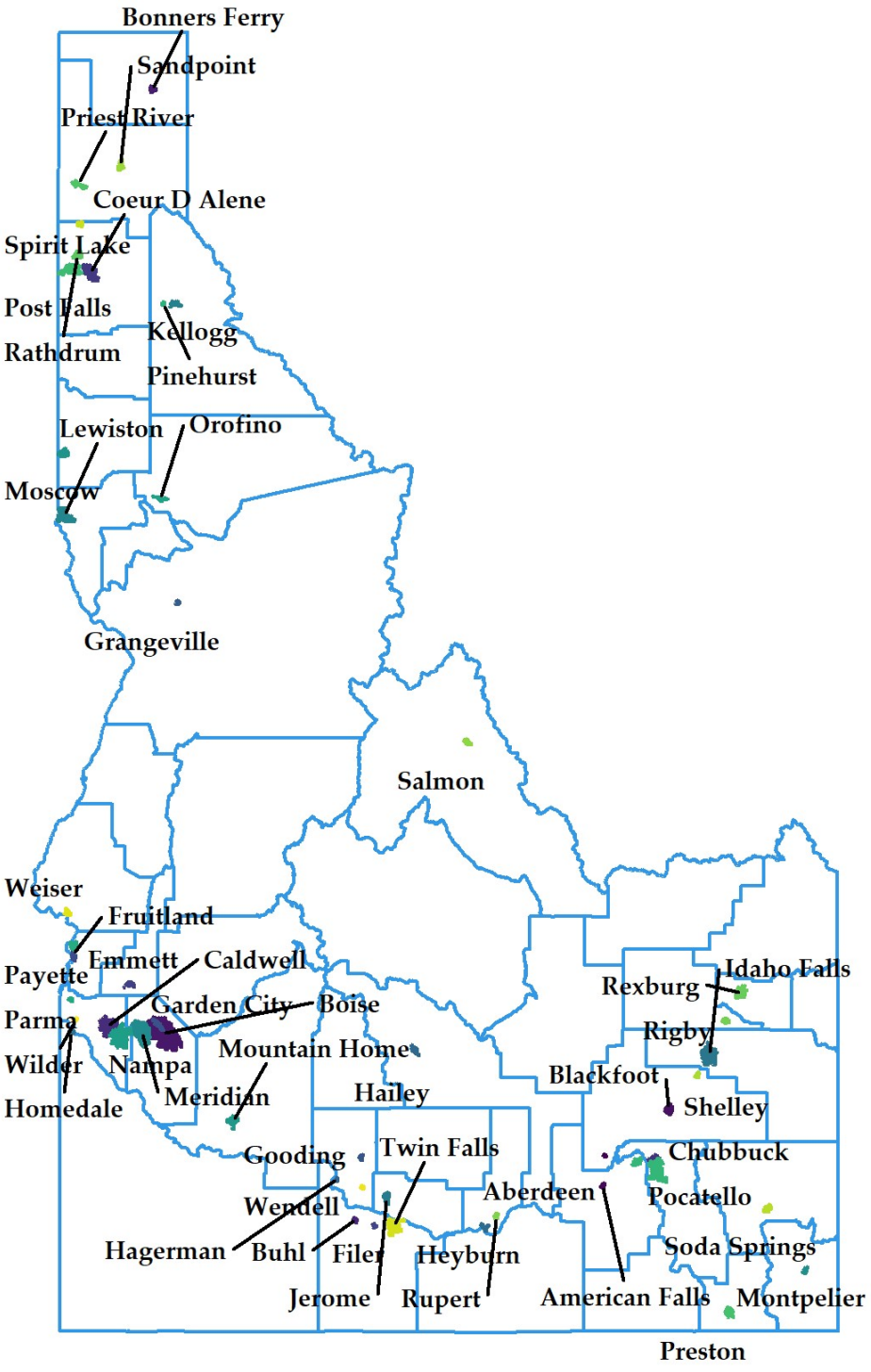
A

Geographic Distribution of 49 Selected Idaho Cities



B

Tables

Table B.1: Summary Statistics

	All Cities	
	Mean	Standard Deviation
Housing Price Index	237.8	89.1
Inventory	169.8	254.4
Residential Permits	157.1	389.4
Per capita Income (2012 $s)	$20,129	$4,767
Migration inflows (% of population)		
Within State inflows	4.3	3.1
Out of State inflows	4.0	3.1
Unemployment rate (%)	6.9	3.8
Total Population	19,511	35,955
White	89.8	7.7
Black	0.4	0.6
Murder rate (per 100,000)	1.8	6.6

Table B.2: First-Stage Regression for Housing Inventory

	Estimated Coefficients (Inventory dependent variable)
Homeowner-Immobility	-3.274*
	(1.189)
Renter-Immobility	-5.281*
	(2.657)
Residential Permits	0.190*
	(0.0771)
log Per capita Income	1.052*
	(0.511)
Unemployed rate	-0.0355**
	(0.0135)
Log Total Population	1.474***
	(0.424)
No. of Observations	392
R^2	0.7804
Wald test	48.15***

Notes: The asterisks (*) denotes the statistical significance of the estimated coefficients, *** significant at 1%, ** significant at 5%, and significant at 10%. Standard errors are in parentheses. Dependent variable is housing inventory