HOUSING MARKET ANALYSIS

Supplement to Commercial Real Estate Analysis and Investment

ABSTRACT

Housing market analysis requires an understanding of both the owner occupant market and the rental market. Here we review the fundamental drivers of demand, supply as well as some dynamics affecting prices and rents. Last, housing affordability is briefly addressed from public and private perspectives.

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Preface

The US housing bubble fallout of 2007-2010 dampened the investment appeal of housing for many households. Disillusioned by the bursting of the house price bubble that destroyed equity, many former home owners continue to rent today. Younger households, seeking more mobility, and often saddled with student loans, postpone home ownership or choose to have the greater flexibility of renting. Demographic shifts also affect home ownership, and the result was a declining home ownership rate after 2010 and corresponding increase in the percentage of households that rent. When mortgage rates were artificially lowered during COVID in early 2020, we saw ownership and prices increase in response to relatively cheap mortgage money. Meanwhile, single family rental units, SFRs, have become a new and permanent asset class for real estate investors, while some firms develop new housing concepts geared towards sharing amenities and mobility.

Housing supply is adequate in most US markets, defined as being affordable for the majority of households, but there are many exceptions especially along the Northeast and Western U.S. coasts. Affordable market-based housing is only achievable with greater density and smaller sized units, yet land-use policies and political approval processes have moved in the opposite direction adding greater regulation and restrictions that impede new supply. The internet and social media have facilitated quick mobilization for groups that feel threatened by new housing developments that will add traffic and parking congestion in their neighborhood. Those against nearby developments are called NIMBYs for Not in My Back Yard.   Those against any kind of development are called BANANAs, Build Absolutely Nothing Anywhere Near Anybody. Developers are often demonized by NIMBYs and BANANAs, as selfish, greedy and with deep unlimited pockets.

Demographic shifts, student debts and tighter underwriting continue to suggest substantial rental demand in the future. Among the major drivers of metro and state level household growth are in-migration policies and trends. As a whole, the U.S. depends on immigration to fuel the labor market. Any declines in immigration rates will severely curtail both the growth of the U.S. economy and future housing demand. In recent years, several metropolitan areas would have had zero or negative

population growth were it not for international in-migration. These metros include Chicago, Detroit, Milwaukee, Philadelphia, St. Louis and New York among others.

For the housing market analysts, migration rates into or out of a metropolitan area are a key telltale sign of the local economy's direction. Those metros with strong economies also have significant population growth rates often derived from in-migration from both domestic and international sources. Examples over the past decade include Houston, Charlotte, Austin and Tampa-St. Petersburg. Markets such as Washington D.C. and San Diego have strong international in-migration but experience strong domestic out-migration as well.[1]

Critical to any long-term view on housing demand, whether owned or rented, is the longevity of the current housing stock. If you assume an economic life of 100 years, you expect to lose, on average, 1% of the stock each year to fires, storms, floods, and wear and tear. While some studies exist that suggest at least a 1% or higher rate of housing loss, it is always possible to add capital and extend the life of the existing stock. If the economic life of a housing unit is 100 years, then we need 1.4 million housing units per year over the next few decades, just to replace the lost housing units. Add to this some reasonable level of new unit demand and it is unlikely that we will in the US produce enough housing for projected household growth, based on typical construction rates as of 2018. The type of housing needed in the future is also shifting towards units that accommodate older households.

While some markets embrace growth, others are restricted either geographically and / or by policy. Supply-restricted markets tend to have higher priced housing, higher rental costs and lower affordability. Markets with both high rental and high for-sale housing costs risk losing population bases to lower cost areas.

Much of the variance in the U.S. home ownership rate can be explained by policy changes such as those that impact capital and banking markets. These include policies affecting the reduction or increases in down payments as a percentage of the home price, as well as interest rates, tax rates and the tax deductibility of mortgage interest and property taxes. For example, the benefits of mortgage tax deductions change whenever the standard deduction for federal income taxation is changed. Changes in tax policies can affect the 'own vs. rent' decision going forward, but as of 2018 it appeared that the pendulum was tilting more towards renting versus owning, that is until COVID hit and mortgage rates were lowered.[2]

The second large factor affecting future housing demand, especially rental demand, is the impact of policy changes on immigration rates. As the U.S. population ages, housing demand is becoming increasingly dependent on immigrants, who have a higher tendency to rent. Prior to the US election in 2016, the US Census has forecast immigration to out pace natural population growth by 2023. Since 2017 the rate of immigration into the US has declined significantly and it has rebounded slightly since 2022. Without immigration, population growth rate is expected to slow to 0.4% per year through 2030, less than half the pace of the past decade and reach zero growth by 2040.[3]

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[1] See "Housing Demands and Immigration Trends" Real Estate Issues, by Norm Miller, Paige Mueller and Michael Dinn, July 30, 2018
[2] In 2018 the standard deduction for a household became $24,000. To exceed this with mortgage interest and property taxes would imply a home price far above the median US Price.
[3] IBID from footnote 4

Here we review the drivers of demand, supply, the impact of government intervention and subsidies and the problem of housing affordability. In the appendix we add a touch more depth on a few selected topics.

Introduction

While this discussion on housing market analysis uses the US national market for illustration, the models presented are applicable to local markets and all parts of the world where capitalism and markets are allowed to operate freely. To the extent that housing is subsidized, directly or indirectly through tax policies, or regulated and constrained, the resulting prices or rents will be distorted. Some of these policies will be addressed below, but it is impossible to have an exhaustive discussion of all the regulations and policies which can affect both national and local markets in a single chapter.

Housing Demand Drivers

At the most basic level, housing demand is a function of the size of the population and the average size of a household. Add to this a normal proportion of vacant housing under construction, renovation, abandoned or empty, along with a modest percentage of households that can afford and desire second homes and we get the total housing demand. Split this into rental and owner-occupied demand based on past momentum and trends observed for various ethnic groups, and aged-based trends, and we can derive the total demand for either rental or owned housing. Several nuances can be added to such a model, such as the rate of homelessness or affordability calculations affecting the size and quality of units demanded. We also need to consider the rate at which housing wears out, as such housing needs to be replaced or upgraded. To summarize a general demand model, consider the following factors:

1. Estimate total population growth considering births, deaths and net immigration. This can be done at the national, or local level. See Exhibit 1.
2. Divide this by household size considering probable recessions and demographic trends, if you wish to more accurately nail down annual demand looking out into the future several years.
3. This equals total households, although if we wish to be really meticulous, we might note that some people do not choose or can not afford to live in traditional housing. They live in cars, vans, in tents or shelters. Homelessness exists in the U.S. such that about 560,000 people were without traditional housing and sleeping in cars, tents, alleys or shelters on any given night in 2018.[4] More expensive large cities tend to have higher homeless rates. Single persons make up about half the homeless household count. This is less than 2/10ths of one percent of the population, but it still amounts to significant numbers.
4. Add to this the equilibrium vacant housing from market friction, normal vacancy and second+ home demand.
5. Add to this the housing units lost to real depreciation and obsolescence, natural disasters and normal attrition for changes in use, or public improvements and roads that require the taking of private property.
6. This equals total housing unit demand.
7. Last, estimate the owner-occupied portion of this to derive renter demand, considering credit access, housing related tax policies, existing household debt including student loans and credit debt, housing investment appeal and general affordability.

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[4] See http://www.endhomelessness.org/library/entry/SOH2016 "End Homelessness in America" 2016, and http://www.endhomelessness.org.

Exhibit 1: US Population Trends and Projections Through 2030

Source: US Census and Moody's Analytics

Year	Population (000's)	Numeric Change	Percent Change	Natural Increase	Net International Migration
2015	322,632	3,073	0.94%	1,386	1,119
2016	325,107	2,107	0.65%	1,367	1,097
2017	327,336	2,229	0.69%	1,353	876
2018	329,534	2,199	0.67%	1,368	831
2019	331,700	2,166	0.66%	1,362	804
2020	333,849	2,148	0.65%	1,338	810
2021	336,045	2,196	0.66%	1,188	1,008
2022	338,442	2,398	0.71%	1,212	1,185
2023	340,867	2,424	0.72%	1,203	1,221
2024	343,278	2,412	0.71%	1,166	1,246
2025	345,665	2,386	0.70%	1,127	1,259
2026	348,009	2,344	0.68%	1,079	1,265
2027	350,305	2,297	0.66%	1,023	1,274
2028	352,560	2,255	0.64%	963	1,292
2029	354,777	2,217	0.63%	903	1,314
2030	356,949	2,173	0.61%	840	1,333

Moving from population estimates to household estimates is simply a function of household size. Household size has declined steadily since 1965, but the rate of decline has flattened out in recent years. See Exhibit 2 below which shows the peak of household size at 3.7 for families and 3.35 for all households in the 1960's. When the population is adjusted for non-households; e.g., those living in group quarters, the average household size is about 2.54 overall and 3.15 for families as of the 2015 Census. Two factors are contributing to a decline in the average family size. One is delayed marriage. The median age at first marriage increased from 23.5 for men and 21.1 for women in 1975 to 29.5 and 27.4 respectively in 2016.[5] Second, there is an increase in single person households due to one spouse living longer, typically females, and again, delayed marriage. Single persons living alone have more than doubled since 1960. If household size continues to decline, we will continue to see household growth exceeding population growth rates. This is likely as the population ages. See Exhibit 3 showing household size by age bucket.[6]

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[5] U.S. Census Bureau, Families and Living Arrangements, Table MS-2.

[6] This chart was developed by Paige Mueller as part of a housing analysis team completed for the National Multi Housing Council in 2017. See https://www.nmhc.org/research-insight/research/ and https://www.weareapartments.org/NMHC-NAA-US-Apartment-Demand-in-2030.pdf

Exhibit 2: US Household Size Over Time and Forecast

Changes in Household Size
Source: U.S. Census

Legend: All Households, Families
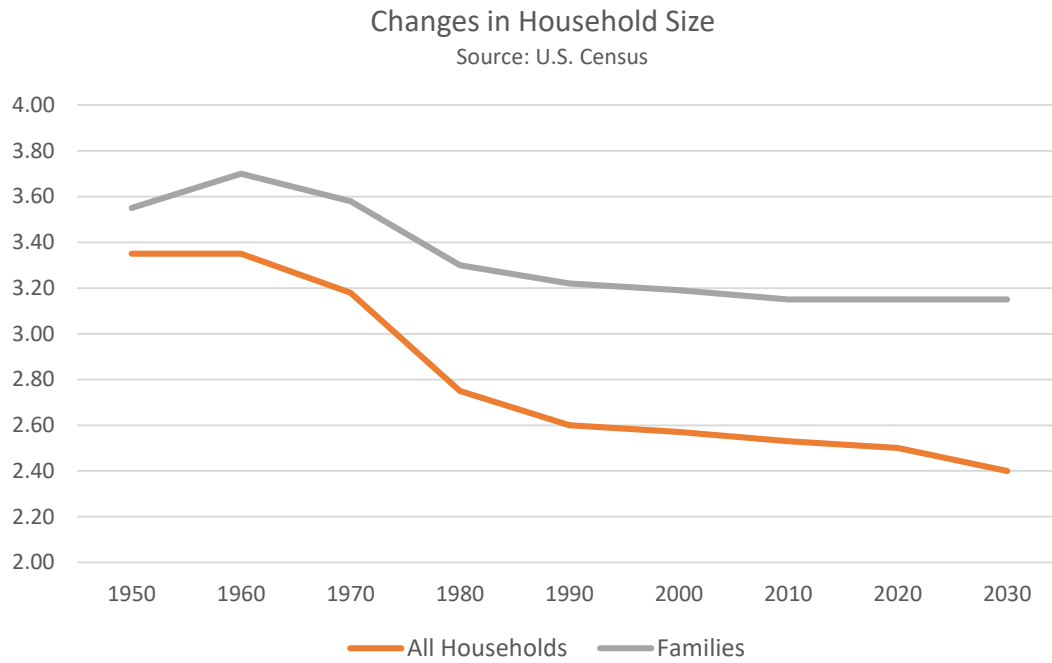
Exhibit 3: Household Size Declines with Age Past 39

Source: US Census

Household Size by Age of Householder

| Age of Householder	Mean Household Size
20-24 years	2.44
25-29 years	2.56
30-34 years	3.03
35-39 years	3.38
40-44 years	3.26
45-49 years	3.04
50-54 years	2.71
55-59 years	2.36
60-64 years	2.08
65-74 years	1.90
75+ years	1.64
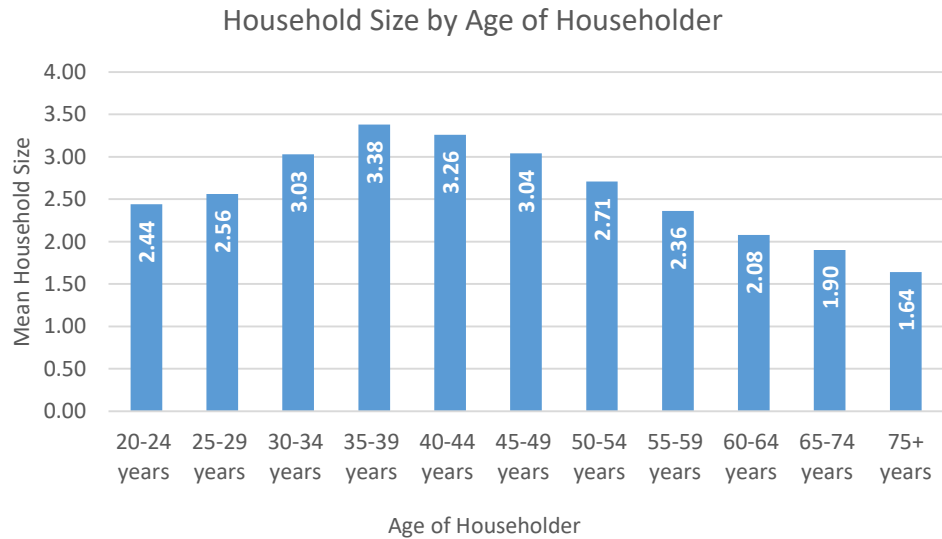
Another significant trend impacting household size are demographic trends. Households of Hispanic origin[7] accounted for an estimated 20% of U.S. population growth in 2015 and 43% of net in-migration. By 2030, the U.S. Census Bureau estimates that people of Hispanic origin will account for 24% of U.S. population growth and 41% of net in-migration. This is significant to household size estimates because households of Hispanic origin are significantly larger, averaging 3.25 people per household as compared to 2.42 people per household for non-Hispanics.[8] However, similar to overall U.S. household size data, Hispanic households are also declining in size, down from 3.56 people per household in 2001.

The implications of the household size and population trends are projected below in Exhibit 4. The U.S. is expected to have approximately 141 million households by 2030. From the end of 2018 through the end of 2030 the population should grow in total by approximately 9% but the household growth rate over that same period could be 13%, as the household size declines.

Exhibit 4: US Households Grow Faster Than the Population
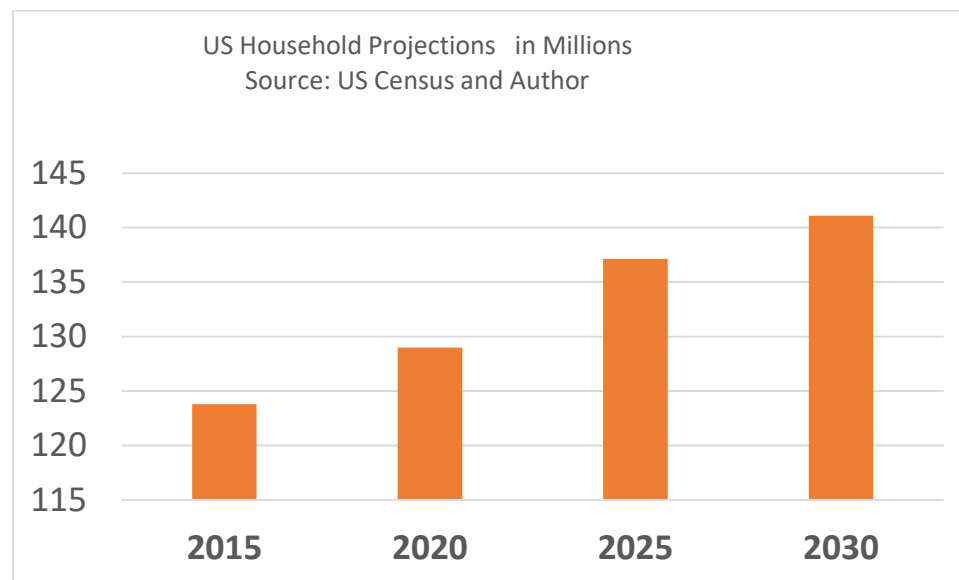
Next, we must add to the household count the housing units normally vacant. The U.S. Census Bureau surveyed nearly 134.8 million housing units in 2015, some 118.2 million were occupied and 16.6 million of them were vacant representing 12.3% of the stock.[9]   We can break the vacant housing statistic into three parts:

First, there is the normal equilibrium vacancy rate in each market where rents tend to go up when the vacancy rate is below a certain level.[10] Residential rentals have the lowest average natural vacancy rate compared to office, industrial and retail property. At the national level, we estimate this at

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[7] Note that origin is separate from race, and thus Hispanic households may be of any race in U.S. Census data.

[8] Source: U.S. Census Bureau, Current Population Survey 2016.

[9] U.S. Census American Community Survey (ACS) 1-year estimates.

[10] Source: "REVISITING THE DERIVATION OF AN EQUILIBRIUM VACANCY RATE" by Richard Parli and Norm Miller, Journal of Real Estate Portfolio Management, Vol. 20, Issue 3, 2014.

about 5.0% to 6.0%, although in some local supply constrained markets it normally runs even lower and in some elastic supply markets, it runs higher. [11]

There are also vacant homes within the owner-occupied market simply because of imperfect timing, or time needed to repair homes prior to occupancy, or from units vacated after buying a new home. This tends to add 1.5% to 2.0% vacancy to the entire stock of housing.

Next add second home demand. Second home demand is difficult to estimate as many are treated as investments and rented out part of the year. One way to derive second home demand is to simply assume that the difference between an estimate of total demand and total supply are because of second home demand. Then this percentage can be assumed to be required going forward, although it is likely that second home demand does change with economic cycles. Better second home demand analysis will require more research in the future. For now, we will use 5.6% as an estimate that seems reasonable by an analysis by Len Kiefer.[12] This suggests we simply divide the total demand prior to second homes by (1-.056) or .944 to derive an estimate of total housing demand. Second home demand, will of course, vary by metro market.

Last, we must add some units lost to natural disasters and human conversions or takings for alternative use. The rate of loss of existing housing stock varies according to age and location. A study by Bokhari and Geltner suggested depreciation rates on new multi-family dwellings of 4.0% per year. The depreciation tended to slow down as properties aged until they approached the end of their economic life. They found an average real depreciation rates of about 1.44% per year over the entire economic life. This does not mean we actually lose 1.44% of the stock each year, as many units are retrofitted or rehabilitated via significant new capital investment, so the actual number of units lost tends to be lower, but includes units lost to changes in use, fires, floods and natural disasters.

The CINCH (Components of Inventory Change) reports by HUD provide discussion on quantifying the impact of real depreciation and units lost to natural causes (fires, tornadoes, hurricanes) and demolished for re-purposed property or moved or changed in use. CINCH data is not consistent nor annual and the last major report covered 2011-2013. This represented about 0.4% of the housing stock per year. However, if we used 0.4% of the housing stock each year, that would suggest an economic life of 250 years, well beyond anything statistically supportable. This seems extreme, especially considering the average age of all U.S. housing is currently around 39 years in age, and few homes are over 200 years in age in the U.S. Exhibit 5 shows the age of the U.S. housing stock broken down by owned vs. rented and year the units were built, including a category for all mobile homes and other property types. Note that there are significant differences in the age of housing stock by property type. For example, 30%-40% of single units, either owned (O:1 in the graph below) or rented (R:1 in the graph below) were built before 1960. Conversely, almost none of the mobile home stock was built before 1960, with a large part of the current inventory built between 1980 and 1999. Rental properties that are 5 units or larger (R:5+), a segment frequently tracked by institutional owners, is more evenly distributed with 21%

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[12] One recent study is "Housing supply, population, and house prices: The macro view", May 28, 2107, by Len Kiefer suggesting 5.6%. An older study in February of 2001 by Zhu Xiao Di, Nancy McArdle and George S. Masnick from the Joint Center for Housing Studies at Harvard University, titled "Second Homes: What, How Many, Where and Who" suggests a similar ratio of about 5%.

built before 1960, 61% built between 1960 and 1999 and 13% built in the 2000's. Note that this segment has the largest percent of inventory built since 2010, at 5.1%.
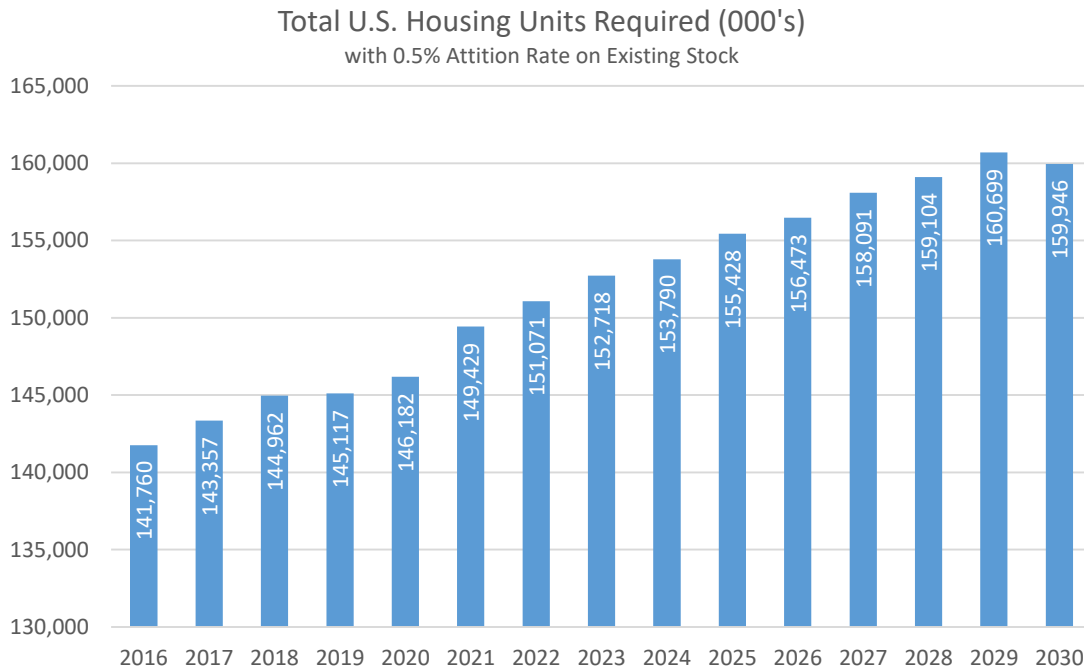
Exhibit 5: Age of U.S. Housing Stock

Housing Stock Composition by Age and Type of Property
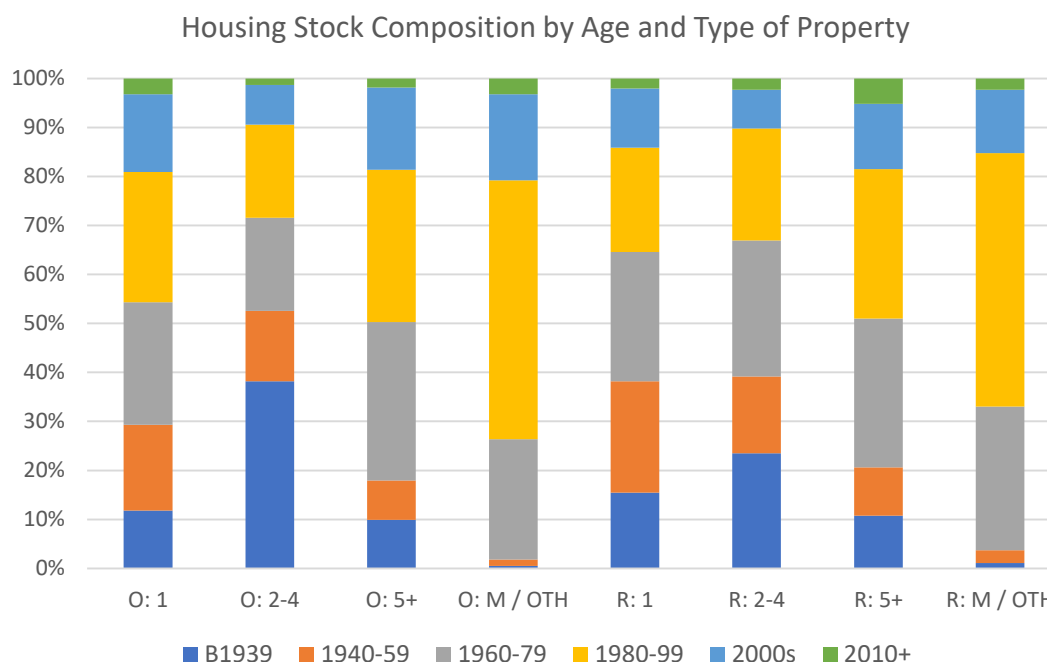
Using the general number of 1.44%, based on the average of Bokhari and Geltner estimates, results in an economic life of about 70 years for multifamily properties, which seems reasonable assuming owners keep them maintained. One lesson of the Bokhari and Geltner study is that major capital improvements are required to periodically update properties, and without such capital expenditures the wear and tear and loss of real value (gross depreciation) would be much higher.   But below in Exhibit 6, we assume major renovation occurs sufficient to maintain more of the stock such that only .5% are lost each year.   We should also note that the type of buildings we observe which are 250 years-old and still standing have two attributes. They are built of very strong materials, stone or brick and very long-lasting roofs. They are also continuously occupied in strong demand areas and well maintained. Today, we tend to use materials that are much less durable. Putting this all together and we get something which approximates Exhibit 6 for the US at the national level. The dip in 2030 is based upon a deep recession that presumes some doubling up of households. If this deep recession does not occur then the demand will exceed 160 million units.[13]

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[13] This deep recession is based upon hitting a fiscal crisis with an unsustainable national debt. See https://www.itreconomics.com/ and Alan Bealieu's 2014 book "Prosperity in The Age of Decline"

Exhibit 6: Total US Housing Demand

Total U.S. Housing Units Required (000's)
with 0.5% Attrition Rate on Existing Stock

Year	Value
2016	141,760
2017	143,357
2018	144,962
2019	145,117
2020	146,182
2021	149,429
2022	151,071
2023	152,718
2024	153,790
2025	155,428
2026	156,473
2027	158,091
2028	159,104
2029	160,699
2030	159,946

Housing Supply Drivers

Housing analysts understand that housing supply elasticity is an important indicator of how housing markets will respond to changes in demand. Elasticity here refers to the ability to add new units within a reasonable period of time. Constraints that make markets less elastic, or less responsive, include physical limitations or political and regulatory limitations.[14] In general, markets with slow or no growth are easy for developers to get permits and add supply. Markets with limited land or high growth tend to be more challenging. These considerations are independent of and in addition to capital market and other economic drivers of the housing market.

As of 2018, there is ample anecdotal evidence that adding new housing units has become more difficult, especially denser smaller-unit developments that provide more affordable types of units for owners and renters. However, this is by no means a new development; we can find articles from three decades ago that taut the problems with regulatory constraints. For example, in 1991, Tony Downs wrote on the difficulty of adding housing in the face of regulation, particularly in wealthy areas preferring exclusivity that used local zoning laws to restrict new supply.[15] More recently, in an article titled "The Fight Against Small Apartments: Why Neighborhood Groups Are Uniting to Stop Developers from Building Tiny,

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[14] See "On Local Housing Supply Elasticity," by Albert Saiz, 2008. This paper provides further discussion on how housing supply elasticities are a function of both physical and regulatory constraints.

[15] See http://www.tandfonline.com/doi/abs/10.1080/10511482.1991.9521082 The advisory commission on regulatory barriers to affordable housing: Its behavior and accomplishments.

Affordable Units",[16] Dominic Holden outlined a current movement against micro-units in Seattle. Paraphrased below is an excerpt from the article:

"Homeowners on Capitol Hill were furious about a construction project…. One neighbor was Alan Gossett. Gossett was trying to sell his blue Craftsman house, which shared an alley with the new development. Standing on the corner of his rear deck, Gossett pointed through the trees to the half-built structure and said, "I think this is going to be a magnet for very sketchy people."

Why sketchy? According to permitting paperwork, the building was a commonplace cluster of six town houses. Inside each town house, the developer was building up to eight tiny units (about 150 to 250 square feet each, roughly the size of a carport) to be rented out separately. The tenants would each have a private bathroom and kitchenette, with a sink and microwave, but they would share one full kitchen for every eight residents. The rent would be cheap—starting at $500 a month, including all utilities and Wi-Fi—making this essentially affordable private market housing in the heart of the city. Gossett and other neighbors felt hoodwinked. There was no public notification and no review process that allowed neighbors to pose objections. This was due to a loophole in the permits: The city and developers classified the building as six units (with up to eight bedrooms each), instead of as an apartment building with dozens of units, which would have required a more public process. Neighbors said they feared that the area wasn't ready for so many new residents and that the influx of newcomers would usurp on-street parking. But Gossett also seemed concerned by who his new neighbors might be.

'Anyone who can scrape up enough money to live month-to-month can live there,' he said, worried that low-income interlopers would jeopardize his chances to sell his own house. 'I don't think most people want to live next to a boarding house with itinerant people living in it.'

Similar stories abound throughout the country. The two seemingly ubiquitous claims of neighborhood residents against development are 1) that traffic will increase dramatically and threaten the safety of children, and 2) that there will be insufficient parking. Further claims against such developments depend on the neighborhood at issue, but generally will involve concerns of adverse impacts on 3) property values, 4) crime, 5) school systems and infrastructure, and 6) water supply.

Despite the similarity of these complaints over the last decades, what is different today compared to 1991, or even 2006, is that it has become exponentially easier to use political pressure to stop development, especially against anything perceived to potentially interfere with the comfortable status quo. This can likely be attributed to the widespread use of internet applications that connect neighbors and communities of people with similar interests. While we do not yet have a measure for the impact of political activism on the process of adding new housing, especially the more affordable type, one might surmise it is correlated with income and wealth. Specifically, political activism, along with profit margins on high-end housing, might explain one factor in the national trend towards approving only the larger high quality and higher priced housing or rental units with the lowest densities.[17]

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[16] http://www.thestranger.com/seattle/the-fight-against-small-apartments/Content?oid=16701155
[17] For an excellent review of the factors affecting housing supply see "The Economic Implications of Housing Supply" by Edward Glaeser and Joseph Gyourko, in *the Journal of Economic Perspectives*, 32:1, pp 3-30.

While no single index may be indicative of the *true* severity of challenges developers face today, and that they could be viewed as historical in context, there are a few indices worth discussing that measure the challenges of adding new housing.

Geographic Housing Constraints: One major constraint on development can be described as **physica**l in nature, based on the presence of water or topography and preserve areas that simply reduce the potential area where any development is possible. In an early study of geographic constraints on housing, Louis Rose and Sumner La Croix analyzed the factors contributing to the price of residential land in Honolulu being much higher than mainland areas of the United States. They concluded that a peculiar combination of market constraints led to higher land prices. These included: environmental amenities, isolation from the United States mainland, highly restrictive state and local land use regulations, prominence of private land ownership; and heavy foreign investment in the city's business and residential markets contribute to the high residential land prices.[18] Later, building on his previous study of Honolulu, in 1989, Louis Rose published "Topographical Constraints and Urban Land Supply Indexes". Based on the observation that half of the 40 most populous urban areas in the United States are land-locked, while the other half are bounded by a water body, this article summarized the implications that variations in available land supply have on land price. Specifically, Rose developed and applied a method to measure the extent to which large water bodies restrict urban supply by calculating indexes for the 40 most populous U.S. urban areas from 1980. Each urban area was given a 30-mile radius and, after subtracting out water, the amount of net available land was measured. For example, when the article was published, New York had an index value of 0.703, "indicating that its urban land supply was 70 percent of what would be available in the absence of water restrictions."[19] Atlanta and Phoenix had the highest indexes at 1.000, while the lowest indices of the top forty areas were San Francisco, Norfolk, and Chicago at 0.521, 0.546, and 0.561 respectively.

Admittedly, one aspect of Rose's method that may need to be reconsidered is his inclusion of wetlands in the amount of land available in each area.[20] This is slightly surprising, in that Section 404 of the 1972 Clean Water Act requires individuals to obtain permits under a strict review process before draining wetland areas. Specifically, applicants have to show that no practicable alternative exists which would have less adverse impact on the aquatic ecosystem, and that the discharge cannot cause or contribute to significant degradation of wetlands by adversely impacting wildlife, ecosystem integrity, recreation, aesthetics, and economic values.[21] Despite this permitting process, Rose may have included wetlands as part of the physical land because they were still *potentially* developable even after the passage of the 1972 Clean Water Act.[22]

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[18] Rose, Louis A., and Sumner J. La Croix. "Urban Land Price: The Extraordinary Case of Honolulu, Hawaii." *Urban Studies*, vol. 26, no. 3, 1989, pp. 301–314., doi:10.1080/00420988920080311.

[19] Louis A. Rose. 1989. Topographical constraints and urban land supply indexes, Journal of Urban Economics, 26(3): 335-347, 343

[20] Louis A. Rose. 1989. Topographical constraints and urban land supply indexes, Journal of Urban Economics, 26(3): 335-347, 342.

[21] http://www.water.ncsu.edu/watershedss/info/wetlands/protect.html#sec402

[22] Note also that in the 1960's swamp lands in Florida were being sold to speculative investors with the idea of future development, once drained. This practice continued even in 2006. See The Washington Post, "Heated Bidding for A Slice of Fla. Swamp Sales of Unbuildable Lots Are Often Scams" by Mark Pino September 9, 2006

Since the Clean Water Act, regulations on wetlands have only tightened. Most states have enacted laws that offer some manner of protection specifically for wetlands and many have included wetlands in the definition of state waters.[23] Furthermore, if Rose's analysis was re-calculated today, many of these indexes would decrease because wetlands would be removed from the measure of developable land. Other than this readjustment however, Rose's methodology was the first of its kind and set the stage for further studies on housing supply constraints.

In his 2010 study, titled "The Geographic Determinants of Housing Supply", Albert Saiz examined the physical limits of developable land within 50 miles of the center of each urban market based primarily on water and slope. He found that steep-sloped terrain effectively curtails residential development, and that most areas with inelastic housing supplies are also severely land-constrained by their geography, leading to the conclusion that supply elasticities are functions of both physical and regulatory constraints.

The political and regulatory constraints on housing supply were added to the physical constraints in an analysis by Richard Green, Stephen Malpezzi and Stephen Mayo published in 2004 titled "Metropolitan-Specific Estimates of the Price Elasticities of Supply of Housing, and their Sources", where they studied the metropolitan differences in the supply responsiveness of housing. Using regression models on complete data for 44 Metropolitan Statistical Areas (MSAs), the authors found that heavily-regulated metropolitan areas always exhibited low elasticities (high inelasticity), while the elasticities of lightly-regulated areas depended on whether they exhibited slow or high growth demand. The authors conclude that while "regulation and density (urban form) work largely as expected in explaining variation in elasticities, other variables like MSA growth rates and city size did not match the predictions of the model."[24]

In a 2007 article published in Urban Studies, titled "A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land Use Regulatory Index", Joseph Gyourko, Albert Saiz, and Anita A. Summers laid out an index which compared many geographic areas based on a host of regulatory constraints.[25] Specifically, based on survey responses of over 2000 jurisdictions across all major housing markets in the US, the authors documented (1) how regulation of residential building varies across space, and (2) how the stringency of land use control varies across markets. They found that Coastal markets tended to be more highly regulated, with communities in the Northeast region of America were the most highly regulated on average, followed by those in the West region (California especially). A new effort to generate a new index is underway as of 2018.[26]

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[23] Salvesen D. 1990. Wetlands: Mitigating and Regulating Develop- ment Impacts. Washington (DC): Urban Land Institute. Retrieved from http://www.water.ncsu.edu/watershedss/info/wetlands/protect.html#sec402

[24] Malpezzi, S. 1996. Housing Prices, Externalities, and Regulation in U.S. Metropolitan Areas. Journal of Housing Research 7(2): 209-241.

[25] See http://real.wharton.upenn.edu/~gyourko/WRLURI/The%20Wharton%20Zoning%20Regulation%20Index-July%202,%202007.pdf
[26] See https://www.naahq.org/news-publications/barriers-apartment-construction-index

A more recent regulatory index is aptly called the 2014 Regulatory Climate Index, focusing on the impact of five areas of regulation: (1) Starting a Business, (2) Dealing with Construction Permits, (3) Registering Property, (4) Paying Taxes, and (5) Enforcing Contracts. Lower values indicate greater regulatory burdens. Of the five areas analyzed by the index, the "Dealing with Construction Permits" scores could help discern whether older regulatory indices such as the WRI are outdated. That being said, this index only covers ten US cities, specifically Dallas, St. Louis, Raleigh, Boston, Atlanta, Detroit, Chicago, Los Angeles, San Francisco, and New York City. Comparing the results of the WRI to the more recent Regulatory Climate Index looks as follows:

Examples of Cities Ranked from Hardest to Easiest in Adding Housing Using Two Indices

WRI (2007)	Regulatory Climate Index
Boston	San Francisco
San Francisco	Los Angeles
NYC	Detroit
Los Angeles	Chicago
Raleigh	Atlanta
Chicago	New York City
Detroit	Boston
Atlanta	St. Louis
Dallas	Dallas
St. Louis	Raleigh

Modeling Housing Supply

Housing supply responds to one driver, profitability. In simple terms, when prices exceed the cost to create we will see new supply, or at least attempts to add supply. Prices must exceed building costs including land, labor, materials, soft costs like legal and marketing costs and normal administrative costs by a sufficient margin for new development to be profitable. Historically home builders like to see a 20% or so gross profit margin before undertaking new development efforts. This margin must be sufficient that if anticipated sales go slower than expected or at prices less than expected, the project can still exceed break even. Naturally this profit margin will vary with the riskiness of the local market and the uncertainty of the economic climate going forward. For example, in markets with higher uncertainty over the time required for full entitlement, before construction can start, the required profit margin will be higher as will all home prices. In markets where development can proceed quickly "by right", the term for a development proposal being in full compliance with local land use regulations, the profit margin might be lower and new development investment still worthwhile.

The challenge for developers is that the decision to try and tie up or purchase land and the time required before a completed unit can be sold varies greatly by market. In markets with few supply barriers, the time lag might be 2 years from starting the process of acquiring sites to selling off new homes. In other markets, like San Diego or Honolulu, this process may require 10 years or longer, just to reach full entitlement because of all the local land use controls and agencies that can request more studies and repeatedly send the process back for further reviews. No one can accurately predict market

prices 2 years out, let alone a decade out, nor the mortgage interest rates which are so important to home affordability, and this is why developers need a significant cushion in their anticipated profit margin.

Tying up land is more of a challenge in markets where land is a higher percentage of the total final housing costs. In most markets, such as the Midwest, land will seldom be more than 20 or 25% of the total cost of a housing unit. The average as of 2017 according to the National Association of Home Builders was 21.5%.[27] But in high land value markets, like San Francisco or New York City, where barriers to development are high, land can run 50% or more of the final housing cost even with higher densities. Land cost differences are the primary explanation for differences in the price of housing, both new and existing, around the US.

One other point is important here. Adding new housing supply can occur two ways. The first is obviously building new units. The second is by upgrading existing units. When we think of housing we must recognize two components to the market, one is quantity measured as space, and the other is quality measured by the features and overall condition of the home. If an older home or apartment is upgraded, this adds to the overall supply of housing.[28]

Because supply inelastic markets tend to stay that way and supply elastic markets tend to stay that way, we can model housing supply using past historical rates of supply added relative to jobs, household growth rates or both. One approach is to use a constant term, based on the minimum average supply added plus a percentage of the net jobs growth rate, household growth rate or both. Such models could be run at the national level but are best run at the local level since there is no reason to assume excess housing or shortages are geographically mobile, so using averages of added supply may provide a very misleading picture of local market dynamics. For shorter term forecasts, housing permits might work. For example, it might be that 76% of all permits approved get built over the next year. In this case, we simply use the number of approved permits but such a model will not let us go out too far.

Here we present two hypothetical markets and a simple model. The model below could be based on the average change in jobs and households over whatever time fits best in retro tests, and only coefficients that are statistically significant should be used. More complex models could incorporate more variables including supply constraint indices, but this is merely for illustration.

Market A: Housing Supply Units/Year=12,350+.05 (jobs added the last 3 years) +.25(average annual households net change the last 3 years) + error

Now if the average of the last three years we had 15,000 new jobs added and 20,000 households net household growth then the model estimate for the next year would be 12,350+.05(15,000)+.25(20,000)

= 12,350 +2,250+5,000 = 19,600 units expected to be added the next year. Such a model could also be run using lagged household growth rates and jobs such that we predict out further or we use predictions of job growth and household growth from a variety of sources to generate longer run supply estimates.

[27] See http://www.nahbclassic.org/generic.aspx?genericContentID=260013

[28] The concept of housing service units, as developed by Edgar Olsen in incorporates both quantity and quality. See "A Competitive Theory of the Housing Market" by Edgar O. Olsen, *The American Economic Review*, Vol. 59, No. 4, Part 1 (Sep., 1969), pp. 612-622.

For Market B, the model may look like this based on several years of data:

Market B: Housing Supply Units/Year = 5,000 + .15(jobs added the last 3 years) +.35(average annual households net change the last 3 years)

Which of the two markets is more elastic? On the face of it, it seems that Market B is more elastic, but the true answer depends on the size of the existing stock. If Market B is a larger market, then the lower constant might suggest a more difficult market to secure entitlement and it may not be as elastic as indicated by the coefficients of response to jobs and net household trends.

There are other ways to model supply, including the use of past supply (auto-regressive models) as a variable, but again the elasticity of supply will be a critical dimension to your analysis. The ability to add supply might be elastic where all the demand will be fulfilled or it may be inelastic, where less than all the demand will be fulfilled. This supply elasticity will affect future real prices. A telltale sign of what kind of market it is are whether the nominal rents or nominal home prices are moving at or above the inflation rate, which we would describe as real price increases. Markets where the demand consistently exceeds supply will observe rising real rents and prices. Such markets will be deemed to be unaffordable, as price is the equilibrating mechanism that balances out supply and demand. In markets where the supply is elastic, prices tend to move with inflation, and in markets where prices are falling, this is usually the result of a faltering economy where demand is atrophying.

Modeling Home Prices: The Interaction of Demand and Supply

The most valuable insight we can provide is to forecast where the market is heading. Great statisticians may be able to generate econometric systems based on fundamental data, but they will often miss regulatory changes, tax rule changes, and a variety of factors that distort market trends. What matters is catching the forces which drive the market and unless we pay attention to market conditions, including political and herd behaviors, we will miss the short-term trends and the bottoms and tops of cycles. It is these short-term trends that a great analyst must get right as they are more financially rewarding than long term trend analysis. Timing is everything in the world of capital market decisions.

The best analysts will incorporate two approaches, the theoretical which is based on fundamentals, and the technical which is based on signals derived from demand and supply interaction trends. Last, the analysts should add some further analysis based on possible market distortions from government interference. One critical question is how far out you can forecast with reasonable results? In the housing market we can forecast several years out but typically no more than 3 years with any reliability.

In the short run the most important fundamental driver of the housing market are **credit access** and **mortgage interest rates**. The easier credit access, measured by the average loan to value ratio or the average credit score of those borrowers approved for loans, the greater will be housing demand. Here we should note that what affects the home buying market positively, tends to affect at the margin the rental market negatively and vice versa.[29]One example is shown below in Exhibit 7 where we observe the inverse relationship between mortgage rates and home prices. Not only do sales volumes vary

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[29] For further depth on this topic see "The Effect of Real Rates of Interest on Housing Prices," by Jack Harris, *The Journal of Real Estate Finance and Economics,* 1989, Volume 2, Issue 1, pp 47-60.

inversely with interest rates, but so do home prices. Note the inverse relationship between mortgage rates and home prices. In general, if mortgages rates rise we can track the reduction in affordability based on the increased payment. If we hold mortgage payments constant, based on say 25% of income, and increase mortgage rates, the present value oi the mortgage will be lower and so will the affordable price. For example, if a household has $96,000 of income and applies 25% of this to a mortgage payment, they can afford $24,000 per year in mortgage payments or $2,000 per year. With 20% down, and using 4.5% contract rate for the mortgage over 30 years, this supports a mortgage of $394722. With 20% down the affordable home price is $493,403. Now increase the mortgage rate to 5.5% and we get a mortgage present value of $352,244 a reduction of over $42,000. If we don't change the dollar value of the down payment, this is still a reduction in the affordable home price of 8.6%. This type of calculation is reality and it is only a one percent (absolute not relative) increase in the mortgage rate. A two or three percent absolute change in the interest rate can have dramatic impacts on what people can afford and this results in the type of results we observe in Exhibit 7. While we could easily update the charts below, they represent a period of significant swings in interest rates and changes in credit access.

Exhibit 7: Home Prices Versus Mortgage Rates

San Diego Real Home Prices Versus Real Mortgage Rates from 1981 through First Quarter 2011
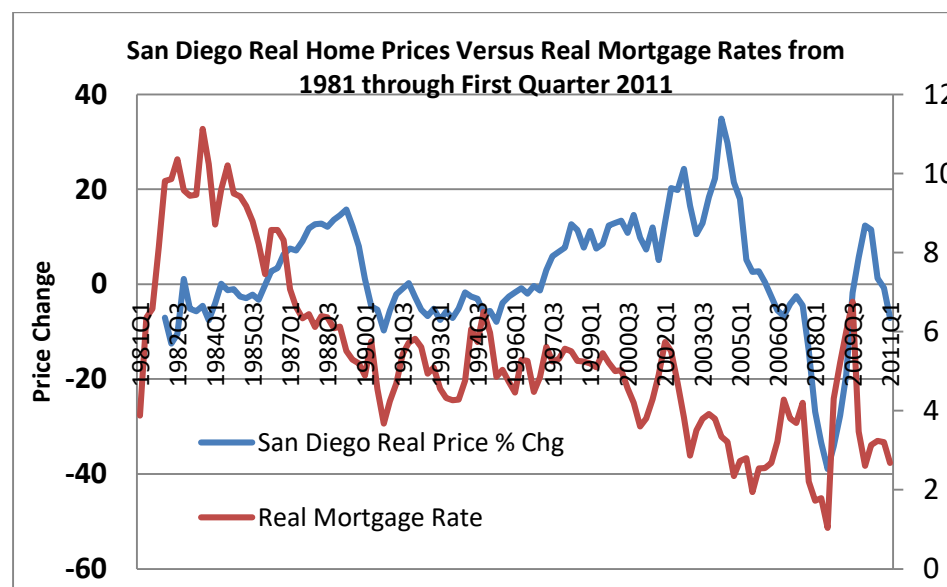
Longer-term fundamentals that drive housing markets include employment, population or household growth rates, and expected supply. Fundamentals include anything that drives demand like demographics (age, household size, ethnicity) and employment trends or anything that drives supply, such as capital costs, construction material costs, labor costs. Recall that supply is primarily driven by a difference between market values and the cost to produce the same building (with normal profit, considering current and future interest rates, current and future loan terms and current risk considerations to develop). The wildcard here are often land prices which may be sticky on the downside. The point is that when you move from macro national to local market trends, the local regulations, incentives and factors affecting supply responsiveness matter much more. Below is an example of employment versus home prices. Note that changes in employment tend to lead the home

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price trends, in this case by a few years. That is because this is a fairly supply inelastic market. In other more elastic markets the lead will be shorter.

Exhibit 8: Home Prices Versus Employment

Quarterly Employment Versus San Diego Home Prices from 1981 to 1st Qtr 2011
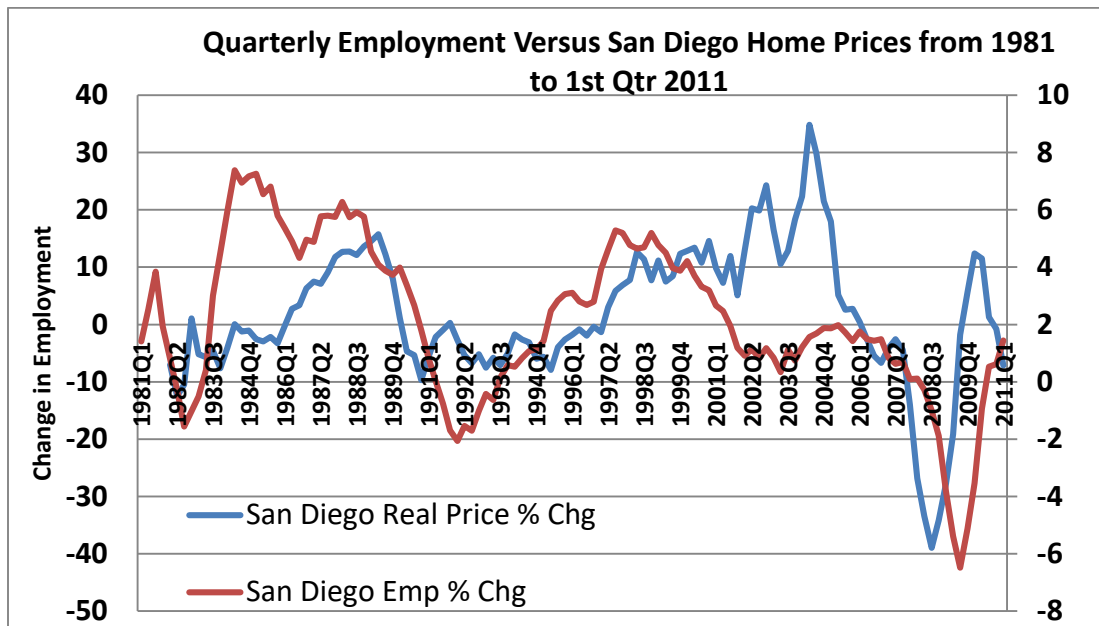
At any point in time, the market can be over-supplied or under-supplied and in a world without collusion we should expect fluctuations (cycles) around long term trends. We can also examine long term vacancy rates against rental growth changes and there is a normal equilibrium occupancy level above which or below which we see rental pressures.[30] Multifamily vacancy rates tend to run lower than office or retail or industrial property, in part because the space market is more fragmented and less lumpy.

But for example, multifamily occupancy rates must be higher than office in order to see rental rates going up. We also need to monitor units lost (to fire, weather, earthquakes, volcanoes or humans taking the property for other uses) and demolition rates which can run up to 1.5% of the stock in a given year, even higher in some markets. These lost units are supply reductions which may exceed new units added resulting in declining vacancies and a shrinking building stock.

To get a handle on where we will go next quarter or next year as we move towards that longer-term equilibrium trend (normal returns and profits), we need to look at **technical factors**. Technical factors are anything that is a reflection of both demand and supply, the interaction of the two. Think of the long-term fundamentals as climate trends like global warming and the short-term trends as forecasting the weather. If it rained yesterday there is a better chance it will rain again today than if it was dry yesterday. Examples of technical factors for multifamily or housing markets are vacancy rates, the change in vacancy rates, absorption the past quarter and year and the trend in absorption (net and gross), days on market required for sales or leasing, the volume of sales, asking rents divided by contract rents, or simply rental rate trends. These tend to be short term indicators of rental rates and home prices. Below we show one example of technical analysis in Exhibit 9. Generally, we observe two things

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[30] For a more detailed discussion please see "Revisiting the Derivation of an Equilibrium Vacancy Rate" by Norm G. Miller and Richard L. Parli, *Journal of Real Estate Portfolio Management*, Vol. 20, Issue 3, 2014.

in such a graph. One is the degree of seasonality in volume and the other is that volume generally precedes changes in prices by one to two quarters.

Exhibit 9: Sales Volume Versus Home Prices
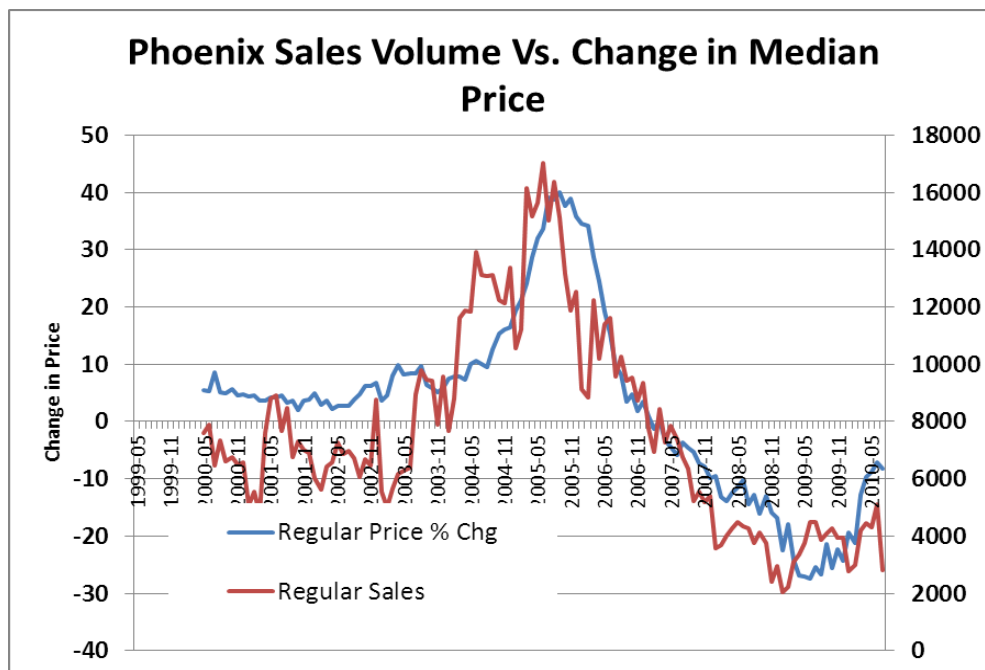
Technical indicators should help us take the long-term trends and refine them to estimate where we are headed next quarter and next year, and if we are lucky then perhaps we can look a few years out. We will generally want to run some statistical package that helps us capture both fundamental data and technical data which can include prior rent levels as well, such as STATA, R, Python, RATS, PCGETS or others.

Last, the third element in forecasting home prices are to consider behavioral factors and uncertainties that are less predictable based on market interference (government incentives, regulation or penalties) or unusual acts of nature or simply rare events. For example, in 2018 new tax laws provided a standard deduction of $24,000 per household compared to $12,700 in 2017. Going forward, the average or below-average-income US family will find that deductions for mortgage interest and property taxes are not likely to matter.   Consider the math on a typical existing home resale price as of June, 2018 (Fed Reserve Bank of St Louis data) of $265,000 and an 80% loan to value mortgage at 5%, property taxes at 1.25% of the home value, maintenance and repair at 1% of the home value and property insurance at .5% of the home value. The approximate cash flow cost would be $17,888 per year and the opportunity cost on the down payment at 3% to be conservative, would bring the total cost to own up to $19,478 a year. There would be little use in taking the mortgage interest or property tax deductions for federal tax purposes and other expenses could not be written off.

Adding in the principal repaid to the cash flow and we get something akin to the cash actually required to own a home. There would be investment benefits over time and the certainty of budgeting if using a fixed rate mortgage, but mobility (selling and moving costs) would run at least 6% of the home value and as much as 30% of the equity for an owner occupant wishing to move. If the household is not

certain about wanting to stay in the same home for several years, renting becomes compelling for several reasons.

An investor in a home occupied by a tenant gets to deduct all the expenses required to own the home, even maintenance and repairs. They also get depreciation on the home. Using the same down payment assumption as an owner might, say 20% or 25%,, and we easily can achieve an after-tax cash flow on equity return of 5% to 6% with rents set just above the $19,478 figure above. That is, the rental cash flow need only be a little higher than the cost to own and the investor can be satisfied with a reasonable after tax cash return and the potential for appreciation. The investor can also sell the home in either the investor market or the owner occupied market, so there are two exit strategies. From the tenant's point of view, the largest benefit of not owning and forgoing any investment returns is mobility. A broken lease may result in a lost deposit and seldom any more. An owner that want to move will need to pay significant transaction costs to move (brokers, lawyers).

In fact, if we try and answer the question, how much must the home price be in order to make it more worth owning that renting, based on the deductibility of mortgage interest and property taxes, we need to get all the way to $457,200, well above the median home value in the US in 2018. Of course, owning will still make sense for many households when they feel it is a good investment, but the propensity and desire to own will not be as high as for earlier generations. Government interference in the market matters, from tax laws, or other subsidies, and must be considered whenever government policies change., if we want to understand how prices will change.

Among the key points here are that good market analysts must be good forecasters and we start by doing a good job on being as exhaustive as possible on all the considerations described above, fundamental trends in interest rates, credit access trends, job trends, and household growth rates along with technical indicators that tell us something about short term trends.[31] Then we add in government interference in the market which may be positive or negative on home prices and rents. One last point to keep in mind is that less supply elastic markets tends to exhibit greater price increases and greater price declines than markets with more elastic supply.

Modeling Rental Dynamics

Supply and demand in any market are brought together by price. Rent levels can be thought of as the "price" of a given unit of housing service for a specific period of time. Investment values of a building are very much dependent on rent levels, and thus price and rent levels tend to move together.

We are interested particularly in the process by which the rental housing market behaves or moves from short run (present to one year) to the long run. A major exogenous change in demand or supply, such as a major loss of local employment, may take several years to reach long run equilibrium in the housing market. To properly understand housing markets, one must first understand certain relationships in the market, which can be thought of as economic principles. These include:

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[31] For further discussion on how housing prices react to local and national economic factors see, "The Impact of Interest Rates, Income, and Employment on Regional Housing Prices" by Alan K. Reichert,, Real Estate Finance and Economics (1990) 3: 373. https://doi.org/10.1007/BF00178859

1) The short run equilibrating mechanism in the rental market are changes in rent levels and or vacancy rates. In fact, vacancy rates tend to change prior to changes in rents.

2) Vacancy rates are short run indicators of disparities between demand and supply. An excess supply relative to demand can lead to either lower rents or more vacancy, both of which will affect investment returns. The normal vacancy rate for a given submarket depends on the typical mobility of the tenant group but generally runs 3% to 7 % in normal long run equilibrium, higher for some groups like students and lower for other groups like seniors.

3) The long run equilibrating mechanisms in the rental market are adjustments to the supply of housing, either through new supply, rehabilitation of lower quality units or a decrease in supply through deterioration or demolition.

4) In the short run supply tends to be very inelastic or fixed, which is why sudden changes in demand must result in changes in price or rent levels.

5) Demand for housing is primarily a function of population, household and demographic trends, real income and employment levels, credit access and mortgage interest rates that influence the buy versus rent decision. These factors are primarily local in nature, except for the cost of mortgage money which is a function of the national capital market.

6) There are many constraints on supply, some natural, some built by humans and some imposed by humans in the form of land use controls or economic incentives or subsidies which may restrict or distort normal supply and affect market prices.

7) There is a minimum required rate of return, which developers/investors must be able to expect, in order to induce new investment in housing production, based on expected risk levels and capital market alternatives. If rents rise to or above the point of normal profits (the kink in a kinked supply curve), then new housing investment is induced. If prices or current rents provide unacceptably low returns, then not only will no new investment occur, but maintenance and repairs may decline as well and deterioration will start to increase. Eventually such deterioration reduces the supply of housing at a given quality level. At the lowest quality levels, abandonment may occur or demolition.

8) There are innumerable housing submarkets, defined in terms of geographical area, quality, size range, or other features typically important to a group of potential buyers. These features need not be identical, but the total housing package must be viewed as substitutable in order for competition to exist.

Patterns of Possible Rental Housing Market Changes

There are two general processes which bring a market back to long run equilibrium after a change in demand or supply. The first occurs if demand increases or if supply is reduced. The second occurs if demand is reduced or if supply increases beyond equilibrium levels. Each of these is described from short run to long run and assume the market was in equilibrium prior to the change.

If the demand increases or supply is reduced:

1. Vacancy rates decline, possibly to zero.

2. Rents increase.

3. Rates of return increase. If the rents move above the level required for normal profit on new construction it will induce new investment. New investment may occur through rehabilitation, or new construction.

4. Eventually the rates of return will decline towards normal or even over shoot it, which reduces the construction rates. As the supply reaches equilibrium, rents may in real terms move towards prior levels.

What happens if supply increases (above normal) based on over-shooting demand, or if demand is suddenly reduced, say based on a plant closing? The following will occur:

1. Vacancy rates increase.

2. Rents will decline.

3. Both of the above decrease rates of returns to current owners of rental units.

4. Maintenance and repair may decline on some units increasing the rate of deterioration on those units.

5. No new construction will occur.

6. Eventually, properties will deteriorate to lower submarket levels, reducing the supply of the affected submarket, until rents and rates of returns return to equilibrium.

Does the market really behave this way? Yes, but remember it takes time for supply to adjust.

A sudden and permanent decrease in demand caused by a large job lay off in the local market could take several years for the housing market to reach equilibrium. Not everyone moves out looking for new work. Savings are drained and slowly people filter out of the area. The quality of the housing stock starts to decline, but not evenly as some Landlords decide to accept below market returns and continue to maintain their properties as if in a normal market. Eventually the quality of enough units has slipped off the market and the area may even look blighted, with less retail and more vacancies in the commercial market.   Again, this process may take years. On the other hand, a sudden and permanent increase in demand caused by new employment could reach equilibrium in only two or three years if there is land available nearby for new construction and few barriers to new supply. If no land is available because of growth controls, regulation, NIMBYs opposition, or natural land boundaries (such as oceans or mountains), more time is needed before new development can occur, as the density of projects will need to increase over time. In supply constrained markets, rents will remain higher with greater population growth supporting higher land values. But the pattern of changes in such a constrained market is still consistent with the behavioral model described above. One can observe vacancy rates, rental rate changes and new construction, rehabilitation or increasing deterioration as symptoms of this interaction between demand and supply in any type of market that requires significant response time. Below, we can use these basic principles of housing dynamics to explore the impact of rent controls.

Rent Controls as a Solution to Housing Affordability: Good Intentions with Long Term Consequences

Supporters of rent control suggest it is necessary in an era of unaffordable housing. Of course, if you are old enough and have followed the housing market, it seems that most US coastal markets have always been in an unaffordable housing crisis.[32] A recent report focused on Los Angeles suggested a "shortfall" of some 500,000 affordable housing units.[33] Many cities seem to be considering rent control as of 2018.[34] For example, Long Beach, Inglewood, Glendale, Santa Ana, Pasadena and LA County are all considering joining a band of California cities that already have rent control and "just cause" eviction laws that prevent landlords from ousting tenants in good standing.

The challenges of providing affordable housing are most pronounced in large coastal cities, where healthy economies have pushed housing from the demand side. At the same time, political activism, (NIMBY's) has spurred development challenges and hurdles, such as excessive parking requirements, maximum height limits and development fees that are not prorated by unit size, so that only larger unaffordable units are provided in the non-subsidized private portion of the market. Traffic and congestion are always cited as reasons not to permit any development dense enough to be mainstream market affordable. Some of these same activists will be found protesting all new developments, as they do not seem to realize that as long as they continue to have kids and expand the population base, the housing problem will only get worse unless more density is allowed.

Proponent of rent controls argue that tenants can be exploited if building owners are allowed to raise rents to market levels and in some cases, tenants will become homeless. Rent controls vary by market, but in most markets, rents can be increased only when a tenant moves out, so the landlord-tenant game becomes discovering when the real tenant moved out and the sub-let secret tenant moved in, often paying the original tenant a large windfall gain beyond the current rent. In some markets, only new or rehabilitated units can have rent increases, so the landlord-tenant game becomes one of waiting for the tenants to move out, then "rehabilitating" the unit to the minimum level necessary for a new market based rental charge. New York City is a classic case of such rent controls and a great laboratory to show what happens with long term rent controls.

While many of us understand the intention behind rent controls, few free market economists find any redeeming value in rent controls. Opponents to rent controls find such regulation is not only terribly inefficient, but also inequitable in serving a city's residents with different levels of windfall gains extracted like a tax from landlords. Abuses are sometimes difficult to detect with rent-controlled units. Various "lucky" (long-time residents of rent controlled units) receive more benefits than other newer residents or those residents living in areas without rent controls.

Rent controls hurt residents in the longer run in that such controls result in less housing investment (maintenance and repair) and less new stock than otherwise. With less housing stock, rent

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[32] For example, see Locked Out: California's Affordable Housing Crisis, Erin Riches and Jean Ross, May 2000 at http://calbudgetcenter.org/wp-content/uploads/0005lockedout.pdf

[33] See http://1p08d91kd0c03rlxhmhtydpr.wpengine.netdna-cdn.com/wp-content/uploads/2017/05/Los-Angeles-County-2017.pdf   SCANPH Southern California Association of Non Profit Housing, May 2017.

[34] See for example "Rent control gains traction as housing costs 'crush' tenants" in the Orange County Register by Jeff Collins, March 24, 2018

controls result in a rationing system where units subject to rent controls have huge pent up demand. The problem is illustrated in the graph, Exhibit 10 below. Over time as market rents exceed controlled rents, the demand at the controlled rent level is Q_d while the actual supply is Q_s rather than the market solution at Q_m.

Exhibit 10: Rent Control Effects on Supply

Rent

Supply

Market rent

Rent Control limit

Demand

Q_s Q_m Q_d Quantity of Housing
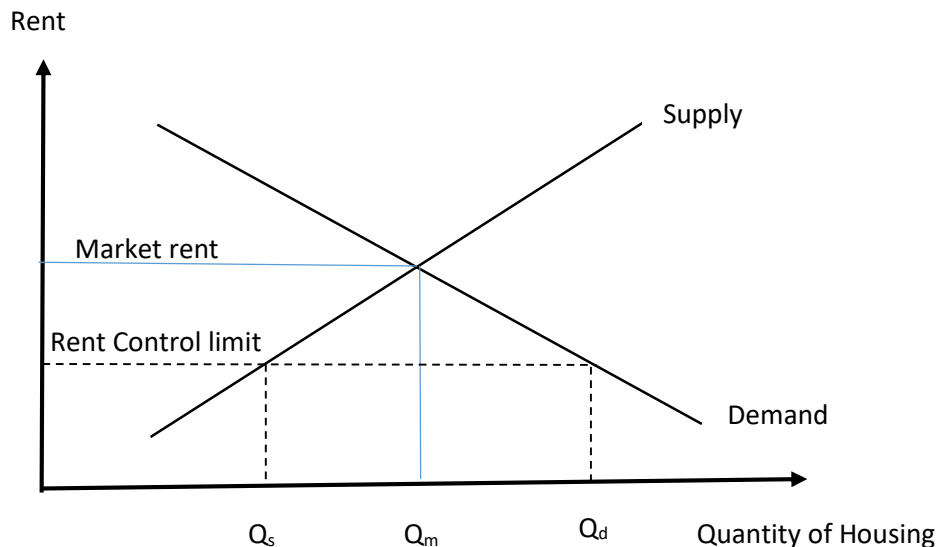
The gap between Q_s and Q_m is a shortfall in supply that the market refuses to provide at lower rent levels. In fact, over time, the gap continues to grow and the housing affordability problems, for those not in rent-controlled units, becomes even worse. That is, new rental housing is simply not built, except for subsidized development, where the profit comes from fees and rents do not matter. Developers would build units to sell as condominiums or even convert apartments to condominiums rather than be subject to rent controls, when possible.

Here is what we know will happen in the housing market, if extensive rent controls are enacted:

1) Fewer units will be built over time leading to an even greater housing shortfall over time and higher rents on new units than otherwise.
2) Units subject to rent controlled will not be well maintained and owners will not provide amenities or services that are otherwise designed to keep tenants.
3) A black market, only known by the official tenant and an unofficial occupant, will develop over time as the official tenant gains by collecting some of the gap between the official limited rent and the market rent.
4) Landlords will discriminate more on tenant selection, seeking those more likely to move out versus those likely to stay long term.
5) Housing unit quality will deteriorate and tenants will need to maintain their own units.
6) Values will fall, by approximately the present value of the gap in rents from those charged to market rents.

Rent controls result in reducing future housing supply, providing a windfall gain to a few tenants while gutting the value of existing rental stock, and lowering the quality of rental housing over time.

More Subsidies and Distortions to the Housing Market

There are several other approaches to subsidizing the housing market. One of the oldest still in use and least distorting, is the **Section 8** program authorized in 1974.[35] Here the household pays approximately 25% of their income towards market rents and the federal government pays the balance. Market rents are determined by the local HUD office and can change over time. Recipients can use Section 8 program support on existing rental units anywhere in the market, and this discretion results in less distortion to the market than with new projects that concentrate lower income residents. Section 8 would be an example of a demand approach.

Another program focused on the supply side are Low Income Housing Tax Credits (LIHTCs) allow a developer to sell tax credits, use these to provide the equity in a project, request grants for part of the capital stack and sometimes use a modest mortgage. Tax credits are based on the percentage of tenants that will be at 80%, 60% or lower proportions of the local median income. Rents are typically set to cover operating expenses and management with little excess return, and units are required to maintain these below market affordable rents for at least 15 years but as long as 55 years in the process of bidding for such tax credits allocated by the states.[36] Created by the Tax Reform Act of 1986, the LIHTC program gives State and local LIHTC-allocating agencies the equivalent of nearly $8 billion in annual budget authority to issue tax credits for the acquisition, rehabilitation, or new construction of rental housing targeted to lower-income households. Housing developers that specialize in LIHTC programs tend to put little or no equity into the projects and earn their returns based on development fees. The rents as set to be affordable to residents at 80% or 60% of the median income in the area, do not generally produce sufficient returns to induce investment without these credits. Securing the credits and grants are essential to funding the development. The grants come from fees charged local developers in the private sector and as a result drive up private market housing costs. Tenants often stay for many years and the waiting list to occupy such units is several times the available supply. There is no evidence that such a subsidy does anything in aggregate to help make housing affordable, but it clearly makes housing more affordable for those lucky enough to occupy such below market housing.

One last strategy worth mentioning is the use of bonus densities. Here a developer is given the right to build more units, typically up to 50% more, on a given sized parcel as a result to providing some percentage of affordable units, typically 10 or 20%. [37]   Bonus densities are applied to for sale housing as well as rental units. The idea is to make the market more affordable by densification, and while it has some merit, it often results in a windfall gain for those lucky households who get discounted housing.

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[35] See https://www.hud.gov/program_offices/housing/mfh/rfp/s8bkinfo

[36] See https://www.huduser.gov/portal/datasets/lihtc.html

[37] See http://www.wahpdc.org/densitybonus.html and https://landuselaw.jmbm.com/2015/01/residential-development-in-california-new-density-bonus-law-makes-new-affordable-housing-difficult-t.html

Later on, if a household's income increases it is not clear if they must vacate the unit and seldom are transactions analyzed after the fact. Adding density to the market is one of the most logical ways to make housing more affordable.

Private Market Strategies to Provide more Affordable Housing

Among the most general and broad- based strategies to improve housing affordability in supply constrained markets are the following:

1) Increased density: The most obvious solution to high land costs driving up unit costs is to disperse the high cost of land over more units. In many areas of the country, particularly along the coasts, **height limits** are frequently 26 to 30 feet or approximately two stories. In order to provide above grade parking and at least two more levels of housing (of any type) requires a height minimum of at least 37 feet. It is possible to go up to four stories and still use stick-built housing construction which is the easiest way to add density that remains affordable. Aside from height, **smaller minimum unit sizes** are essential. Many areas have minimum sizes of 800 square feet or more and there is no reason to mandate any minimum whatsoever. The market can decide how small a space is rentable. Also new housing options like those suggested by www.welive.com involve smaller units with more shared amenities, so that unit sizes involve both a personal unit and shared spaces. **Reducing open air requirements and set back requirements** could also increase density. Local residents will always oppose density, claiming traffic congestion, pollution and at the same time complaining about high home prices and rents. Political compromises include finding sites near schools and highways or main roads and or public transit, and densifying these. Educating the public with more transparency as to what drives up housing costs may also be useful.

2) Aligning incentives by changing fees to reflect unit sizes. Currently, most local governments charge development impact fees for water, sewer, schools, infrastructure and affordable housing in lieu fees on the basis of per housing unit. This results in a disincentive for developers to build anything except for the largest and most profitable units. **Charging fees based on the total square feet** of a development possibly with some small fixed charge per unit will result in more development of smaller and more market affordable units. Special development types such as senior housing or affordable housing could also be promoted with lower impact fees.

3) **Reduce parking requirements**: Minimum parking requirements unnecessarily drive up total costs per unit. For example, some areas require 1.5 parking spaces per studio apartment with exceptions for transit-oriented development, and this is simply not supported by the market. One significant trend is a lower car ownership rate among younger people and few driver licenses among those aged 16-19.[38] Ride sharing and autonomous cars will probably be significant factors reducing the need for personal garages within ten years and yet real estate lasts decades or centuries and longer-term perspectives are essential in order to do whatever is possible to lower unnecessary development costs.

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[38] The share of high school seniors across the country who have a driver's license dropped from 85.3 percent in 1996 to a record low 71.5 percent in 2015, according to data from the University of Michigan's Monitoring the Future survey. See "Why many teens don't want to get a driver's license", Nation, Mar 6, 2017.

4) **Faster and more certain reviews**: Single comprehensive reviews of applications components are essential. Among the most challenging parts of the entitlement and permitting process is a set of reviews that may include site plans, environmental impacts, traffic impact studies, water and sewer impacts, design and material reviews and more. In some cases, these are done sequentially and in other cases they are done simultaneously. Allowing for simultaneous reviews speeds up the process if it does not trigger re-reviews, when changes are made to any one component. For example, if designs are modified but not the unit size or count, this should not trigger the need to once again review environmental impact or traffic studies. Anything that can be done to speed up the review process and eliminate follow up reviews is a great benefit to developers lowering risks of carrying a site or spending money on planning and then not knowing when the entitlement process will be complete. Among the reviews that are most contentious are design reviews. If the criteria are known ahead of time, there is no problem, but when design reviews are completed by "expert" without skin in the game, arbitrary decisions or the threat of arbitrary decisions will keep developers out of a market. Another type of review which scares off developers is a public vote for approval of development plans. Local planners and professionals are preferred to public votes which tend to make decisions based on sound byte campaigns and with less than full information. If developers are asked which is more important: lower fees or faster more certain reviews, they will often state faster more certain reviews. Fees are predictable and known and priced into the development. Higher fees lower land value and will be borne by sellers of land, although we should note that in weak markets this can result in negative land values and no development whatsoever.

Conclusions

While both the rental market and owner-occupied housing market are driven by the same demand factors, anything that affects the buy or rent decision will impact one of these in a positive fashion and one in a negative fashion. That is, for example, lower mortgage rates may spur the owner occupant market but at the expense, on the margin, of the rental market. Tightening credit standards, may on the other hand reinforce rental market demand at the expense of the owner-occupied housing market.

In the short run, mortgage interest rates and credit access are critical drivers of the housing market, while in the longer run, employment and household growth trends are dominant factors. Among the key signals to watch are whether there is net migration into or out of a region. Higher net migration rates into an area are a signal of strong and growing economies with jobs. In a similar manner, net immigration rates into the US do affect housing demand, especially the rental market demand and policies affecting immigration trends may be critical to local economies in need of labor. Predicting short term price trends requires observing technical indicators of the market such as months remaining inventory, time on the market, list price to sale price ratios as examples.

The rental market always changes in a predictable pattern. In the short term, vacancy and rental rates adjust. In the longer run, supply will adjust, all in response to value trends relative to the underlying cost to produce and maintain housing.

Affordability concerns in the housing market cannot be solved by government intervention or subsidy. Rather, increased density, lower parking requirements, and fees charged by unit size not simply by unit are all ways that housing can cost less to produce and less to own.

Resources (Web Sites and Research Links)

ULI, Urban Land Institute, https://uli.org/

NAHB, National Association of Home Builders   https://www.nahb.org/

NMHC, National Multi-housing Council, https://www.nmhc.org/research-insight/research/

NAA, National Apartment Association, https://www.naahq.org/ and
https://www.naahq.org/publications/research and https://www.naahq.org/news-publications/barriers-apartment-construction-index

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Appendix Topics

Seasonality, Home Sales and Price Effects

Low Income Housing Tax Credits

Proposition 13 in California: An Example of Market Distortions

A note on Sustainability and Housing

Questions and Answers

Seasonality, Home Sales and Price Effects

Most housing analysts understand that seasonality affects home sales volumes, but many do not know that it also affects home prices. Sales volumes in the housing market are affected by seasonality. Both of these topics are discussed below. One implication is that sales volumes should be seasonally adjusted or compared year over year for the same time period. Another implication is that when appraising property and using comparable sales, consider the time of the sale as it may have affected the sales price. Appraising a home in May with comparable sales from January will result is a biased low appraisal, and vice versa when appraising a home in January using sales from May, at least in most markets.

Seasonality in the housing market is a result of climate, holidays and schools. Most people prefer not to shop for a home during cold months or during peak holiday seasons. People with children also prefer not to disrupt a school year, and so these factors influence when we buy and sell. Typical seasonality in the sales volume is depicted below for the average US housing market where 1 equals January and 12 equals December. Note that the average volume tends to be lowest at the end of the calendar year and beginning of the next year. We see a peak volume at over 120% of the average in late spring, early summer as shown on the vertical axis. These patterns also affect price. In markets like Chicago where the winters are cold the seasonality is more pronounced than in markets like San Diego where the weather is milder.

Exhibit A-1: Seasonality in Sales Volume

Typical Seasonal Pattern of Housing Sales By Month

35
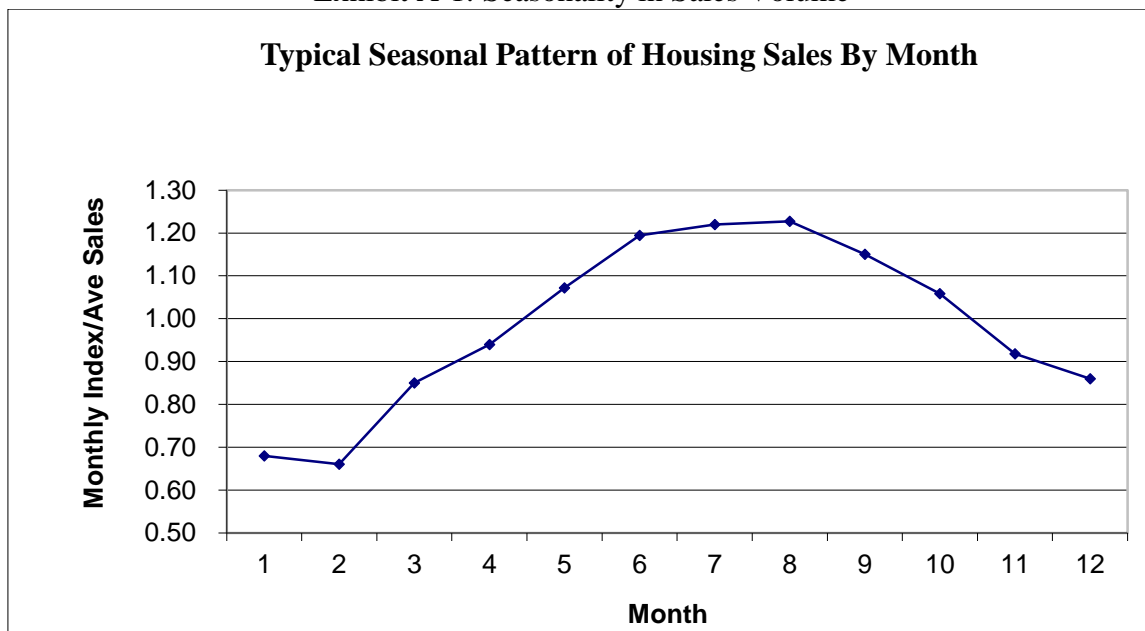
Prices also vary slightly over the course of a year with the highest demand during the spring and lowest demand being during the winter influencing the probability of getting a better home value. However, since it is often a simultaneous decision to sell and buy, it is difficult for most families to try to time the decision to sell or buy in a way that might take advantage of some slight pricing variations over the course of a year. Figure A-2 below shows the average monthly change in price for a sample of over 200 US Metros. The monthly change in prices is relative to the month of December. As seen in the figure, prices are higher in months after June. The prices are low in January through May, after which they start to rise. The price variation is sizable with the lowest being - 6.13% and the highest being 1.55%.   Note that the results shown here are based on closing months as opposed to contract months. As such, the contracts were typically signed 30 to 60 days prior to the closing. If one has discretion as to when to buy, December would be a good time to contract In contrast, a seller wants to be on the market in spring.[39] These results will vary by market with less intense weather markets showing less variation in volume and prices and more intensive weather markets showing strong variation in volume and prices. For example, Chicago and Cleveland have significant seasonality and San Diego has much less. Again, one should keep seasonality in mind when comparing prices over time. It is generally best to use a year over year result, unless there are adjustments for normal seasonality.

Exhibit A-2: Seasonality in Home Prices
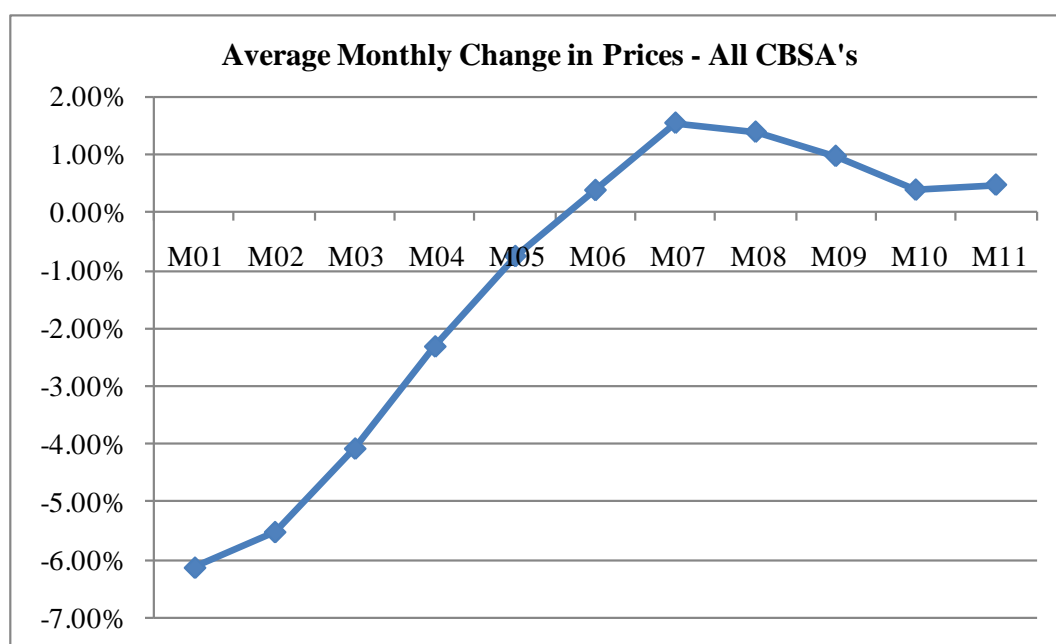
Note: The monthly changes are relative to December

Based on the work of Miller, Sah, Sklarz and Pampulov we find that seasonality affects housing markets somewhat differently and while weather plays a role, we observe significant seasonally induced price effects even in mild climates.   Here are some examples of markets with more and less variable weather in

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[39] See "Is there Seasonality in Home Prices—Evidence from CBSAs" 2013, by Norm G. Miller, Vivek Sah, Michael Sklarz, and Stefan Pampulov, *Journal of Housing Research,* 22:1.

A-3 and A-4 respectively. Note the large dip in M01 (January) in Honolulu where weather does not vary much, and the much higher prices achieved in Omaha in M08 (August).

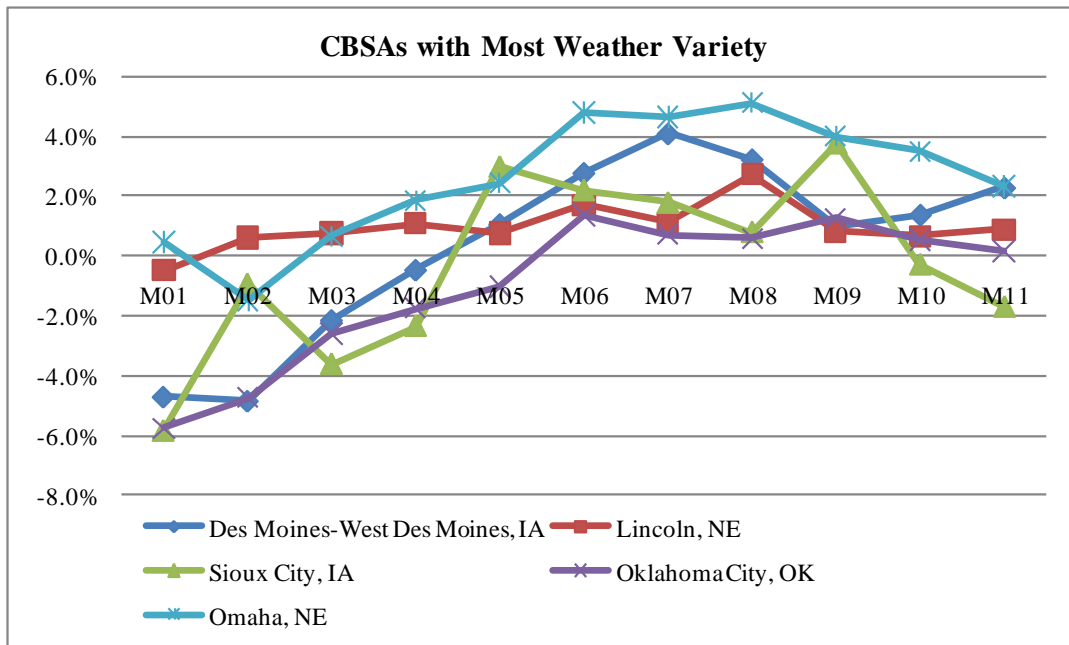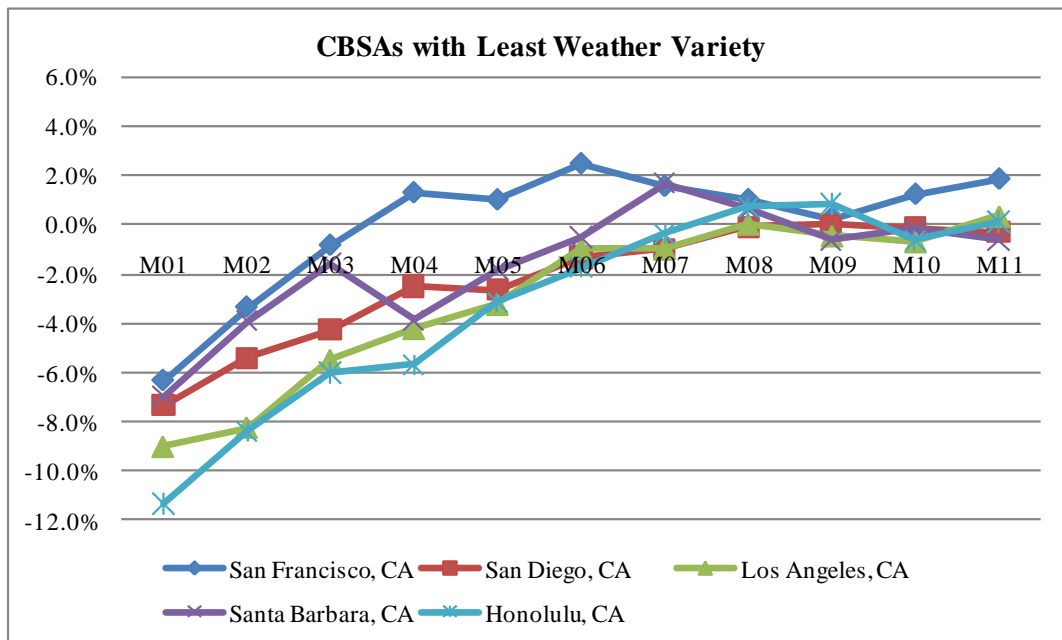## Exhibit A-3 Markets with more weather variability

CBSAs with Most Weather Variety

Legend:
- Des Moines-West Des Moines, IA
- Lincoln, NE
- Sioux City, IA
- Oklahoma City, OK
- Omaha, NE

Exhibit A-4: Markets with less variable weather

CBSAs with Least Weather Variety

Legend:
- San Francisco, CA
- San Diego, CA
- Los Angeles, CA
- Santa Barbara, CA
- Honolulu, CA

Low Income Housing Tax Credits

The Low-Income Housing Tax Credit (LIHTC) program was added to the tax reform act of 1986 to encourage investment in multifamily housing for those in need of affordable rental housing options. Today the program continues to flourish with developers raising equity by selling tax credits and then adding grants and transfers from housing commissions and agencies to complete the capital stack. As such these affordable programs are fee driven investments for developer/investors as opposed to income driven. The rents seldom cover much more than operating expenses and some administration and upkeep on the property. The grants usually come from in lieu fees charged private market developers who decide not to include affordable (below market rents or prices) units in their development.

The LIHTC provides funding for the development costs of low-income housing by allowing an investor (usually the partners of a partnership that owns the housing) to take a federal tax credit equal to a percentage (up to 70% or 30% of property value depending on the credit type, of the cost incurred for development. Development capital is raised by selling the credits to investors. To take advantage of the LIHTC, a developer will propose a project to a state agency, seek and win a competitive allocation of tax credits, complete the project, certify its cost, and rent-up the project to below median income tenants.

Because the eligible households are based on relative income thresholds compared to the surrounding households in the region, in areas like San Francisco, eligible households might be making twice the national income average. Unit costs including land, tend to be driven up by the grants and it is not unusual for unit costs to exceed those in the private sector per square foot by a significant margin.

Some question whether such credits should be used for adding new housing when much cheaper old stock could be bought instead. The housing agencies would argue that the intent is to create new supply and not simply use existing supply, but the result of focusing on new units is that the quality is also quite high compared to the existing stock of rental units.

Markets that use LIHTCs and also Section 8 rental subsidies include New York City, San Francisco, Los Angeles and San Diego, none of which have shown any trend towards making housing more affordable by inducing new supply. Some might argue that all such subsidies do is transfer wealth to a few lucky occupants who get to rent such units while making the remaining private market more expensive.

Typically, at least 20% or more of the residential units in the development are both rent restricted and occupied by individuals whose income is 50% or less than the area median gross income. At least 40% or more of the residential units in the development are both rent restricted and occupied by individuals whose income is 60% or less than the area median gross income. "Low-income" tenants can be charged a maximum rent of 30% of the maximum eligible income, which is 60% of the area's median income adjusted for household size as determined by HUD. There are no limits on the rents that can be charged to tenants who are not low income but live in the same project.

The program is administered at the state level by State housing finance agencies with each state getting a fixed allocation of credits based on its population. The state housing agency has wide discretion in determining which projects to award credits, and applications are considered under the state's Qualified Allocation Plan. The credits are usually awarded to projects in a few "allocation rounds" held each year,

on a competitive basis. Typically, the top ranked project will get credits, then the second, and so on until the credits are exhausted for the round.

References

See What Is the Low-Income Housing Tax Credit Program? https://affordablehousingonline.com/guide/low-income-housing-tax-credit

See "The Future of Housing Policy: Fungibility of Rental Housing Programs to Better Fit With Market Need" by Kirk McClure, Housing Policy Debate, April 11, 2017.

Proposition 13 in California: An Example of Market Distortions[40]

Several US states have considered or are considering property tax increase limitations similar to those described below in California, known as "Prop 13". New Jersey has the highest effective rate at 2.38% of property value, followed closely by Illinois (2.32%), New Hampshire (2.15%), and Connecticut (1.98%). On the other end of the spectrum, Hawaii has the lowest effective rate at 0.28%, followed closely by Alabama (0.43%), Louisiana (0.51%), and Delaware (0.55%).[41] Texas, Michigan, Florida and other states have considered property tax increase limits that are intended to help prevent elderly and lower income households from losing their homes to unaffordable property taxes. In this regard, California has now had Prop 13 long enough to examine its impact on the housing market, which is the purpose of this study. Prior to other states implementing these rules so favored by the aging population, politicians should carefully examine and understand the longer-term implications.

Prop 13 has been in effect since 1978. This legislation limits increases in property taxes to no more than 2% per year. It also requires effective property taxes, defined as the total paid per year divided by the value, to be no more than 1% of property market value, although with special assessments the total effective property tax rates range from about 1.02% to 1.21% for homes with full assessments in San Diego County, the area studied here.[42] Because of the ability to pass on the benefits of Prop 13 to the next generation, the longer Prop 13 survives the greater will be the disparity between what the earliest beneficiaries pay in property taxes each year compared to the newest open market home purchasers.[43]

Whether or not you agree with Prop 13 it is interesting to stop and pause and ask just how Prop 13 has affected real estate markets and what people actually pay? We took all the homes in San Diego County and appraised (valued) them using an automated valuation model (AVM) from Collateral Analytics, known to be one of the most accurate in the country. Then we divided this value estimate into the annual property taxes actually paid to derive the effective property tax rate. Last, we grouped homes by neighborhoods with around 10 to 15 neighborhoods per zip code. Here is what we found.

- ✓ The average effective property tax rate in San Diego County is 64.36% of the 1% to 1.2% target full assessment rate (i.e. market value). See Exhibit A-5 below where 1.0 on the horizontal axis is a 1% property tax rate. This is likely indicative of other coastal cities in California.
- ✓ 22.4% of all households pay less than 50% of the 1% effective property tax with some households paying just a fraction of that.

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[40] See "The Impact of Prop 13 on Effective Tax Rates, Turnover and Home Prices" by Norm G. Miller and Michael A. Sklarz, The Journal of Housing Research, Vol 25, No. 2, 2016.
[41] Source: http://taxfoundation.org/
[42] See Appendix 1 for a list of actual effective rates in San Diego County
[43] Proposition 60 and 90 allowed extension of lower property tax bases to heirs.

✓ In neighborhoods with an effective property tax rate less than 50% of the 1% effective rate the turnover of housing is around a third of that for fully taxed neighborhoods. See Exhibit A-6 below. Household tenure also increases dramatically.

Exhibit A-5: San Diego 1635 Defined Neighborhoods Frequency by Effective Property Tax Rate
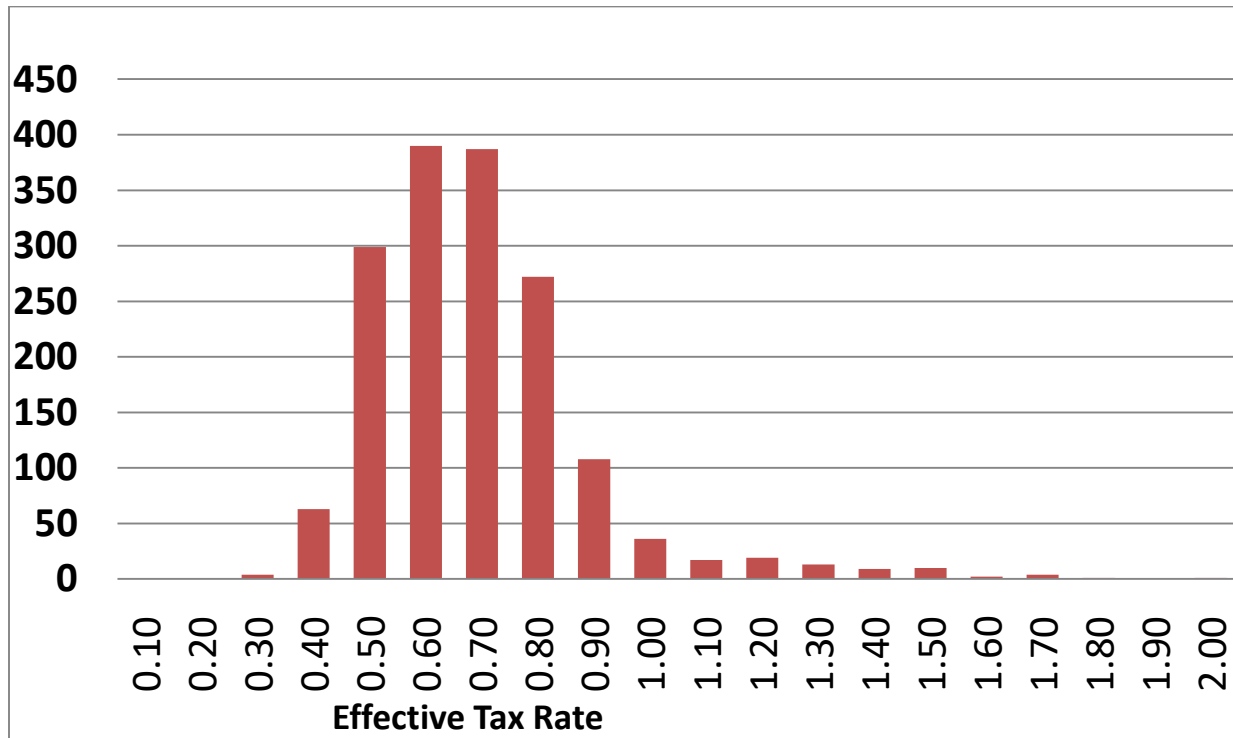
Neighborhoods with lower than average effective property tax rates also show a lower turnover rate. We calculated the long term turnover rates from 2005 through 2014. If there were 100 homes in a neighborhood and 100 homes had sold, including repeats, then we classified that as 100% turnover and so forth. So 100% a turnover rate suggests about 10% of the market turns over on average each year. The average turnover rates shown here are much lower than that closer to 3.3% per year over this time period and slightly below national averages. What is clear is that the lower the effective property tax rate the lower is the average neighborhood turnover.

Exhibit A-6: Turnover Rate of Homes (Percent of Total Inventory Sold Between 2005 and mid-2014) Versus Effective Property Tax Rate

Turnover Rate Since 2005 Versus Eff Property Tax Rate for San Diego Neighborhoods
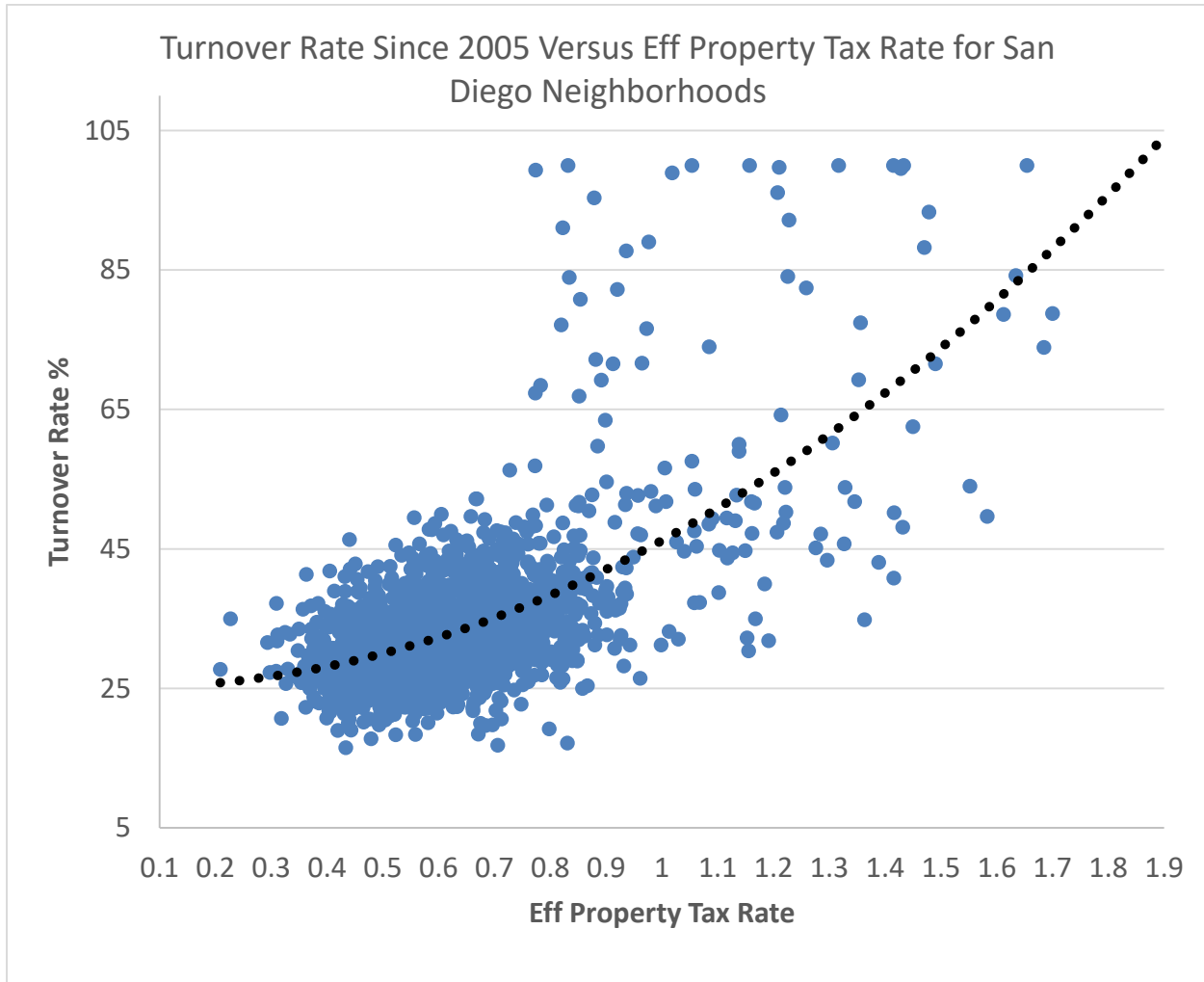
Over time the disparity between households paying full property tax assessments and a fraction of the full assessment will grow. The average effective rate in San Diego County and perhaps indicative of the rest of California's coastal cities is 64% of fully assessed rate. This will continue to drop over time as new beneficiaries continue to hold onto homes rather than sell them to new owners that are subject to full assessment. Owners tenure length is increased 2 to 3 years in coastal California cities that receive Prop 13 subsidies averaging in the thousands of dollars. [44] The present value of saving thousands of dollars in annual property taxes not only discourages external improvements and encourages secret internal capital improvements, so as not to trigger a new assessment, but also results in these homes being much more valuable to the occupants.

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[44] Source: http://www.nber.org/papers/w11108.pdf

While everyone knows about the inequities between neighbors in California paying vastly different property tax rates, an illustration may help to illustrate the size of the benefits and redistribution. In Coronado, full assessment is 1.0478% of market value. One home was pulled at random from this lower than average tax neighborhood pays far less than the average rate. The address is a real property with a faux number and street with actual information as described below:

1000 Lucky Tax Payer Blvd, Coronado, CA. 92118: Built in 1917 this 4 bedroom, 5 bath house is 3524 square feet in size and using an automated estimate of value from Collateral Analytics is worth $2,059,393 as of August, 2014. The property taxes in 2014 were actually $2175 per year. Full assessment taxation would be $21,578 per year some ten times the actual taxes paid. The difference is -$19,403 per year. If we were to use the average rate paid in San Diego County of .64% the difference would still be -$11,005 per year.

What is the present value of the below market taxation to the owner occupant?

Since this return is low risk like treasury bonds, the discount rate should be close to the risk free rate. One might argue the term over which to discount the savings, but is too soon to know and certainly the ability to pass on this tax savings to future generations suggests that many homeowners will keep the below tax situation as long as possible. Think of what they give up if they don't. Using a generously high 30 year Treasury bond rate of approximately 3.3% we get the following results:

30 Year Present Value of Saving $19,403 per year at a 3.3% discount rate = $365,974

30 Year Present Value of Saving $11,005 per year at a 3.3% discount rate = $207,573

These figures are approximately 10% to 18% of the value of the home.

These present value benefits are implicitly if not explicitly known. What is not as well-known are the price effects of lower turnover and less supply coming on the market in relatively low property tax burden neighborhoods.

The question is whether this lack of supply, as evidenced by the lower turnover rate, translates into higher prices based on reduced supply in such neighborhoods. Theory suggests it does.

In a 2004 study by Ferreira called "You can take it with You: Transferability of Proposition 13 Tax Benefits, Residential Mobility, and Willingness to Pay for Housing Amenities" the conclusion was that there was a significant impact on household mobility. Wasi and White (2005) concluded that Prop 13 creates a "lock-in" effect and that the average tenure in California since Prop 13 has been increasing, but that rent controls may explain some of the lock-in impact.

In a 2014 study by Imrohoroğlu, A., Matoba, K., & Tüzel, S. they use theoretical models and simulations to estimate an 18% increase in housing prices and a 17% decrease in the probability

of moving, but note that reality suggests a life cycle hypothesis whereby the longer someone is in a home the less the probability of moving.

The lock-in effect described by other studies and the reduction in supply as a result of lower turnover should only increase over time. One can imagine the great-great-great-grandchild of an owner of a property on Coronado paying a small fraction of what the newest neighbors pay will find it almost inconceivable that they could sell such a property. This market distortion is akin to a long-term tenant in a rent controlled unit in New York City where the tenant does not have to give up the artificial constraint on rent even when they die. The average effective property tax rate in San Diego County will continue to decline if these trends continue as new beneficiaries continue to hold onto homes rather than sell them.

Not only do lower tax rates reduce the supply of housing placed for sale on the market but they also make household less mobile, as suggested by prior studies. The most famous study on the benefits of mobility is probably one by Charles Tiebout (1956). Tiebout's key insight was that when local governments provide goods to citizens who can move among distinct communities and when citizens are faced with an array of communities that offer different types or levels of public goods and services and different property tax burdens, then each citizen will choose the community that best satisfies his or her own particular demands. Individuals effectively reveal their preferences by "voting with their feet." Prop 13 effectively reduces the ability of households to vote with their feet and also reduces incentives to make significant capital improvements to homes.

Whatever, the premium that exists now, it appears that this premium will continue to grow over time and the California housing market will wallow in a bog of its own creation with the ultimate in sticky supply added to an already supply constrained market.

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Tiebout, Charles, "A Pure Theory of Local Expenditures" The Journal of Political Economy, 64: 5, Oct. 1956, pp 416-424 A review is available at http://www.csiss.org/classics/content/43

A note on Sustainability and Housing

Sustainable buildings and features have quickly become mainstream as real estate investors, developers, are realizing the market demand to build to green (less environmentally harmful) standards.[45]   Home owners will certainly make sustainable improvements such as solar power cells, better insulation, LED lighting and lower their utility bills and achieve some premium on resale, although most appraisers are not sensitive to such improvements as of 2018. In the rental market, landlords may also make green investments and save on energy or water, but there is only anecdotal evidence that rentals will pay a premium to live in more environmentally responsible housing. Green features may help attract renters and keep a building filled, but they may not add much in way of rental premiums. Still, they can help with a higher occupancy rate and lower capitalization rate on resell. For most renters and homebuyers, up-front cost still seems to be a dominant issue, even if the total occupancy cost are lowered by such investments. This is why third-party programs like PACE (Property Assessed Clean Energy) have gained some traction.[46] According to a survey conducted by Strata Research, 53 percent of those surveyed said they would "consider" paying more in monthly rent for environmentally friendly features, but only 8 percent of that group would "definitely" pay more[47]. As green features and upgrades become more prevalent in both homes and multifamily units, residents will come to expect their units to be as energy efficient as possible. That being said, these features that will now be considered standard may not always be able to command higher rents.[48]

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[45] These include LEED, GRESB, Energy Star and others. See the USGBC.org, EPA and GRESB.org websites.

[46] See https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs

[47] Wood, Chris. "Apartment Searchers on the Lookout for Greener Digs." 2011. Multifamily Executive. https://www.multifamilyexecutive.com/design-development/green/apartment-searchers-on-the-lookout-for-greener-digs_o

[48] For further discussion see, https://www.multifamilyexecutive.com/design-development/green/apartment-searchers-on-the-lookout-for-greener-digs_o

Questions and Answers

1. The dynamics of the rental market start with an analysis of whether we are talking about a demand change or a supply change. Give some examples of both?

Answers

Examples of Demand Changes: There are several examples of demand changes that will lead to higher or lower rents and could lead to new supply or faster deterioration of the existing housing stock, such as:

1. An increase in local employment will increase the demand for housing.
2. A decrease in the average birthrate in the area may decrease the demand for larger sized units. It may also increase the demand for small units, unless there is net population growth.
3. A decrease in interest rates will induce more demand.
4. An easing of under writing standards making securing credit easier will increase demand.

Examples of Supply Changes: There are several examples of supply changes, such as:

1. A new public building or road may require many existing housing units to be demolished, reducing local housing supply.
2. An apartment building is condemned because of safety violations, thereby decreasing the local supply of housing.
3. A tornado comes through a city eliminating some of the housing, yet killing no one, resulting in a supply reduction, but not a change in demand.
4. The government builds 1000 new housing units in an area for military use and as military types move in the local private market observes higher vacancy.
5. Several worn out housing units are fixed up by local investors thus increasing the supply of better quality units. This is clearly an increase in supply in the higher quality submarket and it could also represent a decrease in supply of the lower quality units.

2. How does the market change from short run to long run with a change in demand or supply?

Answer: When we have an increase in demand, we will observe lower vacancy rates, higher rents (and prices), increased returns on housing investments, inducing lower quality upgrades or new construction until such time as excess returns are dissipated.

Answer: When we have a decrease in demand, vacancy rates increase, rents soften or decline, returns on housing investments are reduced and maintenance and repairs may be postponed or delayed. Over time units become lower quality and at the bottom end, may even be abandoned. Over time supply will shrink until normal returns are achieved again.

Answer: When supply is artificially reduced by an act of nature, such as a tornado, we will see a patter similar to the increase in demand. When supply over shoots demand, we will see a pattern similar to a decrease in demand.

3. Describe the housing market in your area? Would it be described as a market with few supply barriers or high supply barriers, both naturally and regulatory or political? Are these restrictions increasing or decreasing? How does this affect the housing market?

Answer: Consider doing research on housing supply barriers by market to get a better idea of what is normal. Consider the Wharton Regulatory Index or others you find. How does your market compare? What do locals think? For example, in some markets endangered species may be a severe impediment to adding new supply. In other areas, it may be NIMBY types that politically oppose any new development.

4. While housing prices tend to be sticky and have some inertia, that is they don't change instantly in response to new economic circumstances, they must over time adjust to changing affordability. Calculate the amount that a buyer could afford with 20% down in both cases, but with a 30 year fixed rate mortgage at 5% compared to 7%, when the affordable payment each moth is $2,500 US Dollars. Ignore property taxes and insurance for now.

Answer: We can calculate the present value of $2,500 a month (PMT) for 30 years (360 = N), FV=0, at 5% (.05/12 = Interest) and get $465,704.04 Divide this by 80% or .80 and we get $582,130 as the affordable price. Now change the rate to 7% and we get $375,768.92 which becomes $469,711 when we divide by 80%. Note we could hold the capital down payment constant and in that case, the reduction in price is simply the effect on the mortgage present value. This calculation shows how sensitive home prices are to changes in mortgage rates, and although they do not change instantly, in the long run we will observe changes similar to these calculations for the first time home market where most of the home is financed.

5. Why would the home price change less than the calculations in #4 above suggest?

Answer: For second and third and fourth homes, many buyers tend to carry over their equity into the next home. In fact, in the upper price tiers of the housing market, the average going-in loan to value is generally less than 50%. These markets are thus less sensitive to changes in interest rates as less of the home is financed. It is the lower tiers and those financed by FHA/VA loans where the down payments are zero or minimal that are most affected by changes in mortgage rates.

6. Most differences in housing prices across the US can be attributed to differences in the cost of what? Elaborate and provide some examples.

Answer: Land. In high land value markets such as San Francisco, barriers to develop land are much higher and can result in a higher percentage of the total final housing costs. In addition, the concept of willingness to pay to maintain or achieve utility is relevant to land use and property value analyses because what really determines land use is the interest in such land. The said interest consequently creats demand which sustains property values. (see article, "Determinants of Land Use and Property Value"
https://www.researchgate.net/publication/283618969_Determinants_of_Land_Use_and_Property_Value)

7. Explain some of the effects to the housing supply as a result of Prop 13.

Answer: Decreases turnover and supply. Prop 13 increases tenant's tenure and causes them to stay in their homes longer. The lower the effective property tax rate the lower is the average neighborhood turnover.   The lower housing supply also induces slightly higher home prices than otherwise and an ill fitting match between occupants and houses, where owners stay in their homes longer, even when the house is too large for them.

8. What is the relationship between mortgage rates and housing prices?

Answer: Lower interest rates mean you can borrow more money. When you can borrow larger sums of money, you can afford to pay more. As a result of low interest rates, home sellers will notice that buyers can pay more and prices will rise. If you have rising mortgage rates over a longer period of time, then you will see weaker demand in which case you will see housing prices lower, more so in the higher leveraged (higher Loan to Value) lower prices markets..

9. Short term trends and turning points in the housing market are harder to forecast than long term trends driven by fundamentals such as employment and demographics. For the housing market, explain how you would use technical shorter term indicators of the market to forecast turning points and short-term trends.

Answer: When we think of technical indicators we think of symptoms of the interaction of demand and supply. These are things that can be observed that reflect current demand and supply. For example, how long a home is on the market for. If homes aren't staying on the market for long, this may be an indicator that the market is getting stronger. Asking price vs. selling price is another. If buyers are negotiating purchase price at a lower ratio to asking prices, this may be a sign of a market getting weaker. There are other key technical indicators like months remaining inventory and the percentage of expiring listings that do not sell.

10. Explain from the short run to the long run the movement of the housing market to equilibrium after a sudden decrease in housing of all types from a major fire as in Santa Rosa, Mendocino in 2018 or the Carr fire of 2018..

Answer: Immediately, the housing supply has decreased, and demand only a little. Rental demand now exceeds supply by more than before, so vacancy is reduced or zero. Rents will go up and returns on housing capital will be excessive compared to what investors require. This will induce more repair and construction adding to the supply. When yields drop close to normal the construction rate will slow.

11. How does rent control impact the housing supply? Provide an example of how it can affect the rental supply?

Answer: According to the basic theory of supply and demand, rent controls cause some units to charge below market rents and over time this gap tends to widen. This will cause excess demand relative to the rent-controlled units. But it will also reduce the incentive to build new housing in such a market, which over time will create an even large gap in the supply of housing relative to demand and causing new unit rents to be even higher than in the absence of rent controls. Rent control may also incentivize landlords to convert rental units to condominiums or demolish buildings and build new ones or new uses to avoid having to comply with rent control policies. Converting apartments into condos somewhat reduces the supply for rental housing and raises rents overall.