U.S. Apartment Demand – A Forward Look

NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

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May 2017

Estimating the Total U.S. Demand for Rental Housing

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Executive Summary

The housing bubble fallout of 2007-2010 resulted in a paradigm shift in the U.S. among 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 flexibility of renting. Demographic shifts also affect home ownership and the result has been a declining home ownership rate and corresponding increase in the percentage of households that rent. Some of this shift came about in the same housing units, as owned units became part of the rental inventory and today some one-third of all rental units are single-family units.

Tighter underwriting standards by lenders have resulted in a tighter supply of both multifamily and single-family housing with prices and rents exceeding the growth in income for the past decade. Housing affordability, especially on coastal markets, remains low.

Housing supply is adequate in most markets but there are many exceptions especially along the Northeast and Western U.S. coasts at certain price segments. 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. 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.

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. Their natural population increases have been more than offset by domestic out migration and yet international migration has significantly supplemented the population. These metros include[1] Chicago, Detroit, Milwaukee, Philadelphia, St. Louis and New York.

Among the metro markets studied, migration rates 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 include Houston, Charlotte, Austin and Tampa-St. Petersburg. Markets such as Washington D.C. and San Diego have strong international in-migration but experience domestic out-migration.

Uncertain in our housing outlook is the longevity of the current rental stock. This study assumes a base rate of economic obsolescence of 0.5% or 720,000 units per year on average through 2030. If the economic life of a housing unit is reduced to 100 years (1.0% per year), on average, then we need 1.4 million housing units per year just to replace the lost housing units. The type of housing needed in the future is also shifting towards units that accommodate older households.

[1] April 2010 to July 2016

Given the maturity of the current economic cycle, the forecast assumes that the U.S. economy could go through two recessions by the end of the forecast period in 2030. Even under this scenario, all 50 states and the 50 metropolitan markets in this study will need new multifamily housing going forward to meet a growing population base. The Southern states driven by economic growth, low costs and diversified demographic growth continue to lead demand forecasts with metropolitan markets in Texas and Florida ranked in 5 of the top 6 places. Phoenix, Atlanta, Raleigh and Las Vegas also rank in the top 10. Slower growth markets are more likely to experience new demand growth in specific neighborhoods. Developers and investors should evaluate these markets carefully for new growth as well as revitalization of existing neighborhoods. These markets are frequently located in the Midwest and Old South and include markets such as Cleveland, Milwaukee, Birmingham, Pittsburgh and New Orleans.

Growth drivers also vary greatly by metro market and will shape the format of new construction going forward. A few markets will continue to attract new renters of all ages, while many will experience an increasing proportion of demand from 35+ aged cohorts. The 65+ aged cohort will account for a large part of demand in some low growth markets, particularly those experiencing net out-migration trends. Income and ethnicity trends also vary significantly by market.

While some markets embrace growth, others are restricted either geographically and / or by policy. Supply-restricted markets tend to have 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. The middle class, including necessary professions for a healthy economy such as teachers, police and fire-fighters, cannot afford average rents in these markets. States with healthy balance sheets and educated workforces continue to be primed to attract individuals and firms from these markets.

Several 'known unkowns' could occur going forward that would significantly change the forecast. At the national level, 75% of the variance in the U.S. home ownership rate since 1971 can be explained by policy changes such as those that impact capital and banking markets. It is unknown whether policy changes will be put into effect which could impact the applicability of the mortgage tax deductions, particularly for middle income families. Changes in these policies can affect the 'own vs. rent' decision and thus the amount of demand for multifamily properties going forward[2].

The second large 'known unkown' at the national level at the time of writing this report is the impact of policy changes on immigration rates. As the U.S. population ages, growth is slowing and becoming increasingly dependent on immigrants who have a higher tendency to rent. As a base case, population growth is expected to slow from 0.9% per year on average from 2000 to 2010 to 0.7% on average from 2016 through 2030. Under this scenario, immigration begins to outpace natural growth (births minus deaths) by 2023. Without immigration, population growth is expected to slow to 0.4% per year through 2030, less than half the pace of the past decade.

At the local level, some markets could surprise on the upside. For example, large tech campuses continue to expand in Seattle. A growing hub of large tech firms could attract more than expected small tech firms as well as individuals looking to escape the high costs of Silicon Valley. Detroit is at the other end of the growth spectrum but has been increasingly attracting a few investors who are aggregating large tracts of land.

[2] For example, doubling the standard deduction would eliminate the benefits of mortgage interest and property tax deductions for many households and thus, at the margin, provide less incentives to own housing.

U.S. Rental Demand

At the national level, we first estimate total rental demand based upon total population, household size projections, and the portion of the market that desires and can afford ownership given the regulatory environment, interest rates and ease of credit access. The result is the net rental demand in households. We provide some notes on trends worth watching that might affect rental housing demand. We also provide some supply side discussion bringing in the impact of those marginal single-family units that might be rentals or owner occupied.

In brief, the national housing rental demand model is essentially the following:

1. Estimate total population growth considering births, deaths and net immigration.
2. Divide this by household size considering probable recessions and demographic trends
3. Equals total households (with a qualifier on homelessness)
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 including normal attrition for changes in use, public improvements, etc.
6. Equals total housing unit demand
7. Estimate the owner-occupied portion of this to derive renter demand, considering credit access, housing policies, existing household debt including student loans and credit debt, housing investment appeal and general affordability.
8. Allocate renter demand for new multifamily rentals of 5 units or more per building as defined by the NMHC.

1. Estimating U.S. Population

The U.S. Population is approximately 325 million persons[3] as of the end of 2016, growing at approximately 2,229,000 per year which equates to 4 net new people per minute, 6,107 per day. These estimates are based on the three most important metrics of population: births, deaths and net international migration. Of these three parameters, net immigration is the least predictable but most important for forecasting future population. The reason is that as the U.S. population continues to age our domestic death rates will slowly approach our birth rates. We will continue to add net population at the rate of about 1.35 million for 2017 (births less deaths) but the net immigration figure for 2017 will run 0.88 million. By 2023 and beyond the rate of expected population growth from net migration exceeds that of births less deaths.[4] By 2030, net immigration is expected to run 1.33 million compared to an internal net population increase of 840 thousand.

[3] Official estimates from the U.S. Census.

[4] This is from the U.S. Census as well as Pew Research and others. See for example: "Immigration projected to drive growth in U.S. working-age population through at least 2035" PewResearchCenter.org By Jeffrey S. Passel and D'Vera Cohn, published on: April 17, 2017 http://www.pewhispanic.org/2015/09/28/chapter-2-immigrations-impact-on-past-and-future-u-s-population-change and http://www.calculatedriskblog.com/2017/04/lawler-updated-population-projections.html and http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=23839.

Historically, immigration is highly dependent on the state of the U.S. economy, slowing down during recessions and accelerating during better economic times. For example, while Mexico remains the largest source of persons who obtain lawful permanent resident status in the U.S.[5], net immigration is balanced by persons leaving the U.S. for Mexico. Over time, immigration from Mexico has been one of the largest from any single country bringing 400,000 people per year from 2001-2005. From 2006 through 2010 the number slowed to a trickle, only 200,000 total over 5 years or a tenth the previous rate.[6] Since 2010 the net immigration from Mexico has declined to a very small number, and was negative from 2009-2014. Factors for this slow down include a stricter immigration policy on the U.S. side with increased deportation of undocumented immigrants, less demand for unskilled labor, except for agriculture[7], and positive economic growth in Mexico after the 2009 recession. Asian immigration rates are simultaneously increasing and are now surpassing the combined totals from Mexico and all other Hispanics as the largest single entering ethnic group. Immigrants from Asia tend to be highly educated and have job skills making it easier to integrate into the U.S. economy over a broader range of jobs. For example, 57% of Asian immigrants in 2015 had completed college compared to 13% from Mexico and 28% from Central and South America.[8]

As immigration is approaching half the annual net U.S. population growth rate, it is becoming a critical factor in population forecasts (see Exhibit 1 and Figure 1). What is unknown is whether the U.S. policy towards immigration will be broadly more challenging or more specifically challenging towards single countries or certain group profiles. The Obama administration was characterized by severe, if not extreme, vetting of immigrants. As a base case, we use Census forecasts as shown below, presuming that new immigration policies will sound dramatically more extreme, but should be modest in terms of real impact.[9] The impact of more restricting policies is explored in the Scenario Analyses at the end of this section.

[5] Department of Homeland Security, 2015 Yearbook; Mexico accounted for 157,227 of 1,051,031 total persons who obtained lawful permanent residence in 2015, followed by China (70,977), India (61,380), Philippines (54,307) and Cuba (54,178).

[6] See MPI reports at http://www.migrationpolicy.org/article/mexican-immigrants-united-states.

[7] California is especially dependent on Mexican labor for agriculture and would be devastated if temporary work permits were not facilitated.

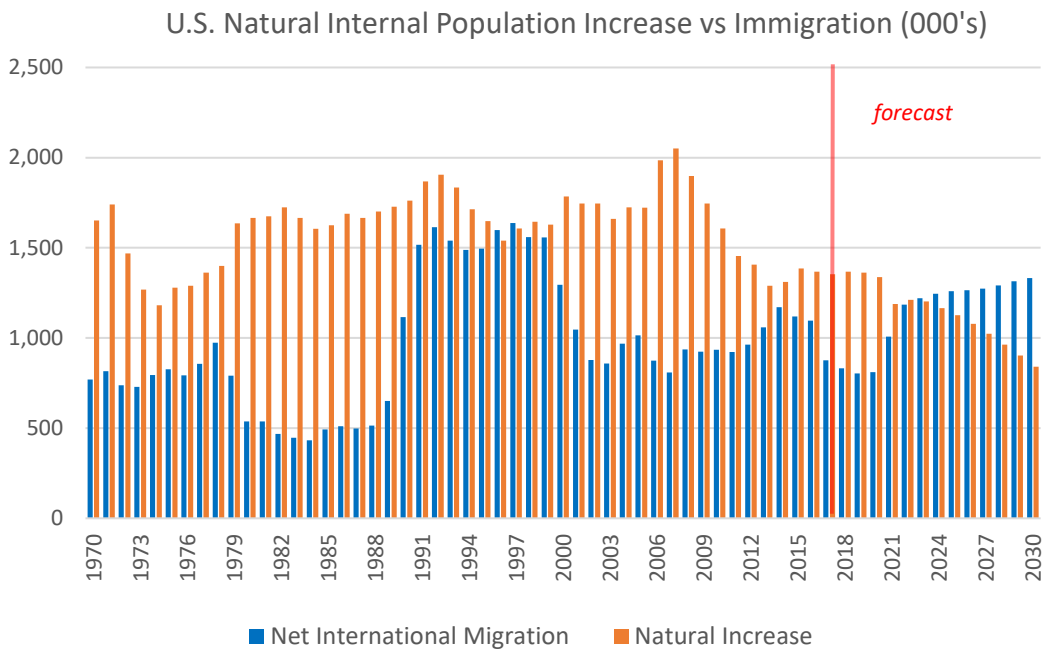
[8] PEW Research Center report on "Future Immigration will change the face of America" 2015.

[9] There are some countries that might be more severely impacted by a Trump administration including Syrian refugees, and those from other Islamic countries but it remains to be seen how new policies will play out.

Exhibit 1: Population Projections

Year	Population	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

Figure 1: Population Projections Plot



The impact of immigration on population growth estimates varies widely. While border states first come to mind as areas that could be heavily reliant on immigration for population growth, we find that many of these areas also attract a large U.S. migration making immigration a small part of total growth, e.g. immigration accounted for only 5.0% of population growth in Texas and Arizona in the 2010-2014 period. To the contrary, we find that immigration is more important to slow-growth states, accounting for virtually all population growth from 2010 to 2014 in states such as Maine, Michigan, Rhode Island and West Virginia, and more than 30% of growth in Connecticut, New Jersey, New York, Ohio, Pennsylvania and Vermont. See the state and metropolitan area reviews of this report for further discussion.

2. Estimating U.S. Households

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 in recent years. See Figure 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. If we divide 325 million by 2.54 we get 127.9 million households as of the end of 2016, but this exceeds the benchmark estimates of 118.2 million per the most current U.S. Census survey. Thus, we used the most complete and current surveys of population and households from different Census surveys[10] and other sources to estimate household size and total households. Figures used in this survey are shown in Figure 7.

Several factors are causing a decrease in household size. Single persons living alone doubled from 13% of households in 1960 to nearly 27% in 2010 (Figure 3). This is a result of influences on both ends of the population spectrum. 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.[11]

[10] U.S. Census B25127 2015 ACS (1-year) table, Moody's Analytics and Hoyt Advisory Services.

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

Figure 2: Household Size Over Time

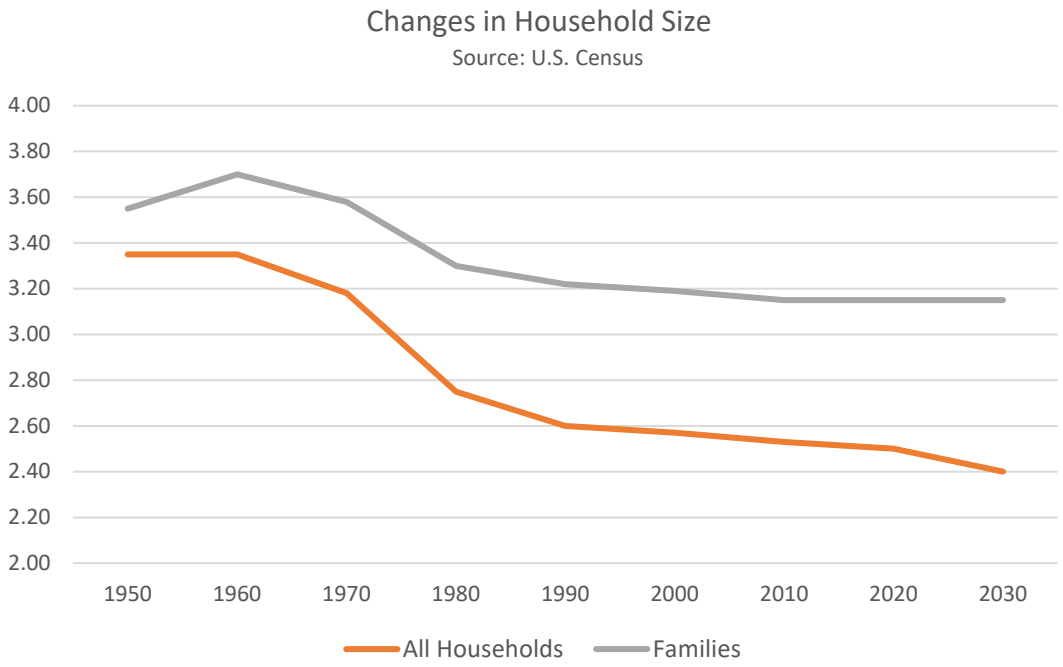
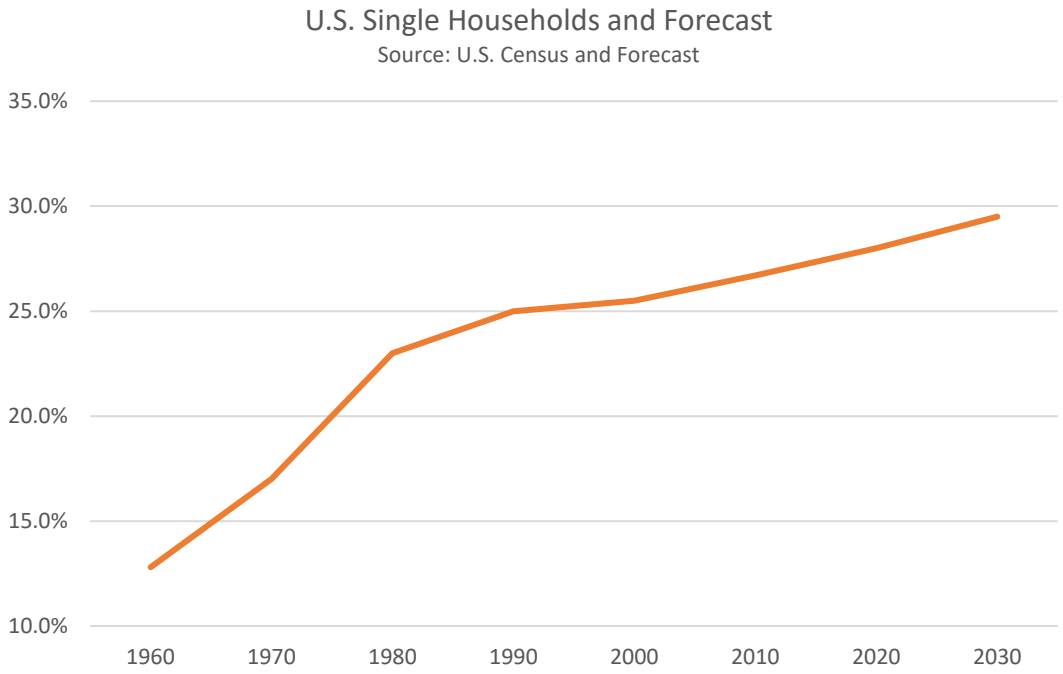
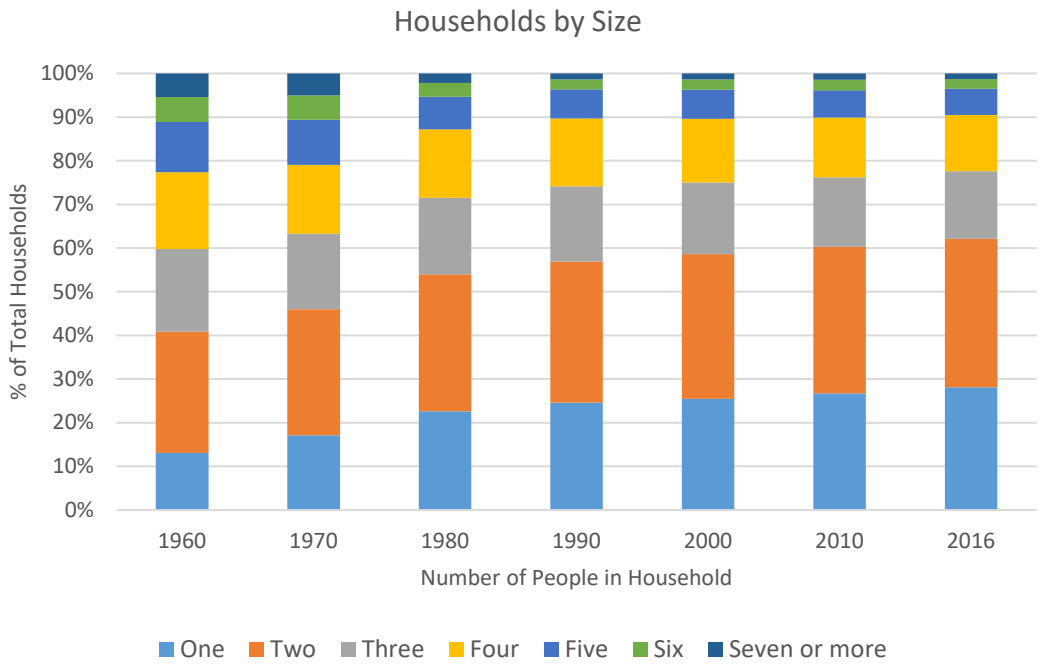


Figure 3: The Rise of the Single Person Household



Not only are the single households rising as a percent of the population but the size of households overall continues to decline as shown in Figure 4. Households of three or more people declined from 59% of households in 1960 to 43% in 1990 and 38% in 2016[12].

Figure 4: Large Households a Declining Share of Total



Household size by age of householder increases on average until age 40 as young people form families and then begins to decline after age 40[13]. See Figure 5 below. Average household size is three people or larger for households where the head of household is aged 30 to 49. Conversely, household size drops precipitously to slightly over 1.6 people when the head of household is 75+ years. As the U.S. population ages, older (and smaller) households are becoming a larger share of the market. See Figure 6 below. Notably, we estimate that the 45-54 aged household segment will decline from 21% of households in 2010 to 16% in 2030 while the Baby Boomers, born circa 1946 to 1964, are entering traditional retirement age. The 65-74 aged segment is projected to increase from 11% of households in 2010 to 17% in 2030 while the 75+ aged segment increases from 10% to 15% of households during the same time period.

[12] Source: U.S. Census Bureau, Families and Living Arrangements.

[13] Source: U.S. Census Bureau, Current Population Survey 2015.

Figure 5: Household Sizes Are Smaller for Older Households

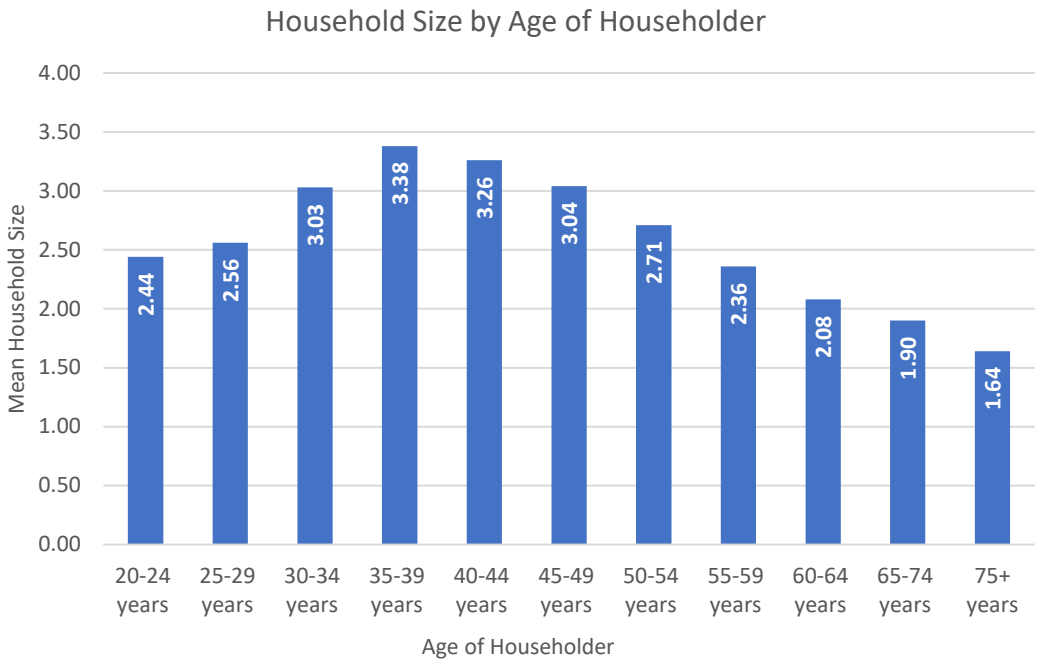
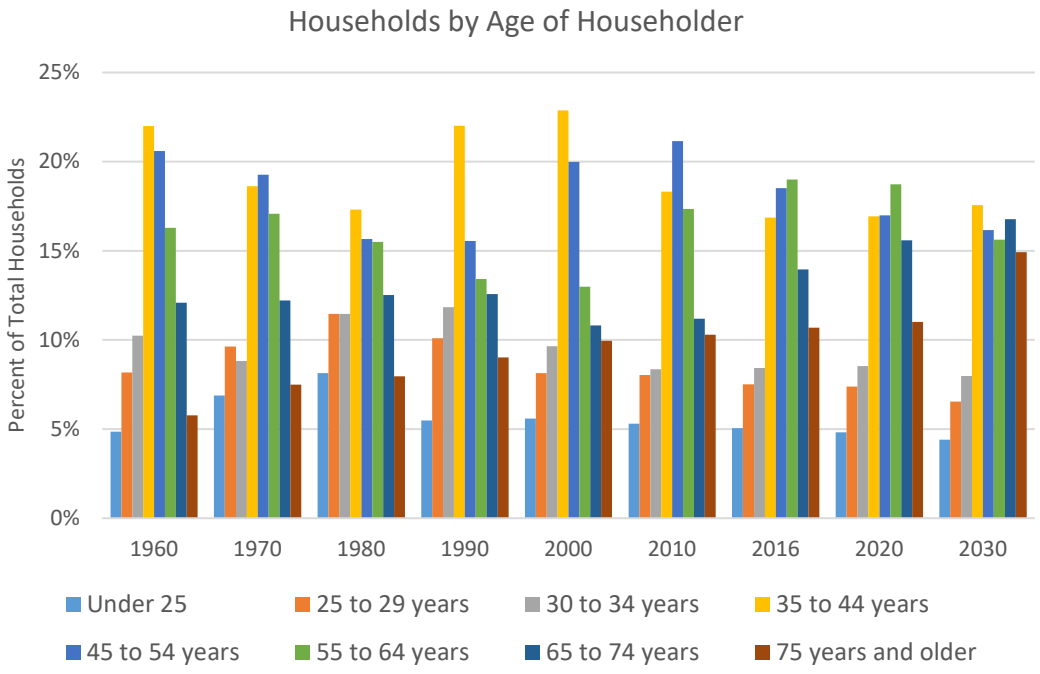


Figure 6: Older Households an Increasing Share of Total Households



Another significant trend impacting household size is the increasing share of population growth attributed to international in-migration to the U.S. See Figure 1 above. Notably, households of Hispanic origin[14]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.[15] 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 Figure 7. The U.S. is expected to have approximately 141 million households by 2030. From the end of 2016 through the end of 2030 the population should grow in total by 9.8% but the household growth rate over than same period is 12.8%, as the household size declines. This is an annual compounded growth rate, in our base case, of 0.7% in population increase and 0.9% in household increases. Note that this is a slower pace than recent historical trends when population increased by 1.2% annually on average from 1990 to 2000 and by 0.9% from 2000 to 2010. Without any net in-migration from other countries, the U.S. population is expected to grow by only 0.4% annually through 2030. Household growth stayed a little more stable over time as household size shrank, averaging 1.2% per year in both 1990-2000 and 2000-2010 and dropping slightly to 1.1% since 2010.

While the timing and severity of economic recessions are difficult to predict, the U.S. has experienced a recession every four to ten years during the past fifty years. Thus, we broadly estimate two recessions slowing down household formation rates in the forecast horizon, the first estimated around 2019 lingering until 2020 and the second and larger recession in 2030, possibly starting in 2029 and lingering through 2031. The first recession is forecast to be mild and is based upon the normal economic cycle.[16] A second mild recession could occur in 2026 but will depend more on a global economy and is not factored into any of our models. The third recession is estimated to be quite severe and is based upon entitlements (Social Security and Medicare) running out of funding resulting in the need for massive tax increases and some budget cuts.[17] The population growth rate in the graph below is shown in lighter gray with the darker column showing households. Normally the household growth rate exceeds that of the overall population, but here we note the effects of the slower household growth rates during projected recession years which is further impeded by lower than historic population growth. The number of households actually shrinks slightly in 2030 as more people double or triple up during a significant recession.

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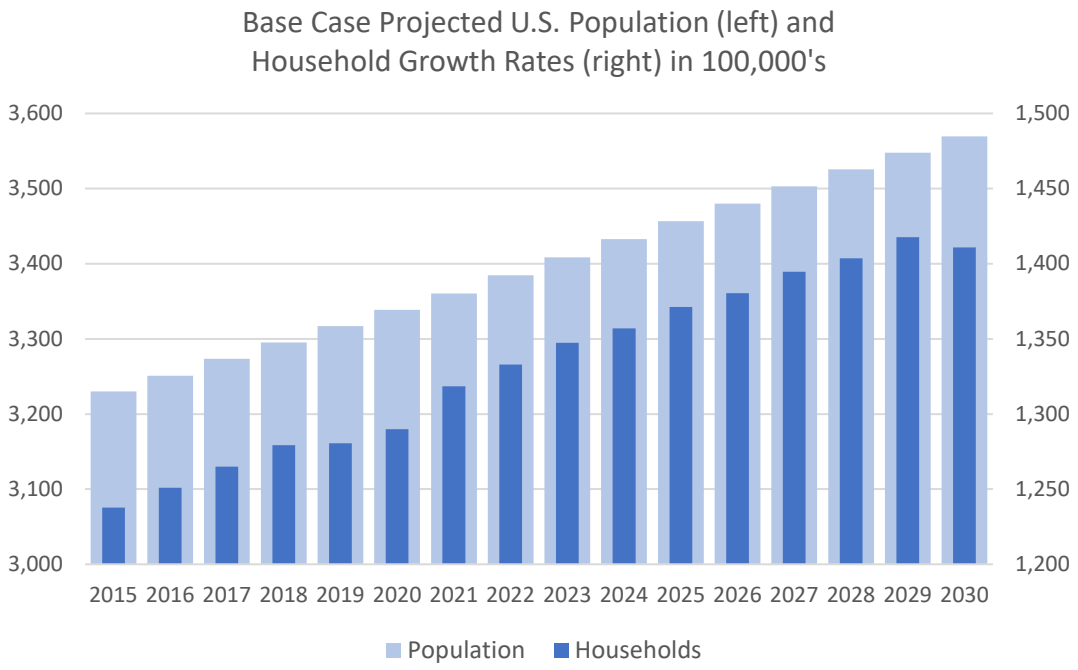
[14] Note that origin is separate from race, and thus Hispanic households may be of any race in U.S. Census data.

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

[16] A variety of sources were used to suggest a recession in late 2019 and during part of 2020. The most convincing of these came from Intensity, an economic forecasting firm headed by Dr. Alan Timmermann. See http://intensity.com/forecasts. Another economist consulted for longer term economic crisis is Dr. Alan Beaulieu. https://www.itreconomics.com/content/alan-beaulieu.

[17] See the very convincing analysis of Alan Beaulieu, http://www.financialsense.com/contributors/dr-alan-beaulieu/us-recession-2019-depression-2030 where he makes the case that the U.S. politicians kick the can down the road until it reaches a crisis point, that being the inability to fund Social Security, Medicaid and other entitlements, along with a maxed out Federal debt creating unsustainable borrowing capacity. The timing estimate here is very much driven by the aging Baby Boomers who will no longer be working and demanding vast increases of medical care in the last years of life.

Figure 7: Base Case of the U.S. Household Growth Rate



U.S. Projected Base Case Households by Year as Used in Figure 4 in 000's

Year	Population	Household Size[18]	Households
2015	323,000	2.53	123,778
2016	325,107	2.52	125,094
2017	327,336	2.51	126,501
2018	329,534	2.50	127,915
2019	331,700	2.51	128,043
2020	333,849	2.51	128,979
2021	336,045	2.47	131,848
2022	338,442	2.46	133,295
2023	340,867	2.45	134,746
2024	343,278	2.45	135,688
2025	345,665	2.45	137,131
2026	348,009	2.45	138,048
2027	350,305	2.44	139,474
2028	352,560	2.44	140,363
2029	354,777	2.43	141,768
2030	356,949	2.45	141,092

[18] Assumes 3.0% of population is in group quarters.

3. Total Housing Demand

While total housing demand parallels the number of households as projected above, the actual housing stock demanded will also be affected by the following factors:

- the number of homeless households,
- the number of excess or vacant units available to fill new demand, if located in areas where demand exists,
- the demand for second and third homes, and last,
- the atrophy of physical housing units which will leave the housing market.

Later, we will divide the housing demand into owner and renter shares, and when doing so, noting the impact of units that might be part of either stock.

a. Homeless Population and Households

Homelessness exists in the U.S. at the rate of about 17 to 18 persons per 100,000 population, about half of whom are considered chronic. Thus, on a single night in 2015, more than 560,000 people were without housing and sleeping outside, in an emergency shelter or a transitional housing program.[19] The highest rate in any metropolitan market is Washington D.C. at 111 per 100,000 population.[20] More expensive large cities tend to have higher homeless rates. Single persons make up about half the homeless household count. From an analysis of long term trends, economic cycles affect homelessness but there is no relative trend based on household income dispersion. During 2016 for example, homeless rates were lower in about two-thirds of the U.S. States and higher in the other third.

For 2016 the impact of homeless households requires an adjustment from 125,094,000 down to 124,820,000 households, a reduction of 2/10ths of 1.0%. At the national level this is not very significant, but in some metro markets such as Washington D.C., it requires a modeling adjustment for household demand.

b. Normally Vacant Units

The U.S. Census Bureau surveyed nearly 134.8 million housing units in 2015, some 118.2 million occupied and 16.6 million of them as vacant representing 12.3% of the stock.[21] HAS adjustments that correlate the decennial Census with their current ACS survey provide for 134.7 million housing units in 2015, 120.4 million occupied and 14.3 million vacancies or 10.6%.[22] The real question is what is the total demand and growth rate, but part of the demand is a function of normally vacant units. We can break the vacant housing statistic into three parts:

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.[23] Residential rentals have the lowest average natural vacancy

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

[20] See http://www.endhomelessness.org.

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

[22] HAS and associates adjustments are based on Census metrics only.

[23] 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.

rate compared to office, industrial and retail property. At the national level, we estimate this at 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. As of the end of 2015 the rental vacancy rate for all residential was 6.8%. Note that 6.8% of the rental stock would represent about 2.6% of the total housing stock.

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.

c. Demand for Second and Third Homes

The third source of vacant homes is from second and third, and in some cases fourth-plus homes, owned but rarely occupied by wealthier households. These are particularly important in tourist markets, but even at the national level the counts are significant. Nationally this surplus housing figure runs about 6.0% to 8.0% of the housing stock, and it has been growing slowly on a long-term basis.[24]

Add together vacant rental units at 2.6% of the total housing stock, plus 1.75% for unoccupied owner units, plus 7.0% for unoccupied surplus homes and we get a total vacant estimate of 11.35%, which is in the range of the Census-based HAS adjusted estimates above.

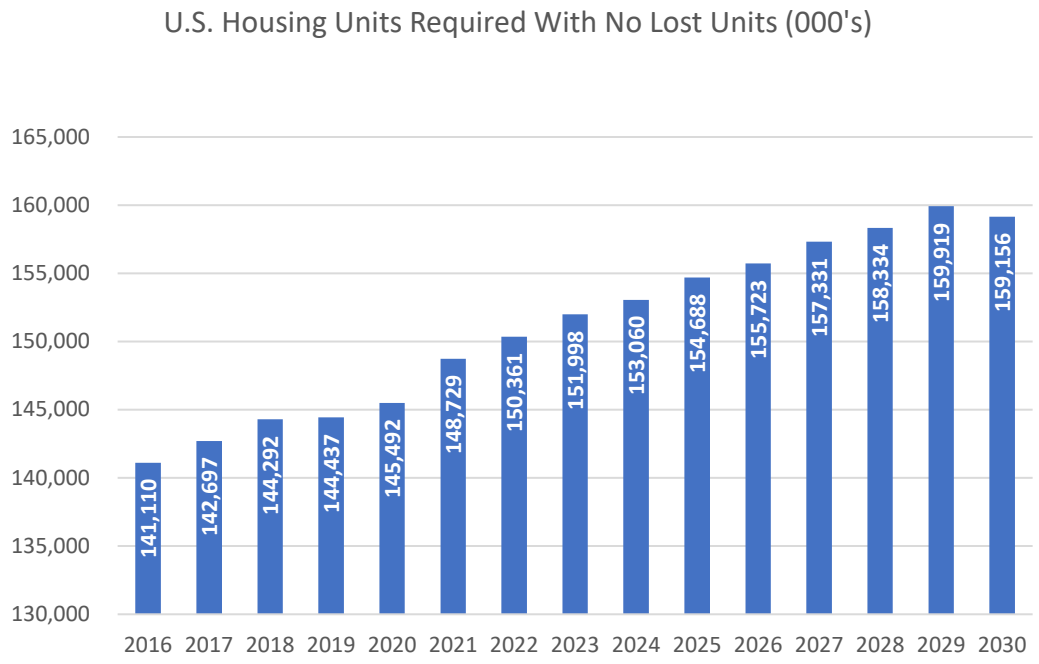
For 2016 this suggests a total housing demand of approximately 125.1[25] million households times (1-.1135) equals 141.1 million housing units. This is similar, but slightly higher than our HAS adjusted estimates above.[26] See Figure 8 below where we project total housing units required through 2030. Note this does not equal total housing demand, nor can it be used to derive net units demanded per year until we make further adjustments. We must consider the obsolescence, real deterioration and demolition of existing housing stock based on a variety of causes and also include housing units lost to the process of eminent domain for public improvements, schools, roads, and infrastructure. Fires, tornadoes, and hurricanes also take their toll, yet we seldom see eliminated housing units brought into forecast models of demand. This will be considered next.

[24] Some of these units may be rented but unreported. Others might be reported as rentals but generally left vacant, so solid and reliable statistics on second homes is a challenge.

[25] The U.S. Census Bureau publishes at least five different estimates of the number of households. Each source yields a somewhat different figure. Most of the differences can be explained because of differing methodologies, dates, and whether undercount adjustments have been applied to the series. This study uses a base household estimate as provided by Moody's Analytics which is based on Decennial Census, Current Population Survey basic monthly files, and annual Census Population Estimates.

[26] There is also some possibility that U.S. households or individuals are living outside the U.S., including those in the military, and yet at the same time foreigners are living in the U.S. No adjustments are made for such ex-pat type housing demand.

Figure 8: U.S. Housing Units Projected Through 2030 Prior to Adjustment for Lost Units



d. Annual Loss of Physical Housing Units

The rate of loss of existing housing stock varies according to age and location. A recent study by Bokhari and Geltner suggested depreciation rates on new multi-family dwellings of 4.0% per year.[27] 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. 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 is the discussion provided in CINCH reports by HUD. CINCH stands for Components of Inventory Change.[28] CINCH data is not consistent nor annual and the last major report covered 2011-2013. During that time 1.567 million units of housing were lost to various causes, or 522,333 per year. This represented about 0.4%[29] 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. Figure 9 shows the age of the U.S. housing stock broken down by owned vs. rented and year the units were built[30], including a category for all mobile homes and

[27] See "Characteristics of Depreciation in Commercial and Multi-Family Property: An Investment Perspective" https://mitcre.mit.edu/wp-content/uploads/2014/03/Characteristics-of-Depreciation-in-Commercial-and-Multi-Family-Property_0317.pdf.

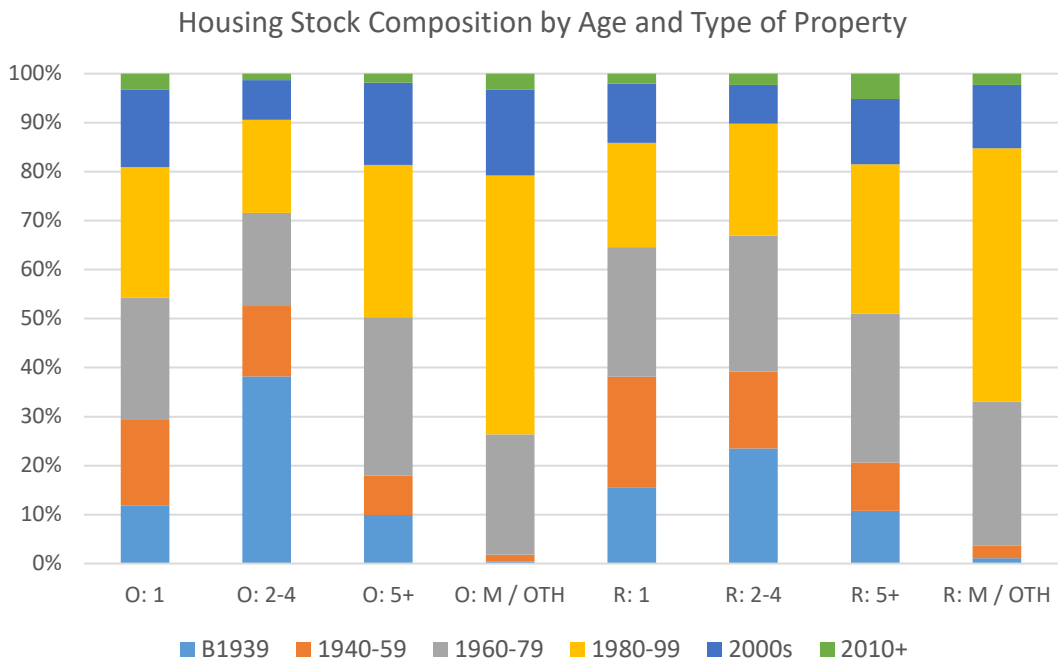
[28] See https://www.huduser.gov/portal/datasets/cinch.html. See also https://www.huduser.gov/portal/datasets/cinch/cinch13/Rental-Dynamics-Report.pdf.

[29] Note that loss rates vary by property, tenure and occupier characteristics with renter occupied properties experience loss rates that are about 52% higher than this figure.

[30] Source: U.S. Census, American Community Survey, 2015.

other property types. Note that there are significant differences in 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% 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%.

Figure 9: Age of U.S. Housing Stock



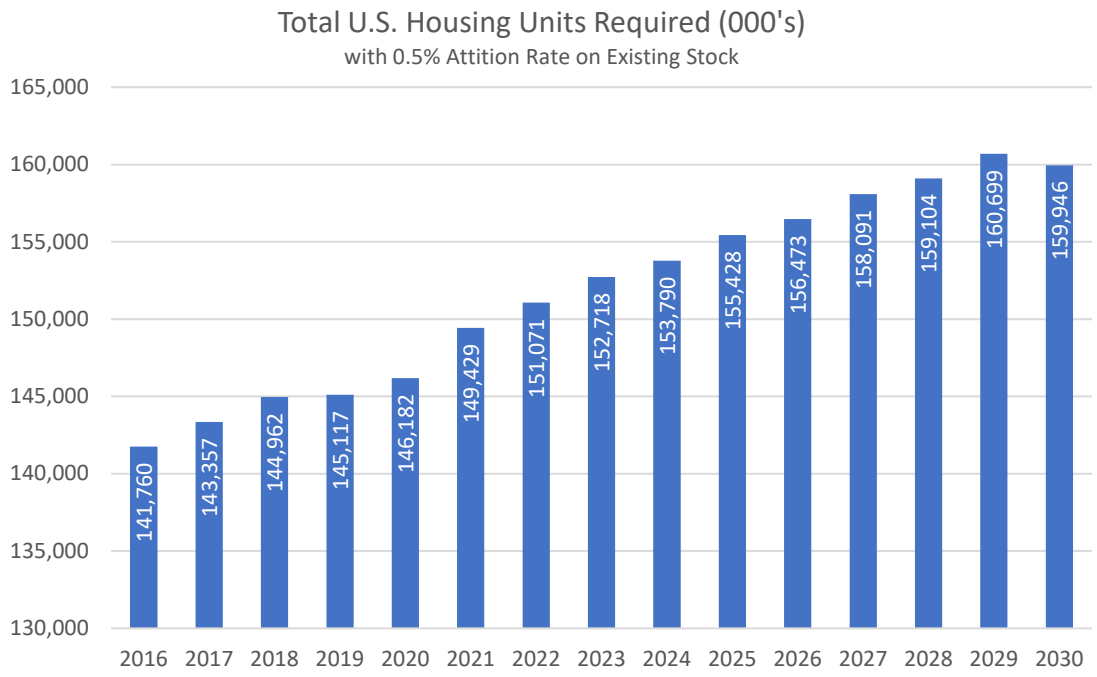
Using the general number of 1.44% based on the average of Bokhari and Geltner estimates results in an economic life of about 70 years for multifamily properties, which seems very reasonable, assuming owners keep them maintained.

One lesson of the Bokhari and Geltner study is that major capital improvements are required to periodically update multifamily properties, or for that matter any building, and without such capital expenditures the wear and tear and loss of real value (gross depreciation) would be much higher. 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.

A recent study by Jiro Yoshida found that the depreciation rate for single family residences was about 1% per year but the rate varies considerably by location and other property characteristics.[31] This study used a rather limited sample of properties. To be conservative for the best case, we will use a 200-year life and a 0.5% loss rate, noting that at least two thirds of this loss will be due to natural causes. Even this very conservative estimate suggests we need at least 650,000 units of housing production in 2016 and growing with the stock rate simply to maintain what we have. We should not assume that housing, once built never disappears. We will add this 650,000 plus figure to the total U.S. required housing stock, growing in proportion to the total. Please note how sensitive this assumption is to our required housing stock. We are assuming that the existing stock will be here for a while since the average age is only 39 years and that is why a conservative replacement assumption makes sense for the next few decades.

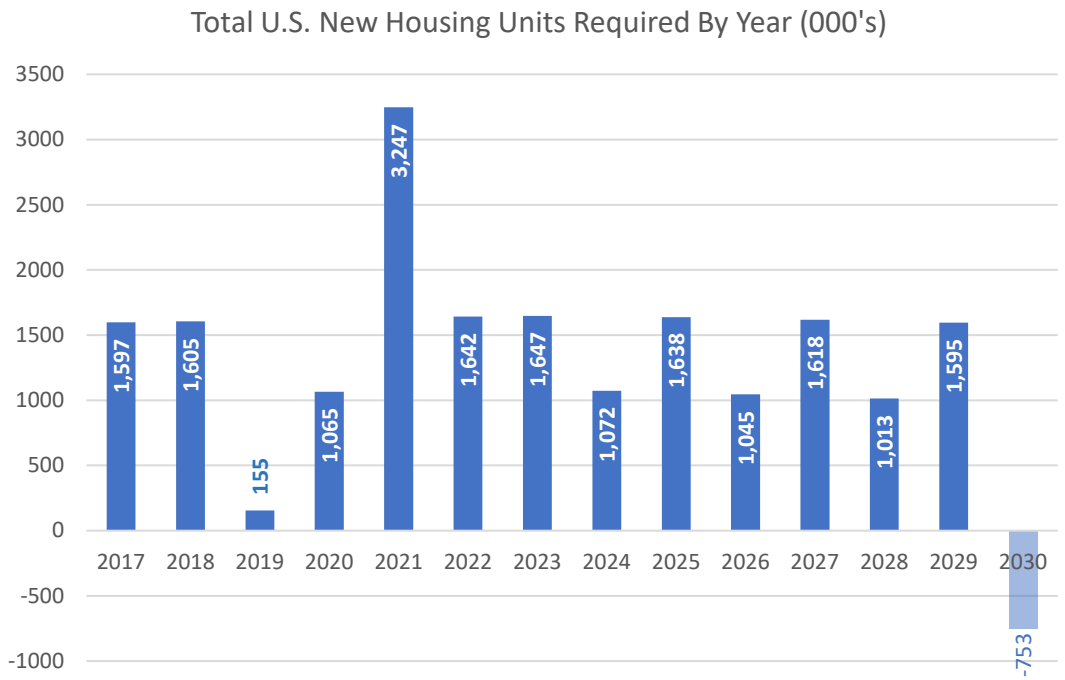
In Figure 10 below, we add in the estimate of lost units to derive the total U.S. housing stock required and in Figure 11 we show the net new housing required each year. The average over the entire period is 1.3 million new housing units each year. Some of the variation in required units is based on a slowdown in economic growth with probable modest economic recessions occurring around 2019-2020 and more severely in 2029-2030.

Figure 10: Total U.S. Housing Units Required



[31] "Economic Depreciation in Property Value: Cross-Sectional Variations and Their Implications on Investments" by Jiro Yoshida, Real Estate Research Institute Working Paper, April 1, 2017. Working papers can be found at http://www.reri.org/research/working.cfm.

Figure 11: Total U.S. Housing Units Required by Year



4. Home Ownership Rates and Renter Portion of Housing Demand

The characteristics of homeowners vary from those of renters. For example, 35% of renters are less than 35 years old with another 20% less than 44 years old. Only 36% of homeowners are less than 44 years old. Renters are more ethnically diverse with significantly more people of Hispanic origin and Black by race, and have a lower proportion of college-educated persons. Interestingly, tenants in rental properties are somewhat sticky with 59% of renters moving into their units in 2010 to 2014 with only 15% moving in 2015. See Appendix 2 for further details.

Globally, home ownership rates vary widely from less than 50% of households to more than 95%[32]. According to data compiled by the European Mortgage Federation from Eurostat, supplemented by more recent data from Eurostat, the majority of European countries, the 28 countries in the European Union, have home ownership rates that exceed the U.S.[33] While international comparisons are difficult to measure, countries with extremely high home ownership rates seem to have several factors in common. Many are former socialist countries which gave existing tenants the housing they occupied.[34] Ever since the dissolution of the USSR and the transition to privatization, the high home ownership rates have been receding. Culture, the momentum of tax laws and other policies that

[32] See http://www.pewresearch.org/fact-tank/2013/08/06/around-the-world-governments-promote-home-ownership.

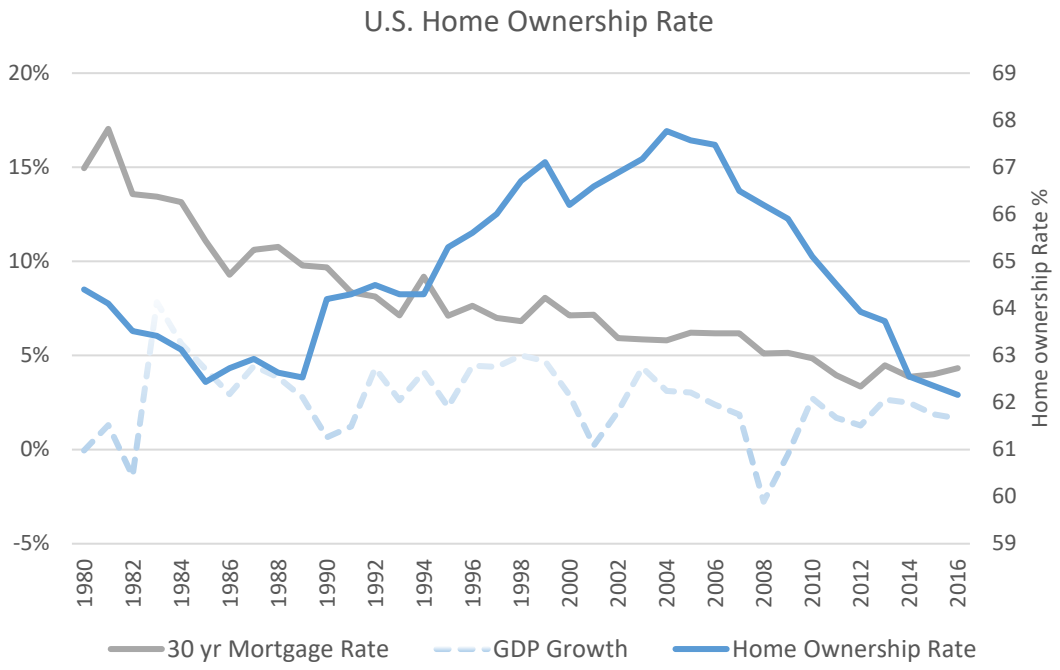
[33] See http://eyeonhousing.org/2015/06/a-cross-country-comparison-of-homeownership-rates.

[34] For example, Romania, Czechoslovakia, and many others.

encourage home ownership and economic stability certainly play a role.[35] Developed countries like Germany and the U.K. have had relatively stable economies and inflationary environments and do not fear runaway inflation, thus the demand for real assets and inflation hedges are somewhat mitigated. Housing affordability across countries is additionally impacted by a number of factors including differences in tax burdens, housing stock characteristics and income equality[36]. In the U.S., age is positively correlated with home ownership and the highest home ownership rates exist for those aged 65-74, as shown in Figure 13. We also observe a conversion to renting as people reach 75+, especially for those 80+. The Baby Boomers will be crossing these thresholds in significant numbers by 2025, which could affect overall home ownership rates. While it seems that there is no universal equilibrium home ownership rate, we have modeled home ownership rates over time as noted below.

In the U.S., a high rate of housing ownership has been an overall economic policy goal, particularly during the past 50 years, after full employment and keeping inflation under control, but this goal seems to have been punctured by the last housing bust. As shown in Figure 12 below, U.S. home ownership rates have historically had little to do with capital market or economic trends.

Figure 12: Home Ownership Rate



National policies affecting credit availability, banking regulation and lending trends have a significant impact on home ownership rates. Changes in political environments and policies are difficult to forecast going forward, but have had a significant impact on home ownership in the past. In fact, we

[35] Capital gains tax laws and exclusions for single and married households help to maintain the momentum of sticking with home ownership after an initial purchase, if significant appreciation has occurred.

[36] See http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/international_rental_housing_carliner_marya.pdf.

were able to model home ownership rates from 1971 to 2016 with a high degree of certainty[37] using three demographic and economic factors and five policy factors. The policy impacts alone explain approximately 75% of the variance in U.S. home ownership rates since 1971. Examples of significant policy changes include the 1977 Community Reinvestment Act which intended to encourage lenders to address the needs of all borrower segments of their communities including low and moderate-income neighborhoods, i.e. it intended to reduce discriminatory credit practices against low income neighborhoods, otherwise known as redlining. In 1992, The Housing and Community Development Act passed, requiring that 30% or more of Fannie's and Freddie's loan purchases be related to "affordable housing" (borrowers who were below normal lending standards). However, HUD was given the power to set future requirements, and HUD soon increased the mandates. The Gramm-Leach-Bliley Act also known as the Financial Services Modernization Act was passed in 1999. It repealed portions of Glass Steagall act, allowing depository and investment banks to merge. Critics often cite it as a cause of the subprime crisis, allowing mergers to create 'too big to fail banks' that did not have enough regulation regarding risk and reserve requirements. The Commodities Futures Modernization Act of 2000 further limited the regulation of financial derivatives. As a response to the subprime crisis, The Housing and Economic Recovery Act was passed in 2008 in an effort to assist homeowners and restore stability and confidence in Fannie Mae and Freddie Mac.

Home ownership peaked in the U.S. in June of 2004. While 10-year Census data routinely reports lower home ownership rates than annual estimates, home ownership rates are estimated to have peaked near 68% in the first quarter of 2005 as a function of easy credit, subprime mortgage brokers peddling high loan to value mortgage options, reasonably low interest rates, appraisals that merely justified prices paid, and rising price expectations by buyers.[38] Since the crash which followed in 2008 and beyond, credit standards have tightened significantly and underwriting remains tighter than prior to the crash.[39] While many subprime mortgage lenders are no longer in business, most lenders still sell qualified mortgages to Fannie Mae and Freddie Mac and find appraisers who will justify the value, with little skin in the game. History may repeat itself with respect to a new housing bubble, but for now we observe that as of the end of 2016, nearly 10% of the mortgaged households remained underwater. The forecast model does not assume any policy changes going forward, although significant modifications to the tax code were under consideration as of the time this report was being written. Modifications for example that offset or impact the applicability of mortgage interest deductions in the tax code should be watched going forward for potential impacts on home ownership rates.

The appetite and investment luster of housing is certainly much less than before 2008. Home ownership rates are notably lower for younger buyers as shown in Figure 13. This segment of the population has also shown the largest change in home ownership trends since the 2009 peak. While home ownership rates for the 65+ segment of the population fell by only 210 bp since the 2004 peak, rates for the under 35 and 35 to 44 segments fell by 840 bp and 1100 bp respectively. The challenge now is to figure out how much of this change is cyclical and how much is secular. Many of those who

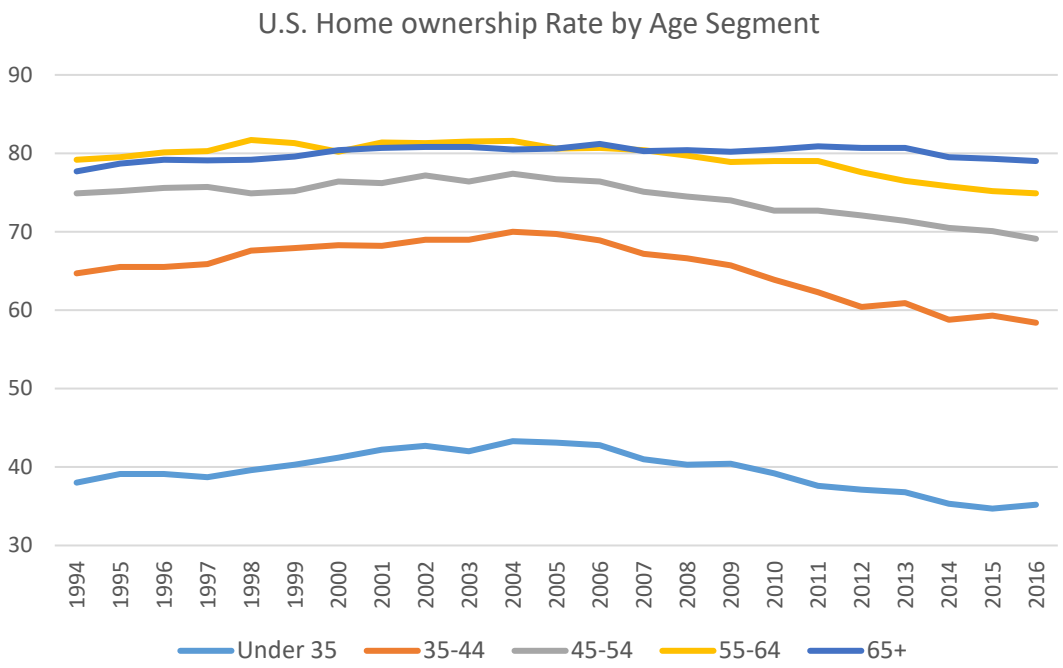
[37] Adjusted R square on the model of 0.847.

[38] See https://www.bloomberg.com/news/articles/2016-07-28/homeownership-rate-in-the-u-s-tumbles-to-the-lowest-since-1965.

[39] See https://www.bloomberg.com/news/articles/2016-07-28/homeownership-rate-in-the-u-s-tumbles-to-the-lowest-since-1965 with a note that minorities now find it harder to qualify for mortgage loans compared to pre-crisis.

bought near price peaks or had their credit affected are hesitant to jump back into housing ownership.[40] Surveys of Millennials suggest that owning a home has less importance than to the prior generation. Others suggest that this reticence to jump into home ownership will change as the younger generation has children.[41]

Figure 13: Home Ownership Rate by Age



Unemployment after the 2008 recession hit the younger population harder. Unemployment for 20-24 year-olds peaked at 17.2% in April of 2010, 10% higher than the average for people aged 35 or over, and double the typical difference between the two age groups. The span between the 20-24 year-old unemployment and the 35+ year-old unemployment did not come back in line until early 2016. Similarly, the 24-35 year-old unemployment peaked at 10.6% in May 2010, significantly higher than the average for the 35+ group.

Young adults living at home in both the 18 to 24 year and 25 to 34 year groups increased by about 5.0% in the past decade to unprecedented levels since the data began in 1960 and remain at elevated levels through 2016 with more than half of 18-24 year-olds living with parents and about 15% of 25-34 year-olds living with parents. Additionally, household size increased from 2000 to 2010, particularly in very young households (less than 20 years old) and in the 50-59 aged group, reflecting adult children living at home. The good news for housing demand is that household size trends began to

[40] See http://jchs.harvard.edu/sites/jchs.harvard.edu/files/hbtl-06.pdf a Harvard study on housing as a means to build wealth, 2013.

[41] See http://rismedia.com/2016/07/25/home-ownership-still-desirable-for-millennials suggesting Millennials would like to own homes but are hampered by student debt and mobility concerns.

reverse slightly in 2016, particularly for younger households that were again beginning to reduce in size, possibly indicating a reversal of the housing doubling up after the recession. In addition to getting married at an older age, young people are having their first child at an older age. In 2000, the mean age of a woman when she first gave birth was 24.9 years old. In 2014, that age had risen to 26.3[42]. These trends are significant because the median age of first-time homebuyers is 32[43] – indicating pressure on young people to stay as renters longer. In fact, first-time homebuyers typically account for approximately 40% of home sales, although this figure dropped to a low of 32% as of 2015 (but rose to 35% of survey respondents in 2016).

College admissions continued to grow through 2010, and with rising unemployment in the younger population, student debt became an increasing burden. Aside from the tighter credit standards and lower investment appeal of housing, we consider student debt a considerable factor in the home ownership rate over the next several years. As of late 2016 student debt in the U.S., incurred by 44 million borrowers, exceeded 1.3 trillion dollars. Student debt has grown by 500% since 2004. The delinquency rate stood at 11.1% and the average monthly payment was $351.[44] Some 70% of the student debt borrowers owe more than $10,000 dollars. The average is now just over $30,000.[45] Converting a payment of $351 a month into a mortgage at 4.5% with a 30-year term has the impact of borrowing nearly $70,000 less; or conversely, it is like adding a second mortgage to any home purchase decision. With an 80% loan to value mortgage, this means the average affordable home is constrained by $87,000 dollars. Another way to look at this is if we use 28% of income towards a home purchase, this equates to reducing income by $15,000 per year.

The New York Fed has studied the issue of student debt and has provided the following statistic: in 2005 student debt stood at just over 310 billion dollars and the under 30 adult home ownership rate was about 34%. In 2015 the student debt reached $1.2 trillion and the under 30 home ownership rate declined to under 28%.[46] The point is that the propensity and capability of buying is being significantly curtailed by student debt. John Burns Real Estate Consulting estimated the reduction in home buying as a result of student debt to be 103,000 homes per year, a reduction of 7.6%.[47]

Some economists have suggested that students who borrow student debt and graduate will get a positive net present value, but this depends very much on the quality of the selected program. Some students will see substantially increased earning power, such as those attending medical schools or business schools, but many of these 44 million borrowers will be negatively constrained and affected by the debt. This will affect the marginal propensity to buy versus rent. We expect the proportion of college graduates seeking to rent instead of buy for the next several years will be somewhere near 55% as they age and start families, and yet this figure could be high. The U.S. Census figure for home ownership by those aged 35 and below slumped from 34.7% as of December 2016 to 34.3% at the end of March, 2017.

[42] Source: NCHS Data Brief, No. 232, January 2016.

[43] National Association of Realtors, Profile of Homebuyers and Sellers Survey, November 11, 2016.

[44] See https://studentloanhero.com/student-loan-debt-statistics.

[45] See http://ticas.org/posd/map-state-data for state by state data.

[46] See http://financeography.com/millennial-home-ownership-shrinks-as-student-debt-grows.

[47] See "Student Debt's Drag on Home ownership", John Burns, April, 2017.

Household wealth also plays an important part in home ownership rates. Wealth is impacted by a number of factors including job growth, income levels, savings behavior and capital market trends. Home prices are a large contributor to wealth, and in turn support spending behavior and purchases of other goods in rising price environments.[48] Home ownership rates also tend to rise in high inflationary environments in our model.

The last major factor that will lower home ownership rates from 2016 through the next decade are demographics. One parent households, headed by fathers, are nine times as common today as in 1960 and four times as common for single mothers[49]. The model also adjusts for factors such as age (previously discussed) and race/origin[50]. For example, Hispanics represent a growing segment of our population. "According to the American Community Survey, only 45 percent of Hispanic households owned their homes in 2013 compared with 71 percent of White Only households. If one were to hold those rates constant as Hispanics become an increasing percentage of the pool of homebuyers, the home ownership rate would drop."[51] The home ownership rate of Hispanics is rising with each successive generation that integrates into American society, but the impact of a changing population mix and a lower percentage seeking home ownership must be addressed in any realistic model on the home ownership rate. Additionally, household size varies significantly by race.

5. U.S. Rental Housing Demand

Based primarily on the lower appeal of for-sale housing for those households burned by the last housing bubble, the impact of student loans and the changing demographics, we expect a decline in the home ownership rate as shown in Figure 14. In the base case, interest rates are expected to continue to increase at a moderate rate, but higher or faster than expected interest rate increases could cause actual home ownership rates to be lower than those shown below.[52]

Figure 15 shows the total rental stock required to meet rental household demand, and Figure 16 shows the result by year. Note that while Figure 15 reveals a perfect and instant market response to anticipated demand, we do not expect the actual pattern to be so erratic. Rather, the time required to anticipate and get development approvals will require significant planning on the part of developers with no assurances of approvals in a timely manner. The actual number of rental units required, from all sources, averages 586,000 units per year from now until 2030. See Figure 16. In 2015 the U.S. added only 306,000 rental units, the most since 1989. At this rate, we are falling short by an average deficit of over 200,000 rental units.

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[48] See "How do house prices affect consumption? Evidence from micro data" by John Y. Campbella, João F. Coccob, Journal of Monetary Economics, Volume 54, Issue 3, April 2007, Pages 591–621 at https://doi.org/10.1016/j.jmoneco.2005.10.016.

[49] U.S. Census Bureau

[50] Wachter and Megbolugbe (1992) estimated that about 80 percent of the gap between White households and Black and Hispanic households can be explained by differences in endowment (including differences in income, education, age, gender, and family type). See https://www.huduser.gov/portal/periodicals/cityscpe/vol18num1/ch9.pdf.

[51] See http://www.urban.org/urban-wire/why-low-hispanic-home-ownership-rate-matters.

[52] Note that ten-year bond yields increased by over 70 basis points from early in November 2016 to December 2016.

Figure 14: Forecast of U.S. Home Ownership Rate

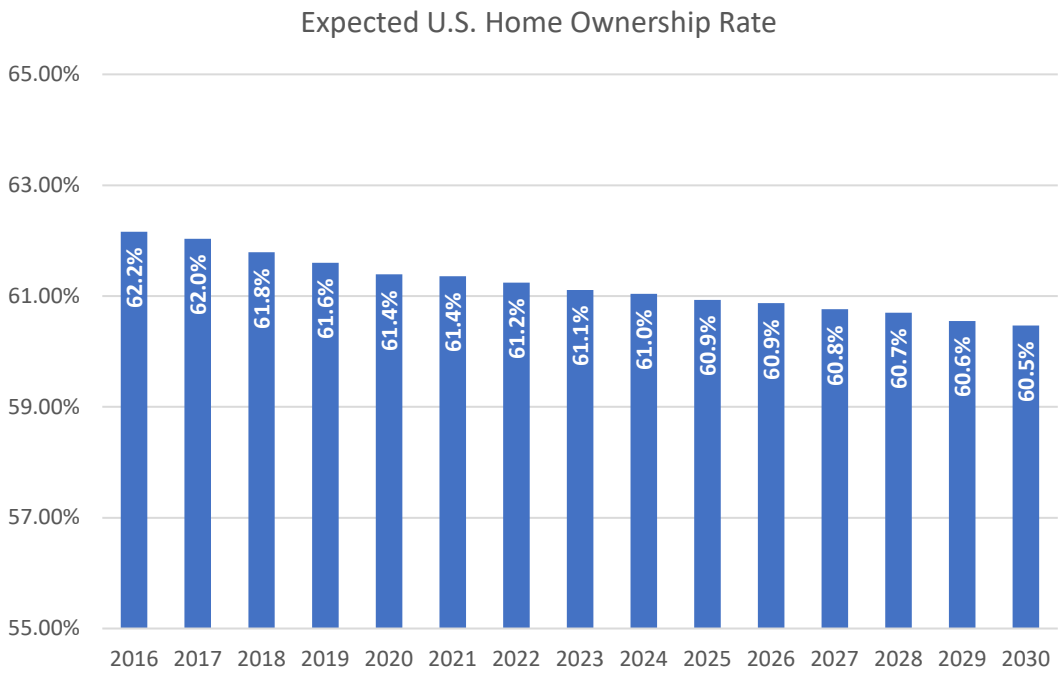


Figure 15: Total Rental Stock Required by Year

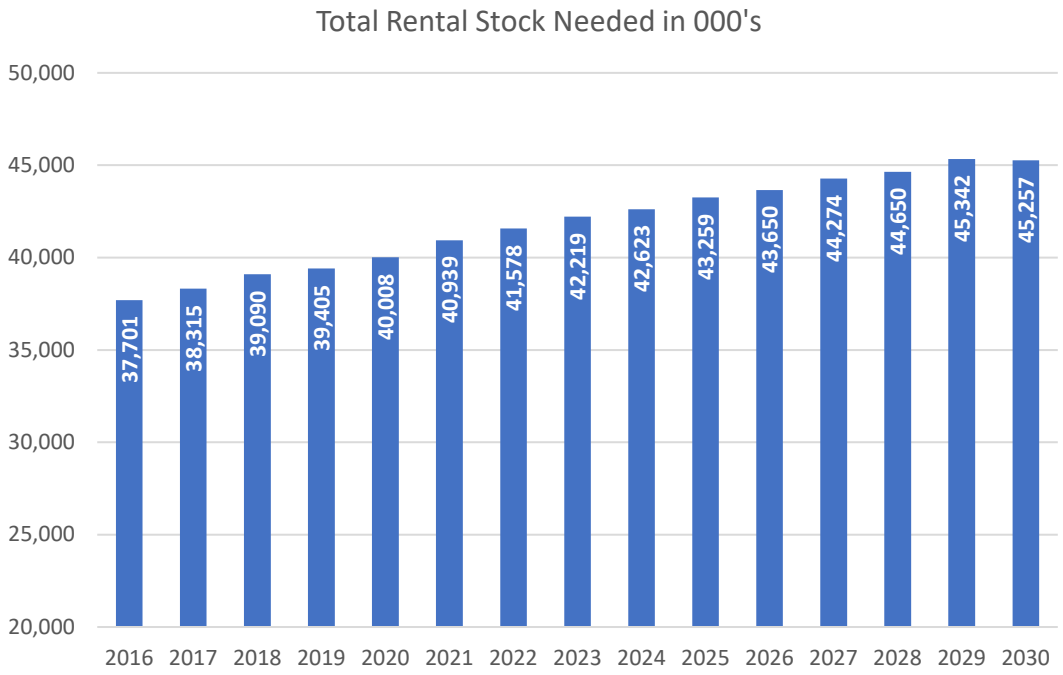
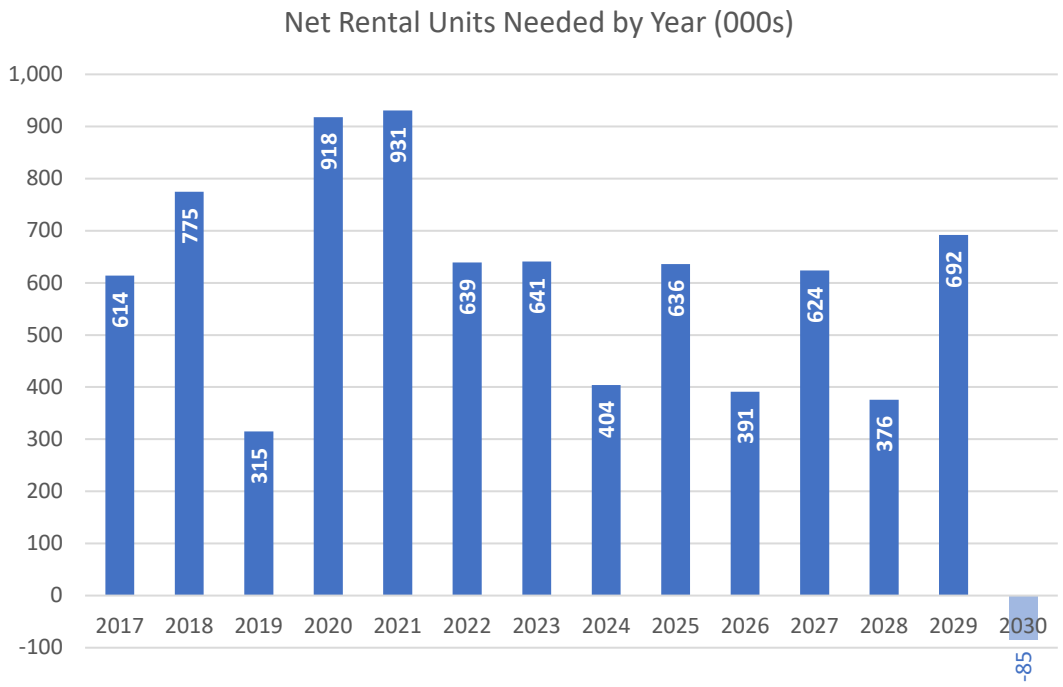


Figure 16: Rental Stock Required Per Year Based on Demand



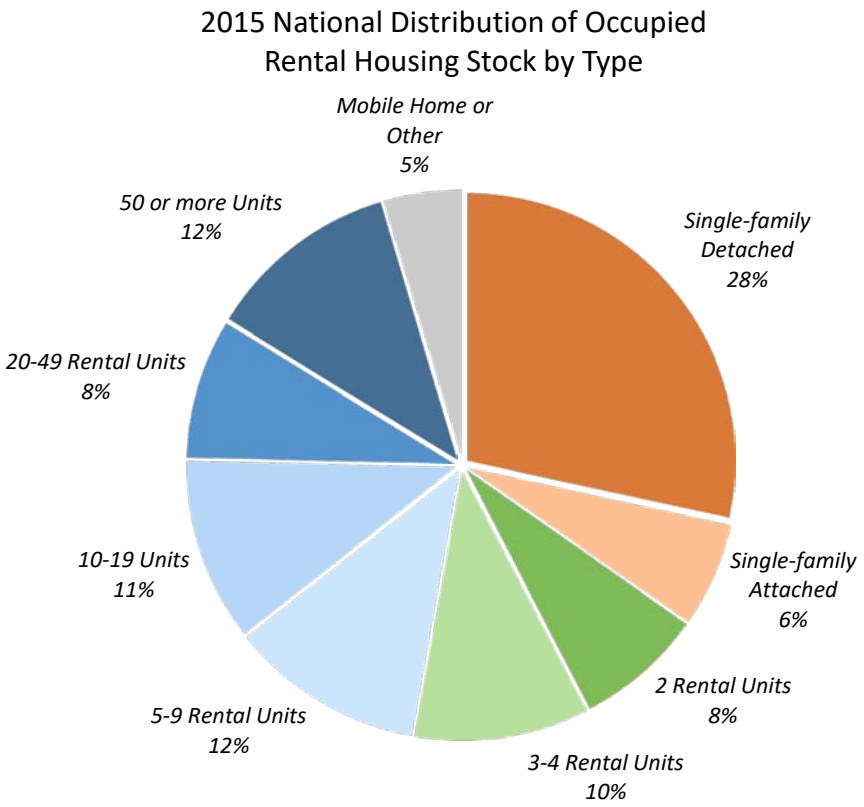
6. Rental Demand for Institutional Investment

We focused next on properties with 5 or more units which are generally of the investment size and quality needed for institutional investors and have provided a large proportion of the needed stock, some 43% or 16.2 million units as of 2016. See Figure 17 below. *The 5+ unit segment of the rental market is the focus of the remainder of the report.*

The 5+ segment was further disaggregated to the state and metropolitan market level for all states and 50 select markets throughout the U.S. by a bottoms-up approach of collecting similar data at the state and metropolitan market level. This data aggregated both Census data and where available, data from private data providers such as CoStar® and CBRE® Econometrics. In some markets, particularly those that are characterized by significant institutional investment, the private data providers had significantly more robust data than the Census surveys. In other markets, the Census data was more robust. Thus, a combination of data sources was used to estimate total stock at the metro market and state level. This data was then summed at the state level to an estimate for the U.S. and was significantly larger than the Census sample, equal to 22.95 million units as of 2016.

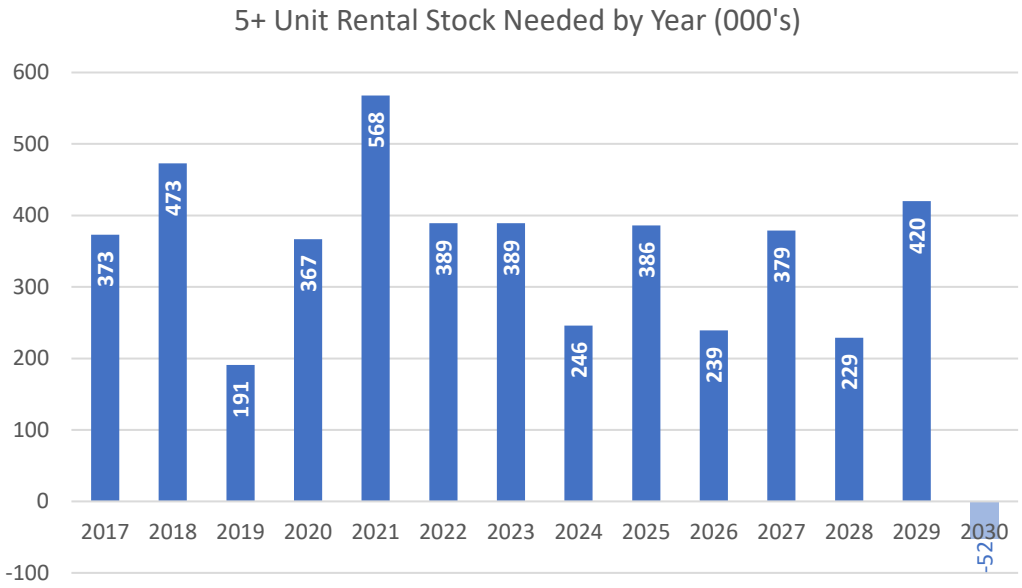
Even with the advent of a new and more permanent single house rental stock, discussed below, we will still need about 328,000 units of rental housing per year provided by larger properties through 2030. Note that as in the base scenario above, the model continues to assume a recession in 2029-2030 that will require no new 5+ rental housing units in 2030. See Figure 18.

Figure 17: Detailed Breakdown of the Rental Housing Stock



Source: U. S. Census Bureau, 2015 American Community Survey 5-year Estimate

Figure 18: Rental Units of 5+ Units Per Year



7. Other Rental Property Types

Single-family Housing and Detached Units as a Source of Rental Supply

After the housing crisis of 2008, many formerly owner occupied units became part of the rental stock. In fact, several investment funds were created to own and operate single-family housing units as part of the rental stock. The term for this trend is the "Institutionalization of Single-Family Rentals (SFR)". Nearly 200,000 single-family homes are now owned as rental units by institutions. A list of the largest is included in Appendix 1, with the largest as of 2016 listed below:

Institution	SFR Units
Blackstone (Invitation Homes)	47,342
American Homes 4 Rent	46,131
Colony Starwood Homes	32,272
Progress Residential	16,345

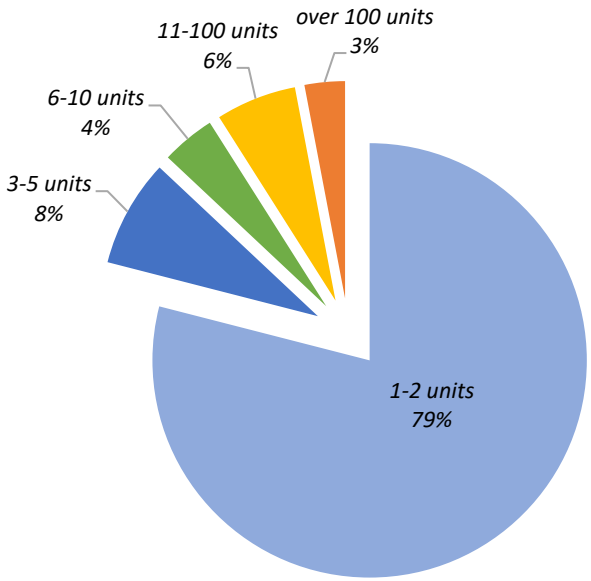
This SFR asset class would not have existed were it not for the low investment basis possible via a wave of distressed real estate sales with potential rents high enough to carry the units using modest leverage. Another key factor in the establishment of SFR as an asset class has been the ability to reach minimum concentration scale thresholds for the efficient management of units. Because of the need for scale, much of this asset class is clustered in markets hit hard by the housing crisis, where rents relative to acquisition cost were attractive.[53]

Despite institutional interest in SFR, the bulk, some 99%, of all rental SFR units are owned by individuals and private partnerships. In total, some 17 million single-family rentals compete today with the 2 to 4 unit and 5 or more unit rentals.

As a percentage of the total rental stock, SFR units surged from 2010 through 2014 and now represent about a third of all rental stock. The result has been a surge in the distribution of small scale landlords as shown in Figure 19 below:

[53] The largest concentrations of SFR units are in Dallas, Denver, San Antonio, Orlando, Nashville, Tampa, Atlanta, Charlotte, Phoenix, Miami, Riverside, Salt Lake City, Las Vegas, Indianapolis, Jacksonville, Cincinnati, Raleigh-Durham, Columbus (OH), and Chicago. See http://roofstock.com.

Figure 19: Small Scale Ownership of Rental Units



While market share of small scale ownership has increased significantly, we have every reason to expect it to decline as market forces prompt a conversion back to the single-family owner occupant in select markets. [54]

We expect that SFR will continue to be a viable rental stock alternative, especially for families choosing to rent and requiring a larger number of bedrooms, something lacking in the typical larger property multifamily stock. Over time, more 3 and 4 bedroom choices could be added to meet this demand, and new units will be added to the inventory. At the same time, some of the existing SFR units will be converted back to owner occupied housing as prices for the owner market rise relative to the rental market and landlords decide to cash out. Additionally, more rental demand is coming from smaller households. For this reason, we do not expect the SFR units to increase as a percentage of the rental stock and in fact, are more likely to decrease over the long run, until the next wave of distressed sales.

[54] See Attom Realty's report called LANDLORD LAND: A real estate dance party is being led by a new breed of rental property investors, March, 2017. http://www.attomdata.com/landlord-land/#.

Scenarios Analysis

At the national level, sensitivity analysis is probably less important in that it is easy to imagine a scenario where some parts of the country are growing more than expected while others are growing less than expected. In such a case, we might conclude that no change in the projected demand for new housing units is needed at the national level if the more positive growth areas exactly balance the less positive (or negative) growth areas. Nevertheless, we have laid out a few national level scenarios that might impact the aggregate rental demand.

Lower Rentership Scenario: Here we assume that home ownership rates increase by nearly 170 bp by 2030, but remain about 400 bp lower than the previous peak, assuming that the subprime market was a contributor to home ownership rates reaching levels near 2004-05 that are in excess of long-term stabilized levels. See the below table for home ownership rates used in the various scenarios. We also assume a long-term slow-down in net immigration with more restrictive immigration policies keeping immigration to just over half the base case scenario. Household growth is slower, resulting in 1.7% fewer households by 2030 than in the base case.

Higher Rentership Scenario: Here we maintain immigration at current rates in the near-term, rising to 1.6 million people per year by 2023 (29% higher than the base case), while we allow home ownership rates to continue to decline based on higher immigration rates, the aging population and continued delay in family formations by younger persons. The resulting total and annual rental unit demand is show in the following graphs.

In the downside rental demand scenario, we require 153,000 units of new rental housing per year on average from here through 2029. If we include 2030 we require only 139,000 units on average per year, with a projected deep recession hitting around 2030. In the upside scenario, we require 525,000 rental units on average per year through 2029 and 517,000 on average through 2030. Of course, during recessions units will not be withdrawn from the market, so the averages through 2029 are relevant figures.

Home ownership Rates Used in Scenario Analyses

Year	Base	Low Rentals	High Rentals
2016	62.2%	62.2%	62.2%
2017	62.0%	62.2%	61.8%
2018	61.8%	62.2%	61.4%
2019	61.6%	62.4%	61.2%
2020	61.4%	62.8%	61.1%
2021	61.4%	63.2%	60.8%
2022	61.2%	63.4%	60.6%
2023	61.1%	63.5%	60.4%
2024	61.0%	63.5%	60.3%
2025	60.9%	63.5%	60.2%
2026	60.9%	63.5%	59.9%
2027	60.8%	63.6%	59.8%
2028	60.7%	63.6%	59.6%
2029	60.6%	63.7%	59.5%
2030	60.5%	63.8%	59.2%

Figure 20: Total Multifamily Rental Stock Required by Year in Scenarios

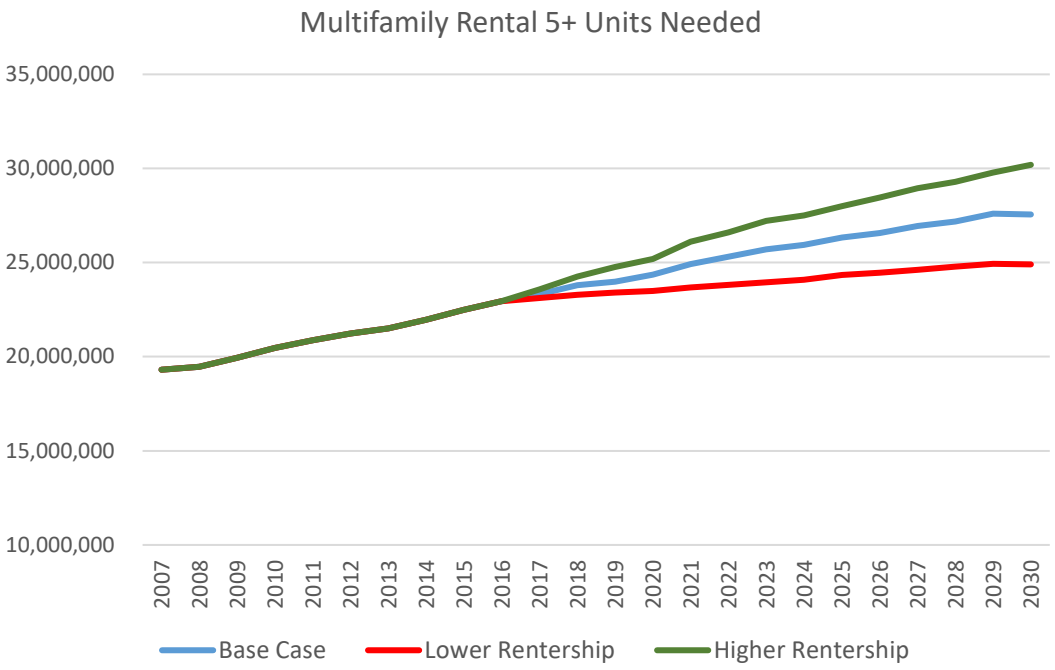
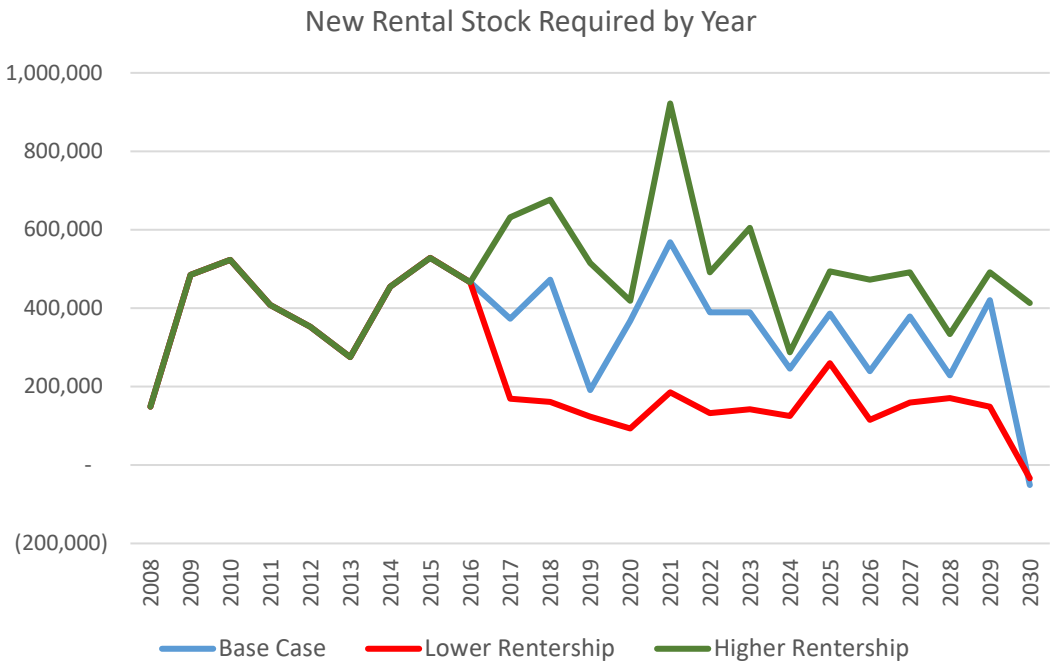


Figure 21: Annual New Rental Stock Required by Year in Scenarios



National Trends Worth Watching

While the total units of housing required overall will not deviate with a number of other market trends, we feel it worth mentioning some observations influencing the types of units which will be demanded in the next decade or two. These include an upscale shift in rental households, changes in unit sizes, the impact of an aging population, the impact of demographics, better data sources, the impact of an increasingly privatized student housing market, the conversion of affordable units and uncertain future subsidies to housing, and the impact of short term rentals and reactionary regulations at the building level to neighbors to cities. Each will be discussed in turn.

1. Upscale Shift in Rental Households

The housing downturn and recent surge in multifamily development have revealed a shift in rental households toward upscale tastes, greater buying power and corresponding demand for new rental product. National field studies using market segmentation modeling[55] have seen this rising share of renters to be 30%-45% of all rental households in most metro market sectors, a much greater share in the high-demand metros of San Francisco, Los Angeles and New York. Upscale renters will devote more gross monthly income to rent, expect a wider array of unit choice and amenities, and have found a 12-, even 24-month lease aligned with their mobility and career horizon.

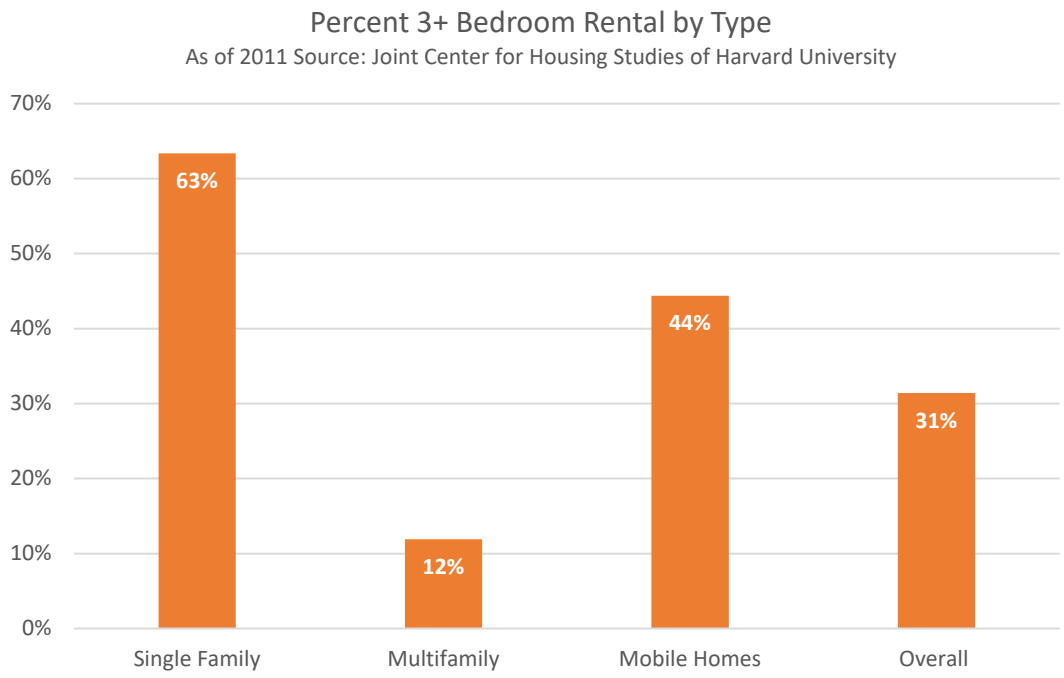
2. Unit Types: Expansion at both ends of the size spectrum

Family units: The housing crisis of 2008-2010 drove many foreclosed home owners to rental stock. This created a surge in demand for 3 and 4 bedroom units. Some households went into single-family units, as discussed above. Others went into larger rentals within traditional apartment complexes. See Figure 22 below. Here we can see that the proportion of 3+ bedroom units runs about 12% for multifamily properties and 63% for single-family units including detached and attached, creating a better fit for those moving from owned single-family housing, and thus fueling the surge in newly institutionalized single-family rental market after the 2008 downturn. The mobile home proportion of 3+ bedrooms is 44%. The vacancy rate on these 3+ bedroom units is lower than average and the turnover is much lower, suggesting such units add stability to rental streams, although household size for renters is generally smaller and thus a balance of unit size that reflects local demographics must be in place at each property.[56]

[55] For example, Tapestry Segmentation by ESRI®.

[56] Daryl Carter, founder and CEO of Avanath Capital Management suggested that family sized rental units were not a well-served market, yet they typically had half the turnover rates and lower vacancy rates than any other sized units. See http://www.avanath.com/about_management-team_daryl.php and Institutional Real Estate Investor interview where he suggested these units do not need amenities as much as space.

Figure 22: Proportion of Rental Housing with 3+ Bedrooms by Type[57]



Micro-housing units: At the other end of the spectrum, what some households in the older housing of Russia or China would consider typical sized units, we call micro-units. We define micro-units as units which are typically 650 square feet or less, although in New York City a micro-unit might be 250 square feet and in Dallas it will be 500 square feet.[58] The reason for increased demand of micro-units is twofold. First, to keep costs down to affordable levels in high cost markets, the units must be very small. Second, location tends to dominate the criteria for apartment selection and not size. Combine the two criteria and we see a large demand for urban well located micro-units. It is unlikely that too much of this type of housing can be supplied in that it is an affordable choice for typically single occupied households who want to live close to work and social amenities. The development of micro-units has been particularly strong in several markets where they have also been permitted.[59]

Unlike SRO, single room occupant housing where bathrooms and kitchens and common areas are generally shared, micro-units typically include modest kitchens and private bathrooms.[60] Some cities have minimum size requirements. For example, the District of Columbia requires units of at least 220 square feet. Seattle and Portland have no minimum sizes and are more likely to see a variety of

[57] See: http://www.jchs.harvard.edu/americas-rental-housing.

[58] See the ULI report at http://uli.org/wp-content/uploads/ULI-Documents/MicroUnit_full_rev_2015.pdf.

[59] See http://www.curbed.com/maps/microhousing-micro-dwelling-small-space-living-apartment.

[60] See https://www.hudexchange.info/resources/documents/Understanding-SRO.pdf. Many micro-units under 350 square feet feature built-in storage units and flexible furniture systems (e.g., Murphy beds, hideaway kitchen modules, convertible tables, and so on) to make these smaller spaces work. To put the size of a micro unit into perspective, a 300-square-foot micro-unit studio apartment is slightly larger than a one-car garage but considerably smaller than a two-car garage.

combinations of SROs and micro-units with various common amenities.[61] We expect to see substantial excess demand for micro-units that provide affordable housing without subsidies. The limits on this form of housing will likely be regulations and neighbors against smaller unit housing, claiming that it will drive up traffic congestion and parking problems.[62] Should autonomous cars become prevalent they may negate the arguments about parking and reduce urban apartment construction costs by placing dedicated parking structures in less desirable areas. For example, close to noisy rail yards, airports and generally on the boundaries of urban areas. Parking requirements for most multifamily developments are a significant cost factor adding to the required rents and making units less affordable.[63]

3. Aging Households: propensity to own tails off when and if we live long enough

In the United States, tax laws have been favorable to ownership for those in higher tax brackets, as property taxes and mortgage interest are deductible expenses and capital gains are generally excluded from taxation.[64] These laws tend to add significant momentum to the ownership or rental decision. That is, once a household buys a home, they tend to remain as owners for most of the balance of their lives.[65] Ownership tends to start to drop off around age 75. See Figure 23 below. For those above 80 years in age the drop off accelerates. This suggests that as Baby Boomers reach 75 years of age and beyond around the year 2025 we should expect some potential drop off in the home ownership rates, assuming our tax laws remain status quo. A lowering of capital gains tax rates could lower the propensity to continue to own after initial purchase, just as price declines pushed many households away from home ownership, now wary of counting on future home appreciation as a reason to buy.

[61] ULI report http://uli.org/wp-content/uploads/ULI-Documents/MicroUnit_full_rev_2015.pdf.

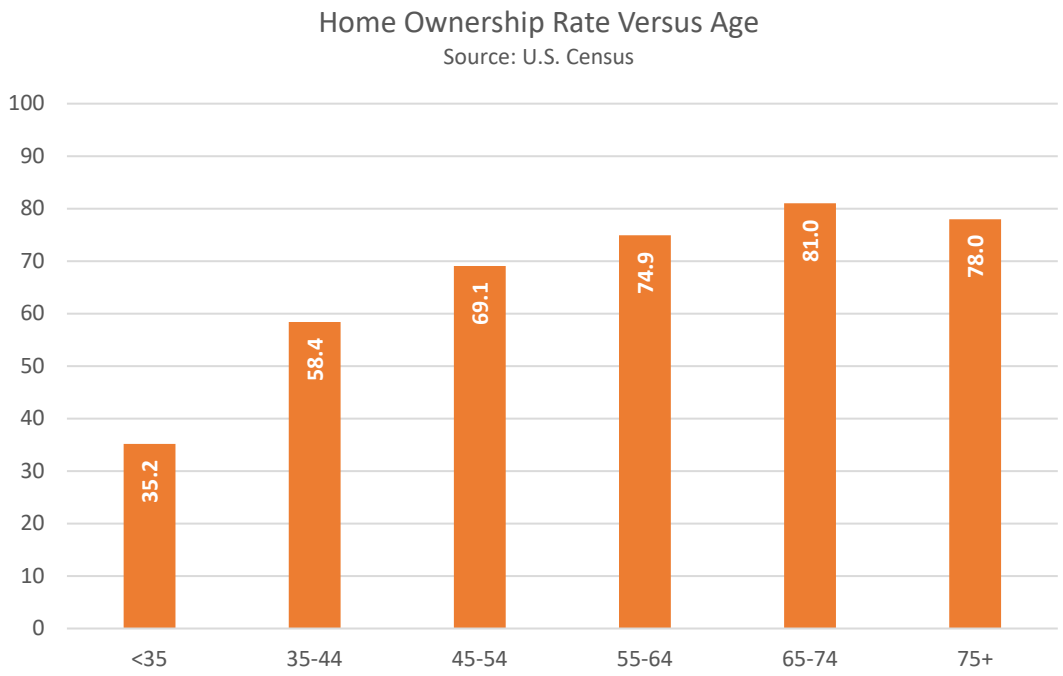
[62] These claims are fairly universal in fights against any new development.

[63] See http://www.vtpi.org/park-hou.pdf. "Parking Requirement Impacts on Housing Affordability" August 24, 2016. Todd Litman, Victoria Transport Policy Institute. The abstract of this research is as follows: Most zoning codes and development practices require generous parking supply, forcing people who purchase or rent housing to pay for parking regardless of their demands. Generous parking requirements reduce housing affordability and impose various economic and environmental costs. Based on typical affordable housing development costs, one parking space per unit increases costs approximately 12.5%, and two parking spaces can increase costs by up to 25%. Since parking costs increase as a percentage of rent for lower priced housing, and low income households tend to own fewer vehicles, minimum parking requirements are regressive.

[64] This is $250,000 for an individual and $500,000 for a couple as of 2016 as long as a new home is purchased within the required time period. See https://www.irs.gov/taxtopics/tc701.html. For those over 55 years in age, there is also a once in a lifetime exclusion of $125,000 single or $250,000 jointly on home gains.

[65] See U.S. Census reports on housing at http://www.census.gov/housing/hvs/files/currenthvspress.pdf.

Figure 23: Age Versus Home Ownership



4. Demographic Trends

Aside from the aging trend mentioned above, the changing mix of major ethnic groups will affect both household size and the propensity to own. Most relevant here and factored into our analysis are the increasing proportion of Hispanic households.[66] In 2015 the Hispanic home ownership rate was 45.6% much lower than for whites, but still an increase from prior years. Over half of all new homeowners were Hispanic in 2012, and most analysts expect the home ownership rate for Hispanics to continue to rise. Still the propensity to own remains lower than for non-Hispanics and this may reduce the overall home ownership rate and thereby increase the demand for rental housing. In particular, the single housing rental units and larger apartment units will observe the most demand pressures from this demographic trend. With lower than average income, rental unit affordability stress suggests that low amenity larger units will be in very high demand for some time.

5. Better Data Sources

Base Census data and estimates do not track rising renter circulation well, especially the previous upscale renters concentrated in revitalized urban cores. Alternative housing surveys such as the Social Compact Initiative have demonstrated over 12% urban household undercounts in even the more sedate Midwestern markets[67]. Developer-provided rent rolls of new scaled developments consistently reflect more tenant buying power and younger professionals in growth employment

[66] See http://www.housingwire.com/articles/36524-hispanic-home-ownership-on-the-rise.

[67] Social Compact Initiative Cincinnati Neighborhood Market DrillDown June 2007. See https://www.uc.edu/cdc/urban_database/citywide_regional/cinti_drilldown_report.pdf.

sectors. On the supply side, several private data sources collect and categorize multifamily housing stock with greater depth, often including rentals from duplex, condominium and detached housing. Along with base Census data, two such sources were referenced for the HAS estimates throughout this review.[68]

6. Student Housing: Increasingly Privatized

Student housing supply tends to be measured in beds, not units. This market has become increasingly privatized with universities providing less and less dormitory units. According to Axiometrics, nearly 220,000 beds were delivered in the four-year span of 2013-2016.[69] Student housing units in the private market will have more amenities, especially fast Wi-Fi and common study rooms and social areas, and will not be that different from some of the larger apartment complexes located adjacent to campuses. Affinity for such private sector housing varies by campus. Florida and Texas universities are among the most dependent on such housing.[70]

7. Housing Affordability

Employment growth is increasingly occurring in large urban centers. For example, more than 14% of jobs that were created in 2009 to 2016 were created in three metropolitan areas: New York, Los Angeles and San Francisco. With this has come significant housing affordability issues. Going forward, job growth is expected to continue in urban centers. Historically, rent control programs have proved to be ineffective in creating affordable housing for the overall market and in fact in some instances have done just the opposite.[71] Thus, creating housing will be of utmost importance in growing markets.

8. Affordable Units Converting to Market

Section 8 rental subsidies and low income tax credit housing programs have provided nearly 1.4 million units of U.S. rental housing. This is a significant percentage of the rental stock and there is a great deal of speculation that affordable low income tax credit housing units will be converted to the private sector over the next several years. Per rental agreements with 15 year minimums and some 30 year restrictions on such conversions to private market rents, we will observe significant units eligible to convert to the private market. The first wave of such units will hit around 2022 although most industry analysts suggest that these properties will need substantial capital improvements to be able to compete with other private sector market properties.[72] What is more likely over the next Presidential term in

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[68] CoStar® and CBRE Econometrics®, with permission.

[69] See http://pinecrestus.com/wp-content/uploads/2016/07/Q1-2016-Student-Housing-Market-Update-for-website.pdf.

[70] See http://www.fanniemae.com/resources/file/research/emma/pdf/MF_Market_Commentary_062315.pdf.

[71] Rent control encourages wasteful use of space. It discriminates in favor of those who already occupy houses or apartments in a particular city or region at the expense of those who find themselves on the outside. Permitting rents to rise to the market level allows all tenants or would-be tenants equal opportunity to bid for space. See Miller and Geltner, Real Estate Principles for the New Economy, 2005.

[72] See https://www.huduser.gov/publications/pdf/what_happens_lihtc_v2.pdf and https://www.huduser.gov/portal/periodicals/em/summer13/highlight1.html.

2017-2020 is a cut back on public housing subsidies putting more pressure on communities to approve affordable market rate housing. The only way to do this is to approve more units with greater densities.[73]

9. Short Term Rentals

The advent of the shared economy brought with it firms like AIRBnB, VRBO and Homeaway.com that matched home owners with empty rooms or houses or condos. As a percentage of the hotel industry the AIRBnB room count provides up to 20% of the short-term rentals in expensive markets like New York City and 12.5% in San Francisco but only 3.4% overall.[74] In many communities a backlash against short term rentals of less than 30 days suggests that these types of operators are more likely to affect the hotel industry and not likely to have a significant impact on the longer-term rental housing market.

[73] The challenge remains one of overcoming NIMBY's that suggest traffic and parking will hurt their neighborhood, yet pushing housing further away simply adds to traffic congestion and air pollution. In California, some legislators have proposed a carbon tax on communities unwilling to approve more affordable private sector housing in their backyards. At the Federal level, see I-732's proposal at https://www.wired.com/2016/11/washington-state-pass-nations-first-carbon-tax.

[74] See https://skift.com/2016/02/03/measuring-airbnbs-real-threat-to-u-s-hotels-using-industry-metrics.

Conclusions on U.S. Rental Housing Demand

There are a few very sensitive assumptions in our models that will affect future demand for housing of all types in the U.S. Among these are 1) the net immigration rate and future government policies that may affect an important source of long term household growth in the U.S., and 2) the longevity of the rental housing stock. Given the relatively young age of the U.S. housing stock, just around 40 years in age as of 2017, it is difficult to suggest that atrophy and replacement of existing units will be a major demand driver in the next few years. But, even at 0.5% of the stock per year, we are talking about 720,000 units per year on average through 2030 for all housing types. Changing this to 1.0% for a 100-year economic life doubles the 720,000 to 1.4 million per year. Eventually capital improvements will be required at much higher levels than today or else greater production will be required.

Annual household formations in the U.S. will require net new housing increases of about 1.3 million units per year for the next 14 years. The figures would be higher were it not for two expected recessions where households will double and triple up, estimated first in late 2019 and 2020 and then again in 2029-2030. Of the net new housing demand, some 40% or so are expected to be renters despite the momentum of senior citizen owners to keep a home until reaching ages of 75+. In fact, the surge in much older citizens starting in 2025 will contribute to a slight reduction in household size and the home ownership rate. Housing starts are running close to the net new demand, as of late 2016, but there is a mismatch in that units added by price type and supply may not geographically match up with where it is most needed. That is, there is no national and fungible housing market. There are only local markets and segmented markets by size and price points. Thus, some markets will fall well short of housing demand, even though top line average vacancy rates may waver, often reflecting trends in new supply which tends to be oriented towards the highest price points in the market.

The propensity to choose renting over buying could dramatically affect the rental demand suggested here. Our numbers are conservatively low on the dimension of choosing renting. To the extent that owned housing is considered a life style choice with less freedom and mobility, significant investment risks and often provided in a size larger than desired or in distant locations from the urban core, rental demand could be even higher than our base case shown here.

Single-family rentals have helped to satisfy some of the rental unit demand but we do not expect that market share to continue to increase. Based on 43% of the total rental demand being satisfied with traditional 5+ multifamily units, we will need an average of 328,000 units per year from now through 2030 and cumulatively 4.6 million units of 5+ unit housing. New supply will also need to match requirements for all income levels, not just the top tier of the market. Anything short of this will simply drive up rents faster, far exceeding expected household income growth and requiring more doubling up and house sharing.

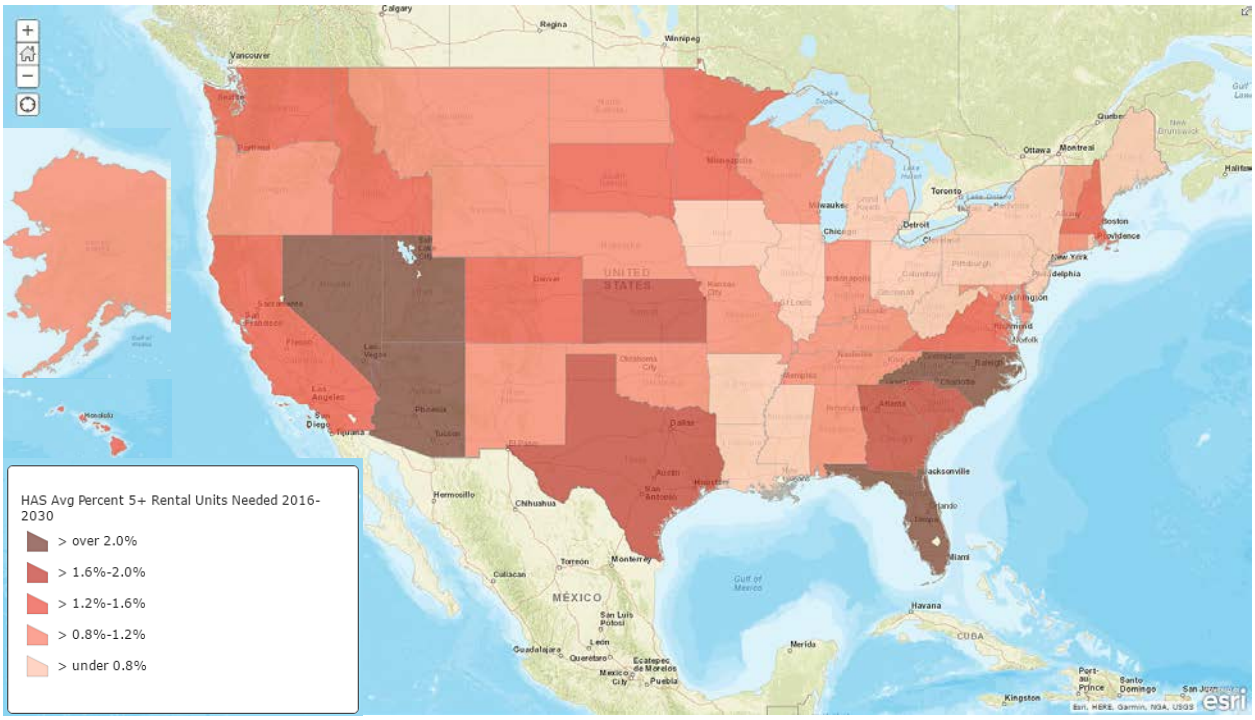
State Key Issues:

- More than 100,000 new rental units will be needed by 2030 in states such as California, Georgia, Arizona, Florida, North Carolina, New York, Texas and Washington.
- Less than 35% of the rental stock was built after 1980 in much of the Northeast indicating significant need for rehabilitation of existing stock. These markets have also tended to be less volatile over the past 20 years.
- The Western U.S., as well as Texas, Florida and North Carolina are expected to have the greatest need for new rental housing through 2030, although all states will need more housing. The fastest economic and household growth will continue in low-cost, business friendly states, primarily in the southeast and mountain west.
- The 65+ age cohort will account for a large part of population growth going forward across all states, especially Florida, Maine, W. Virginia, Vermont, Pennsylvania, Montana, Delaware and Hawaii. Longer term, Arizona and Nevada will also add more senior citizens than average.
- International immigration is assumed to account for 51% of all new U.S. population growth over the period through 2030, declining over the 2017-2020 period and then accelerating again. Most affected by policy changes and international fears that the welcome mat might be curtailed in the future are slow-growth states in the Northeast where natural population increases are the slowest.
- Renters are becoming increasingly diverse with larger families becoming a more permanent part of the rental demand. Hispanics account for more than 30% of renters in 11 states and their lower propensity to own has helped drive down the expected home ownership rate.
- The propensity to rent is and has always been higher in high-growth and high cost states where housing affordability constrains ownership demand, e.g. California exemplifies this trend.
- Generally, the home ownership rate increases with age but this trend reverses for those living long enough. The national forecast assumes slower household growth going forward because of the aging population, although this trend varies by state.
- Renters over 35 years old are a significant component of rental demand, particularly in the Northeast where renters aged 55+ account for more than 30% of rental households.
- In fact, the 55+ age cohort of renters is greater than the 15-34 year-old segment in Connecticut, Maine, Massachusetts, New Jersey, New York, Pennsylvania and Rhode Island.
- The institutional segment (5+ units) of the apartment market is a larger part of the market in higher income states and less affordable housing states.
- Affordability issues are exacerbated by high land costs which is the result of natural supply limits or severe political restrictions. Rents as a percent of income are over 44% in California, New Jersey and New York where housing supplies are limited.
- Affordable housing is needed in both high cost states as well as in lower income states. Renters with household income below the poverty level account for more than 24% of renters in parts of the Midwest and South. 31% of all renters earn less than $20,000. This figure increases to over 30% in parts of the South and Midwest. Florida and Louisiana have lower housing costs but severe income constraints affecting affordability.

State Trends

Similar methodology was applied at the state level to estimate rental demand through 2030 for each of the 50 states. See Appendix 3 for rankings and Appendix 5 for methodology. Not surprisingly, as shown in the map below, the fastest growth through 2030 is expected in many of the southern and mountain west states, including Florida, North Carolina, Arizona, Nevada and Colorado, followed by Texas, Georgia, South Carolina and Kansas.

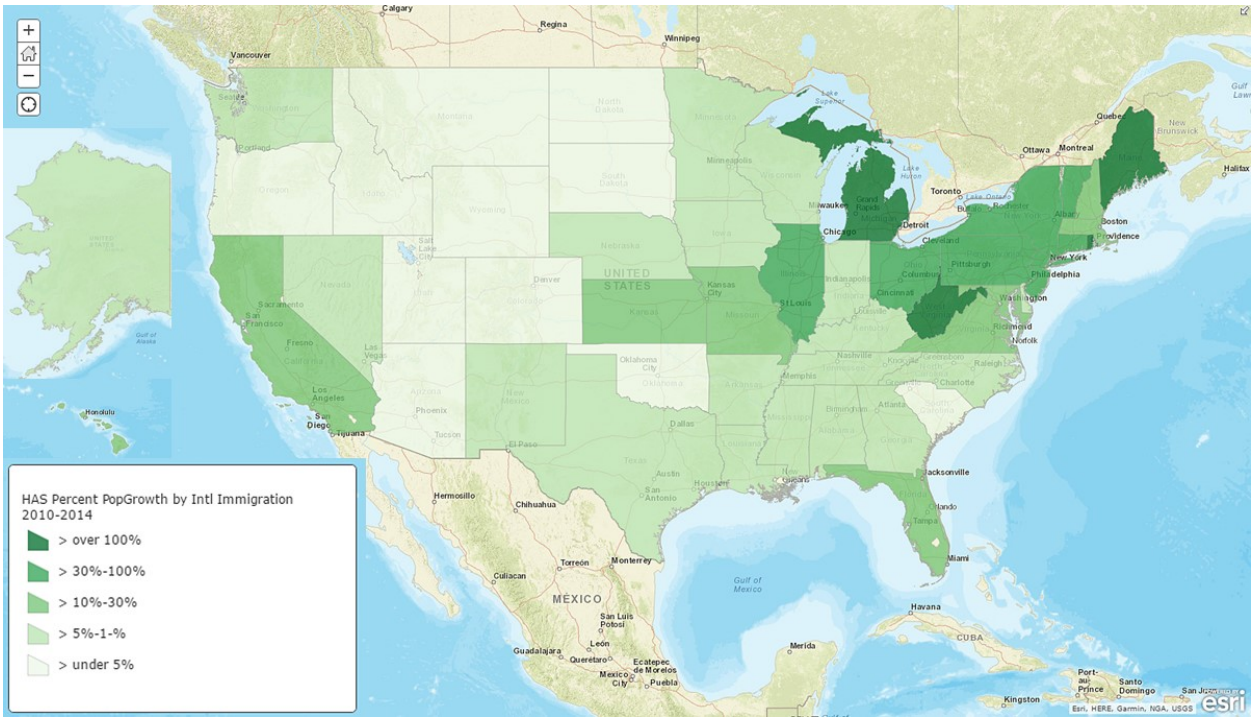
Forecast Growth Per Year in Multifamily 5+ Units.



Some of the more interesting trends appear when looking at the underlying details. One of the policy risks identified in the model is the amount of international immigration that will occur during the next decade. As discussed earlier in this report, due to the aging U.S. population base, immigration is expected to exceed natural population growth within the next ten years. These trends will be more amplified within some states and metro areas. While border states have proximity to other countries, many of those states also have low business and housing costs, as well as young and growing population bases. Thus, states most at risk to U.S. immigration policies are those states that have slow growth, older population bases, and exposure to international trade and immigration (see below map). These states are predominately located in the Northeast as well as parts of the Midwest, with less exposure in border states such as California and Florida. Our expectation is that there are wider margins of error in the forecasts for these states because of the potential volatility in U.S. immigration policies going forward. See the Metro Market Overview section of this report for further information about demographics, in-migration and growth in the major markets in these states.

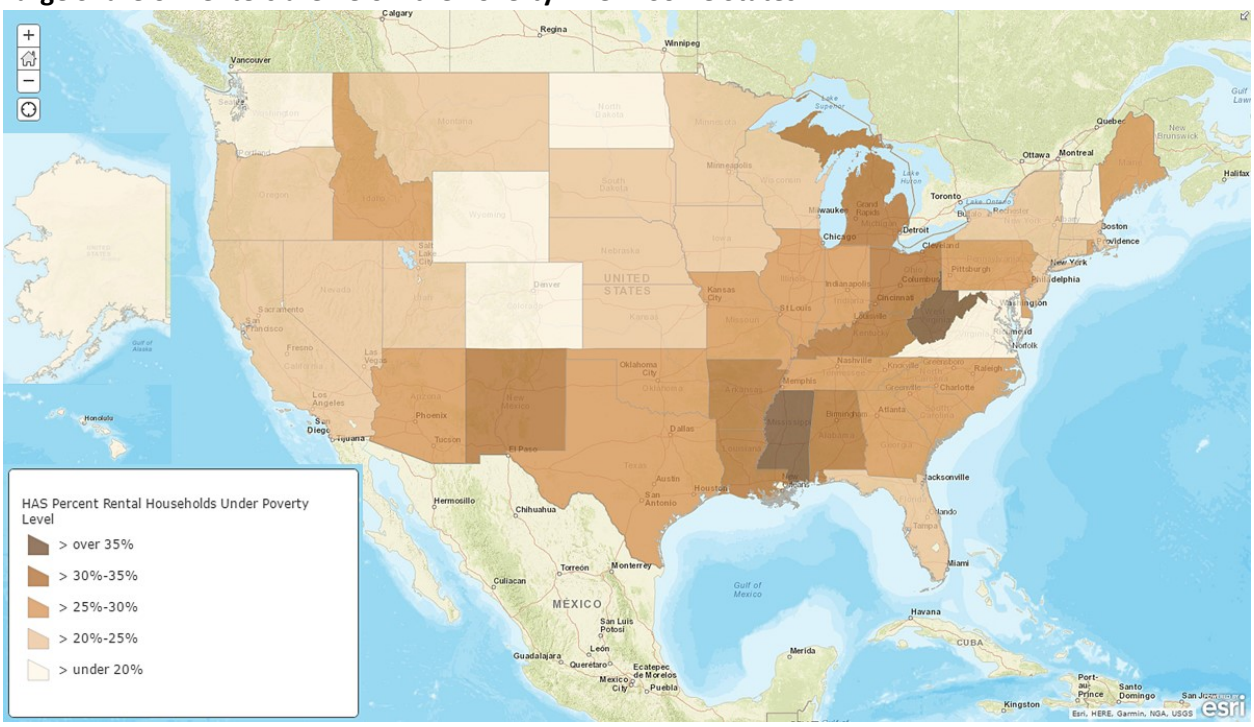
Interestingly, the major markets do not always exemplify the state trends. For example, while international immigration accounts for a large part of population growth in Michigan, Detroit benefits mostly from natural growth (births minus deaths) and experiences net out-migration including international and domestic migration to other locations.

Percent of Population Growth Created by International Immigration slow growth states.



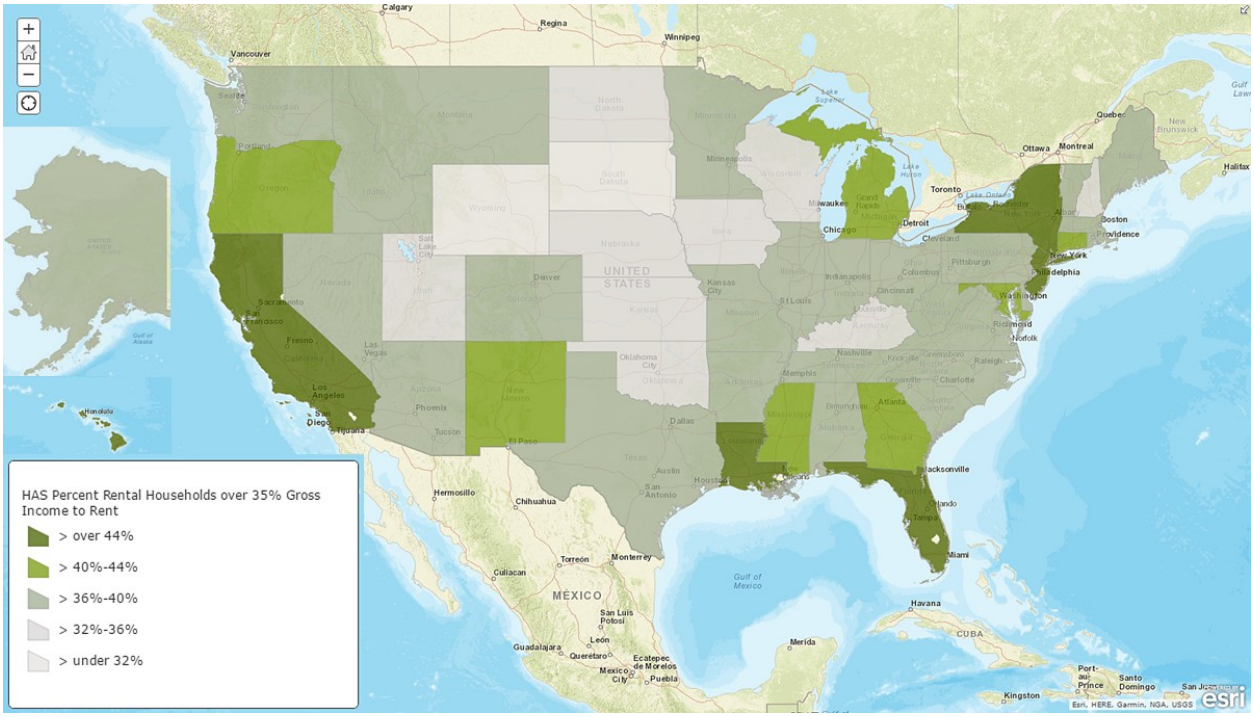
Rental affordability is also a significant issue in the U.S. Affordability can be affected either because of low incomes or because of high housing costs. Exposure to these factors varies significantly by state. For example, 31% of U.S. renters earn less than $20,000 per year. As seen in the map below, renters below the poverty level account for more than 35% of renters in states such as Mississippi and West Virginia, signaling a significant need for affordable housing in these markets.

Large Share of Renters are Below the Poverty Line in Some States.



In other areas, renters have significant incomes, but the high cost of housing creates affordability problems. In markets such as California, Hawaii, New York and New Jersey, more than 44% of renters are spending over 35% of their gross income on rent due to high housing costs. States such as Florida and Louisiana face a similar mismatch in incomes to rental costs, even though they have lower housing costs. We explore this topic in more detail in the Metro Market Overview appendix of this report. At the metro area level, many of these markets have either geographical and/or political restrictions on new supply that can cause housing costs to soar.

Renters in some areas spend a significant share of income on rent.

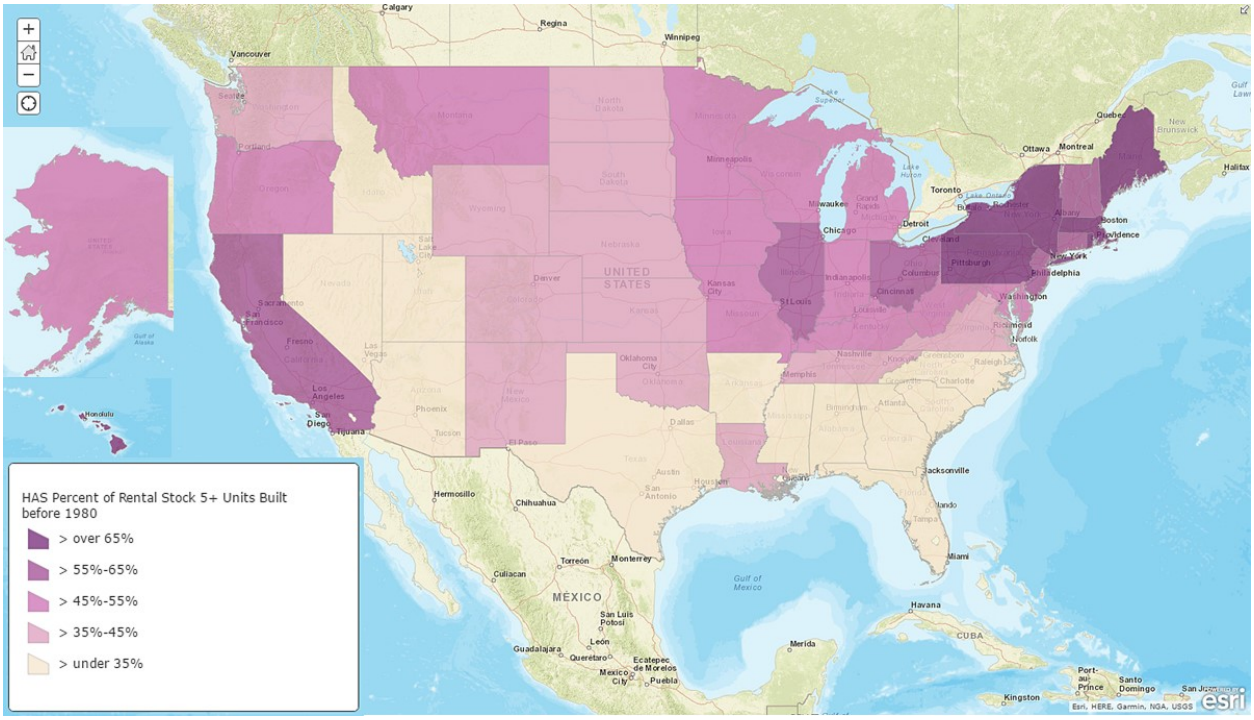


For example, a Redfin study found that only 17% of California homes for sale were affordable to an average teacher in 2016, down from 30% in 2012. Affordability is worse in major metro areas. With average incomes of just over $71,000 in the San Francisco Bay Area, teachers can afford rents that are 48% of average rents in San Francisco and about 67% of average rents in the East Bay.

Percent Teacher Salary Needed for Average Rent	
San Francisco	48%
Alameda	67%
Contra Costa	69%

For investors looking to rehabilitate and improve older properties, the proportion of buildings built before 1980 varies significantly by geographic area. As shown in the map below, in the northern states and California, more than 65% of the multifamily housing stock in properties with five or more units was built before 1980. In contrast, less than 35% of the southern markets are in older buildings. While it is unknown how many of these properties have already been improved or renovated, they create a significant market size. In total, 11.7 million units were built before 1980 in the U.S. These units may also serve mid to lower income households which are a significant proportion of the population base.

Renovation Opportunities? Markets with a High Proportion of Older Stock



Second Tier Affordable Rentals (STAR)

Another product type is of significant size and generally left out of the institutional rental market, although they are a critical and ongoing multifamily supply component. We call these units Second Tier Affordable Rentals or STAR units. STAR units are characterized as older and lower quality units. Using CoStar® ratings of 1 to 5 for sites of five units or more, STAR units are those with lower CoStar® ratings of 1 to 2. Costar® ratings are based on a number of criteria including building structure and systems, amenities, site and landscaping, and certifications such as LEED and Green Globes. Properties rated 2 have functional architectural design and systems, below average finishes and one to no additional amenities. They have minimal to no landscaping and exterior spaces, and are unlikely to hold green or energy efficient certifications. Properties rated 1 may require significant renovation and are possibly functionally obsolete. STAR facilities are likely to serve lower income populations which are a significant part of the population base in some metro areas, and may represent, in some areas, potential investment targets for upgrading to higher quality properties. States such as California, New York, Michigan and Ohio have a high proportion of STAR units. At the metro market level, the percent of multifamily rental properties with 5+ units characterized as STAR units for metro markets in this study ranges from 61% (Los Angeles) to 17% (Austin) with a metro market average of 36%.

Metro Market Key Issues:

- New York and Dallas are each expected to need more than 250,000 new apartment units in dwellings that have five or more units over the next fourteen years, growth that is equivalent in size to more than the entire population of over half the metropolitan statistical areas in the U.S.
- Raleigh, Orlando, Austin, and Charlotte are expected to be the fastest growing apartment markets through 2030, increasing in size by more than 2.5% per year on average.
- In addition to new units driven by net new demand, a sizeable portion of the needed rental housing will be driven by the aging of the structures. More than 65% of the 5+ unit rental stock was built before 1980 in New York, Cleveland, Honolulu, Pittsburgh, Chicago, Boston, Los Angeles and San Francisco.
- Second Tier Affordable Rentals (STAR) are also a significant part of the rental market. These lower quality properties generally fly below institutional radars, but represent more than half the 5+ unit rental market in San Diego, Pittsburgh, Detroit and Los Angeles. Some analysts call this NOAH for Naturally Occurring Affordable Housing. Our research suggests that NOAH units are often not tracked by traditional data bases and even the U.S. Census sometimes under-counts this lower quality housing stock.
- U.S. metro markets will face different challenges during the next fourteen years. Some markets are facing serious affordability issues. Half or more of renters in Miami and Honolulu spend 35% or more of their income on rent with 45% or more of renters in Los Angeles, New Orleans, Orlando, San Diego, Sacramento and New York spending 35% or more of income on rent.
- Some of the affordability issues can be traced to a lack of sufficient new supply and the high cost of entitlement which drives up housing costs, while other markets are affected more by low income levels and declining economic bases. New supply can be restricted by geographical topography as well as by governmental processes and rules. Markets that have high barriers to entry tend to have higher costs and lower ownership affordability rates and a positive, but lesser positive correlation to rental affordability.
- Markets with low ownership affordability tend to have high renter rates. For example, San Jose, Los Angeles, San Francisco, and San Diego have the lowest ownership affordability rates by far of any metro markets in this survey. All four markets rank in the top 10 markets with the highest rentership rate.
- Supply restrictions do not correlate as closely to the actual volume of new construction which is more closely tied to demographic and economic growth. For example, Seattle ranks as the fourth most restrictive construction environment and eighth least affordable market, but with total multifamily inventory increasing by 1.5% per year on average from 2010 to 2016, it ranked 10th of the 50 markets in terms of the highest new supply growth. Housing permits in highly restrictive markets may take 10 or 12 years to secure, but such efforts are underway continuously and with such long lags, one cannot use current supply volume as an indication of the restrictiveness of a local market.
- High costs of housing are correlated with out migration to nearby areas or even cross-state locations for some areas. For example, Los Angeles which ranks at the bottom for both owned and rental affordability has experienced flat to negative migration patterns since 2000, with slightly better in-migration rates in the neighboring and more affordable Riverside-San Bernardino area as well as increasing out-of-state exits to Las Vegas. Thus, it is clear that housing costs do inhibit the economic growth of a region by inhibiting the ability to hire and retain employees.

- Similar to the state trends, southern metro areas rank highly for attracting residents from other areas. Austin, Orlando, Raleigh, Charleston and Houston had the highest in-migration rates since 2010. These markets have more reasonable housing costs and are relatively business friendly.
- Regardless of future international in-migration, current ethnic composition is an important factor affecting rental demand. For example, more than half of the San Antonio rental population is Hispanic, as are at least a third of rental residents in Miami, Riverside, Albuquerque, Los Angeles and Houston. Ethnicity is correlated with variations in home ownership rates, household size and other factors that affect the propensity to rent, amenities desired, and unit sizes.
- Renter income levels vary widely, with a large portion of the U.S. population falling below the high-end cohort of the market favored by multifamily developers. A third or more of the rental households in Cleveland, Birmingham, Pittsburgh, New Orleans, Albuquerque, Detroit, Memphis and Cincinnati earn less than $20,000 per year as of 2016.
- Renter populations are also aging. The 35-54 age cohort is expected to account for more than half of new apartment demand in Baltimore, Cleveland and San Jose through 2030, while the 65+ age cohort is expected to be the primary growth generator through 2030 (outpacing all other age categories combined) in Pittsburgh, Detroit, Milwaukee, St. Louis, Chicago, Philadelphia, Albuquerque and Kansas City.

Metro Market Trends:

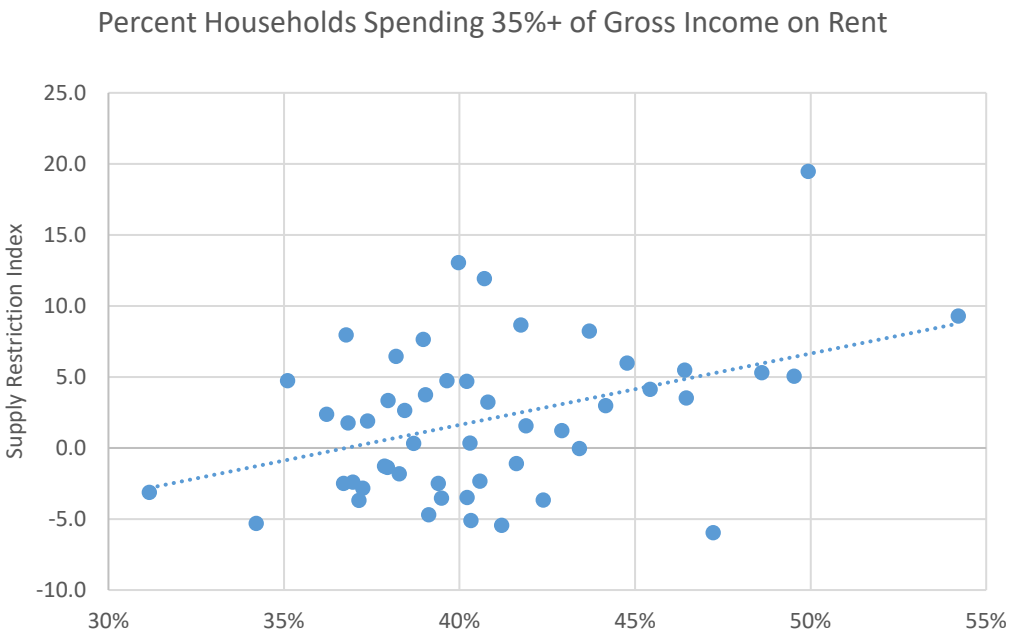
Demand for multifamily properties with five or more units was further estimated for 50 metropolitan markets. See Appendix 3 for a list of markets. The forecasting methodology is similar to that used at the state level adjusting household growth for two modeled recessions through 2030 and adjusting for home ownership rates, age, immigration, homelessness, long-term vacancy levels, the age of stock and the 5+ rental unit percentage of the rental housing market. Methodology is further described in Appendix 5. Historical figures for the years 2007 to 2016 are based on estimates of existing multifamily 5+ total inventory as developed by the HAS team from several sources including the U.S. Census, CoStar® and CBRE® Econometrics. Forecasts represent the number of units needed in properties with five or more units to keep vacancy rates at long-term stable rates that are typical for that market. The model does not forecast supply, so if supply exceeds this pace, then vacancy could rise. The forecast also does not remove units that could fall outside of typical institutional investor portfolios. We call these units Second Tier Affordable Rentals or STAR units as they represent lower quality properties (see Appendix 5 for a further discussion description.)

The metro market analyses included a review of supply restrictions occurring at the local level by reviewing two indices, the Wharton Residential Land Use Restrictions Index and the Lacroix Developable Land Index. The Wharton Residential Land Use Restrictions Index is based on data and a nationwide survey of local land use regulations including process and approvals, rules, and outcomes. The index includes eleven sub-indices measuring the stringency of the local regulatory environment, including local political pressure, local project approval, local assembly, supply restrictions, density restrictions, open space, exactions, and approval delay. The Lacroix index was developed by Sumner La Croix, Ph.D. at the Economic Research Organization at the University of Hawaii and measures the developable area within a 50-kilometer radii from a central city. Factors such as oceans, wetlands, lakes, rivers and other bodies of water as well as areas with a slope above 15% are defined as undevelopable. The Multifamily Supply Restrictions Index is the sum of each sub index for the metro market divided by the average for that sub index for all the metro markets in this study.

A table ranking the 50 metro markets by the supply index is shown in Appendix 3. The index is also shown on each of the Metro Market Overview pages. Higher indices represent markets with more stringent regulatory environments in regards to new housing supply. Of the markets in this study, this index ranges from 19.5 for Honolulu which is the most supply restricted to -6.0 for New Orleans which is the least supply restricted of the 50 markets in the study. (The average index is 2.0 for all 50 markets.)

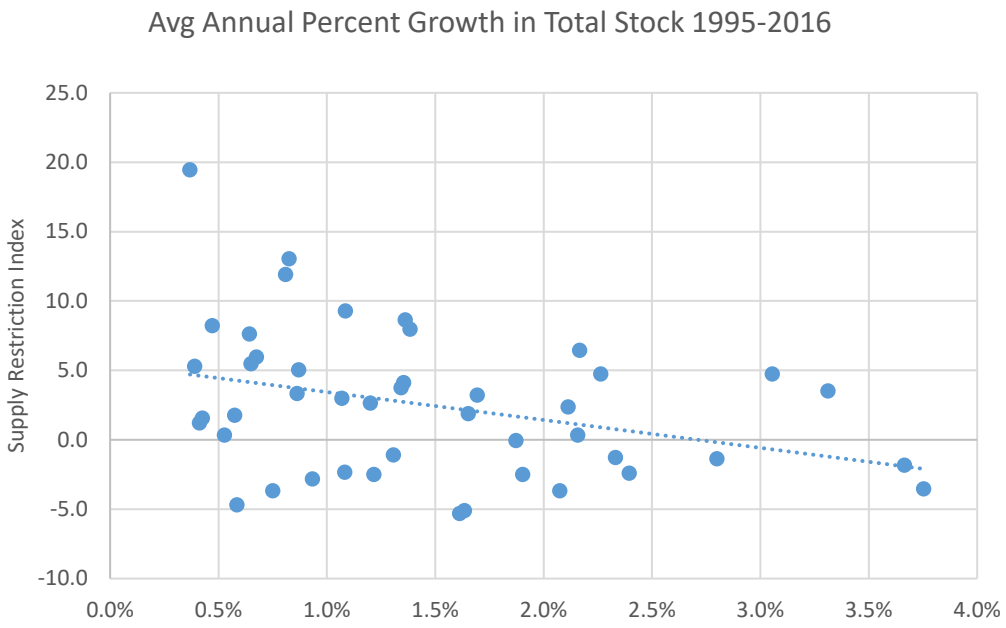
While there are significant variations by market, we find that the supply restriction index loosely correlates to rental markets that are less affordable as measured by the percent of households that spend 35% or more of their gross income on rent, as seen in Figure 24 below. That is, markets that have more supply restrictions tend to be less affordable. Note that affordability is a measure of both income and housing costs. Thus, given the same rents, markets with higher incomes will spend less of their income on rent as compared to rental costs and move further to the left on the below graph.

Figure 24: Supply Restrictions and Affordability



The higher costs associated with supply restrictions are driven in part by less supply in markets with high supply restrictions as shown in Figure 25 below. Note that new supply is also a factor of demographic growth and associated housing needs. Thus, some supply restricted markets do experience growth. In these markets, the result of higher supply restrictions may be longer approval and development time-lines which increase costs and development risks. Similarly, some low restriction markets may not experience inventory growth if they have weak economic and demographic trends.

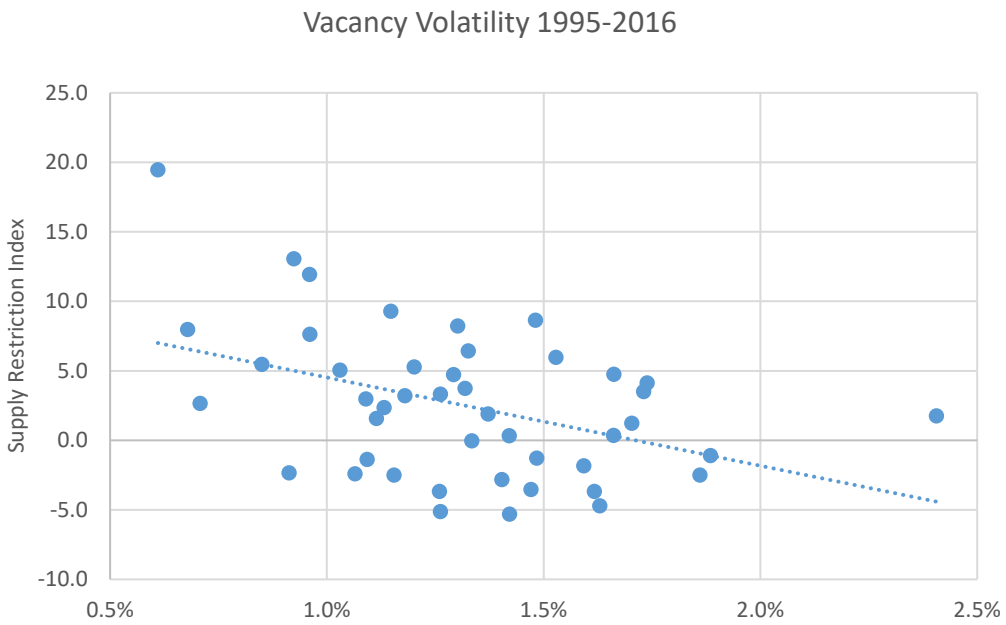
Figure 25: Supply Restrictions and Inventory Growth



Markets with high supply restriction indices also loosely correlate to lower vacancy volatility. That is, with less new supply, these markets are not as likely to experience over-supply conditions (see Figure 26 below which shows the volatility in vacancy rates from 1995 to 2016 as reported by CBRE® Econometrics).

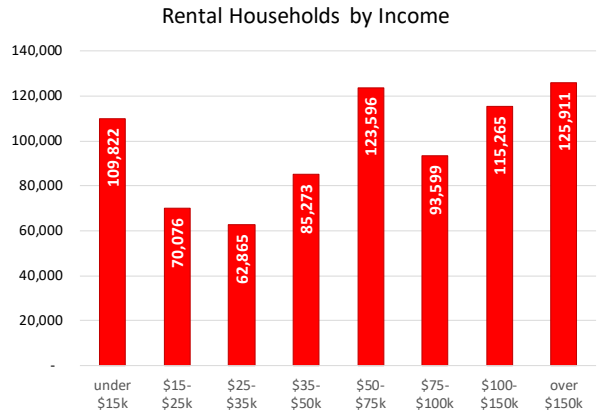
New supply tends to be oriented towards higher rent, class A product. Thus, we also frequently see a higher proportion of older buildings and particularly buildings that we classify as Second Tier Affordable Rentals (STAR) buildings in supply restricted markets. These are non-institutional sites of typically lower unit count, lower quality and greater age, a critical and ongoing multifamily supply component. See the Metro Market Overview section in Appendix 5 for classification methodology for this segment of the market. These buildings create affordable rental options and may create opportunities to upgrade the site to a higher use in good locations in growing markets.

Figure 26: Supply Restrictions and Volatility

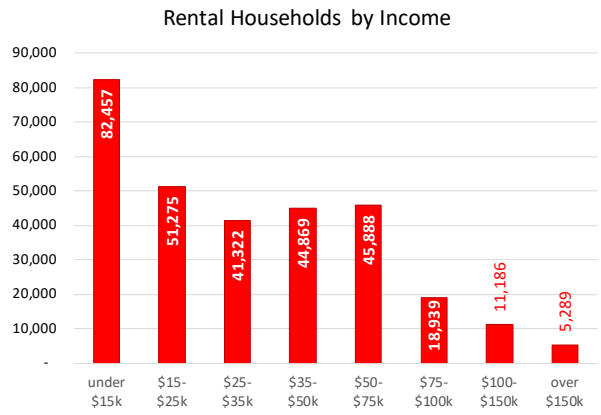


The Metro Market Overviews as shown in Appendix 4 illustrate the significant and important variances in both tenant characteristics and the built environment that occur by metro market. For example, income levels for renters in San Francisco are among the highest of 50 metros studied, while renter income levels in Cleveland are more oriented towards lower incomes.

San Francisco



Cleveland

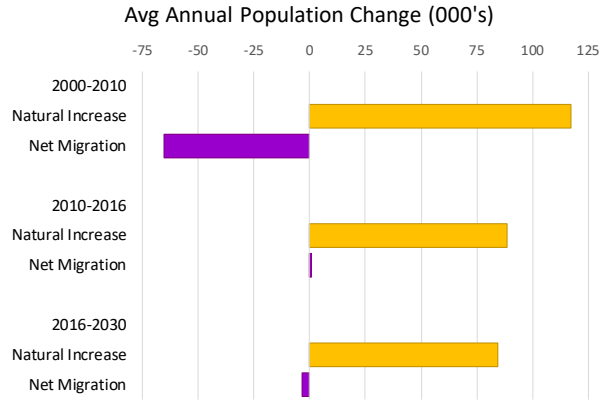


While San Francisco boasts a large share of renters earning household income of more than $75,000 per year, more than half of renters earn less than $75,000 per year. In a market with high rental costs, this creates a severe affordability issue for middle class workers as described in the State Trends section of the report. Additionally, the market's severe affordability issue for owned housing drives the rentership rate up and keeps higher income households as renters. While this at first may seem attractive for multifamily owners, when rental costs become too high, tenants begin to leave the market. San Francisco has been able to escape an exodus of tenants seeking lower costs in recent times

due to the growing tech industry, although it did experience net out-migration in the 2000 to 2010 time period.

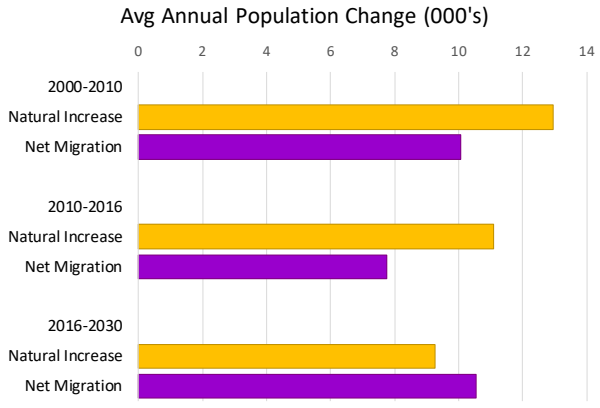
The Los Angeles market which has low affordability in both the owned and rented markets shows more severity in migration trends. Although out-migration stopped in the 2010-2016 time period, it has yet to show any significant net in-migration trends despite recent job growth in its tech industry as well as other industry sectors.

Los Angeles

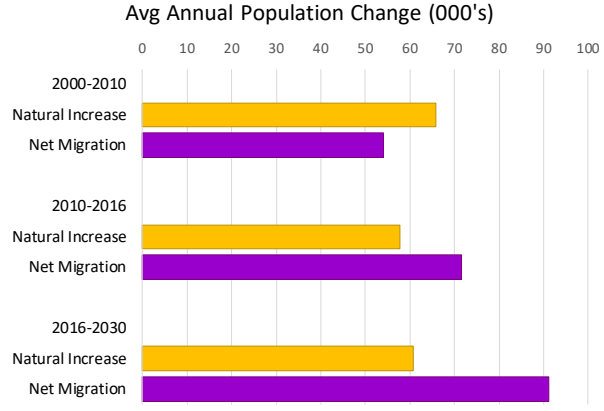


Furthermore, states with low costs and strong fiscal positions are able to draw both corporations (through tax incentives) and individuals from high cost areas. Indianapolis and Dallas are two examples as shown below. These markets gain new tenants through both natural increases (births minus deaths) as well as net in-migration to the area from other metro markets, states and countries.

Indianapolis

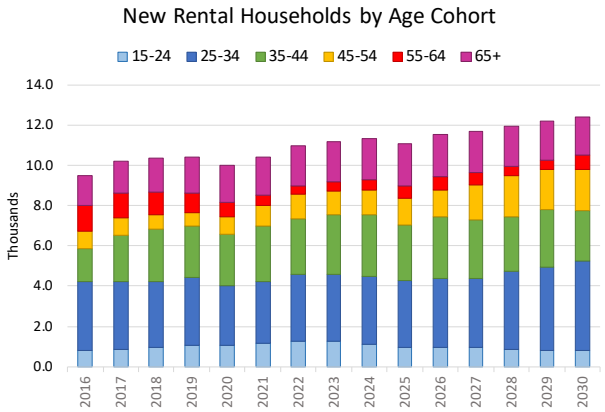


Dallas



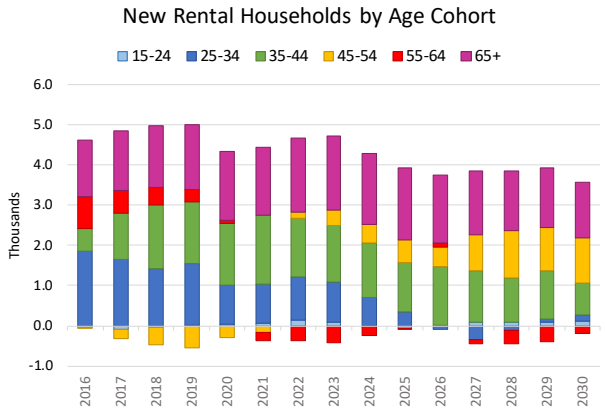
The demographics of local markets, and more particularly submarkets and neighborhoods, should also be carefully considered. We see large variations in renter growth by age group across metropolitan markets. In select high growth markets with good migration trends, e.g. Austin as shown below, we see new tenant demand coming from all age groups.

Austin



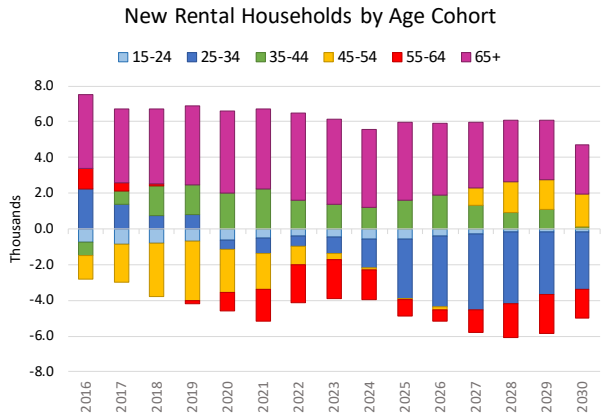
While the results vary widely, the Columbus, OH market as shown below is more typical in that we frequently see new tenant demand increasingly coming from older households.

Columbus, OH



In markets with little growth and particularly those with out-migration trends, we see a large part of incremental demand coming from the 65+ age cohort of the rental market. Detroit, as shown in the graph below, is an example of this type of market.

Detroit



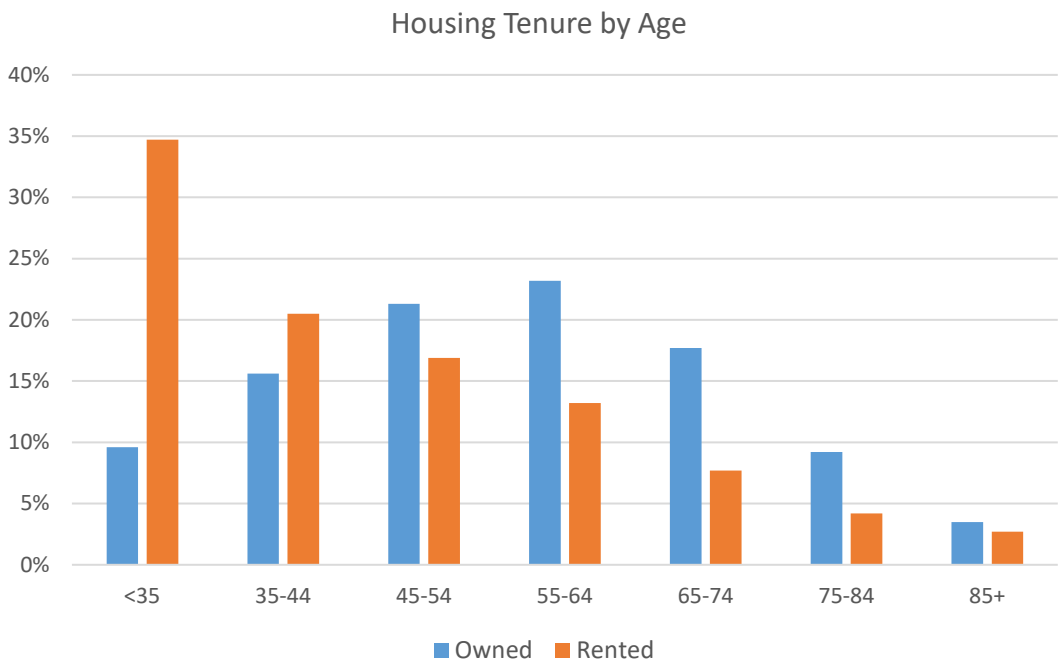
Appendix 1: Institutional Ownership of Single Family Rentals

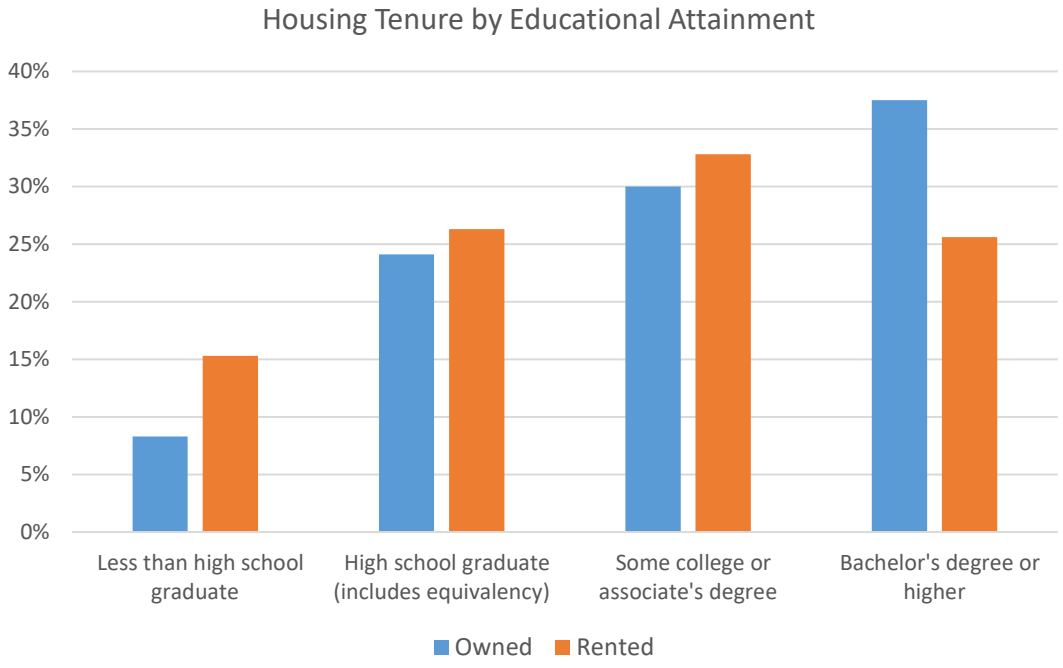
Estimated institutional holdings - single-family rental (SFR) properties

Source: Amherst Insight Labs estimates based on CoreLogic County Record and Transaction Data as of Q1 2016

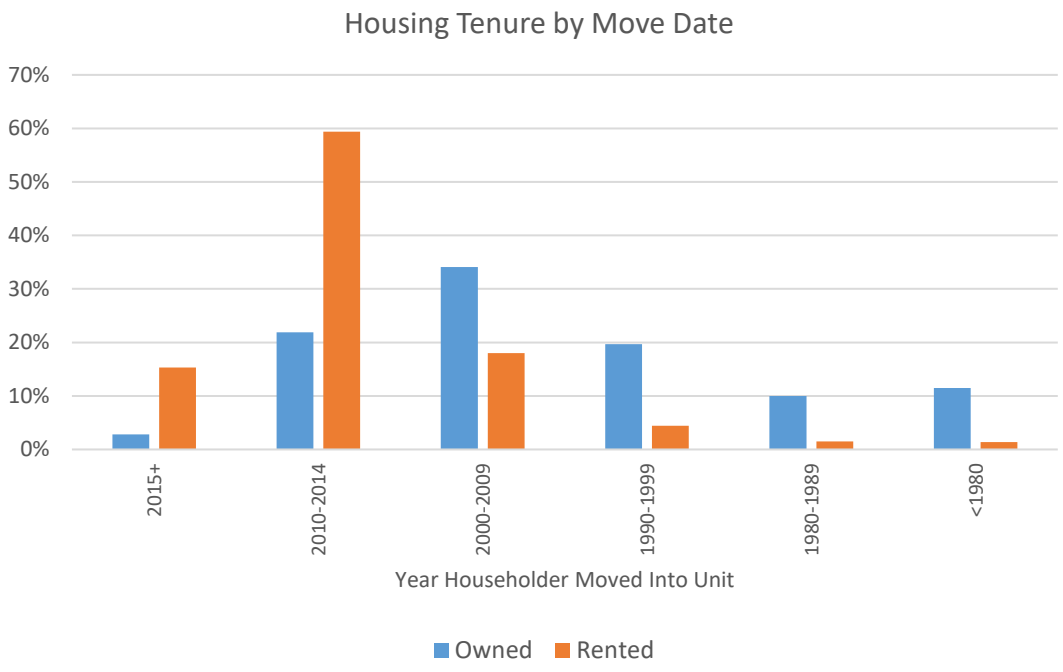
Institution	Units Owned	Total Managed Count
Blackstone (Invitation Homes)	44,386	47,342
American Homes 4 Rent	39,043	46,131
Colony Starwood Homes	27,193	32,272
Progress Residential	14,321	16,345
Silver Bay Realty Trust	6,928	8,798
Main Street Renewal	5,694	6,754
Tricon American Homes	5,103	6,743
Cerberus Capital Management	3,428	5,912
Havenbrook Homes	3,917	4,061
Connorex-Lucinda	2,704	2,994
Altisource Residential	1,522	2,912
Golden Tree Insite Partners (GTIS)	2,182	2,911
Vinebrook Homes	998	1,973
Gorelick Brothers Capital	1,460	1,784
Camillo Properties	13	1,314
Haven Homes	1,253	1,294
Lafayette Real Estate	994	1,271
Transcendent Investment Mgmt	598	628
Reven Housing Reit	216	500
Broadtree Home Rentals	432	468
Prager Property Management	119	277
Pintar Investment Company	151	164
TOTAL		**162,655**

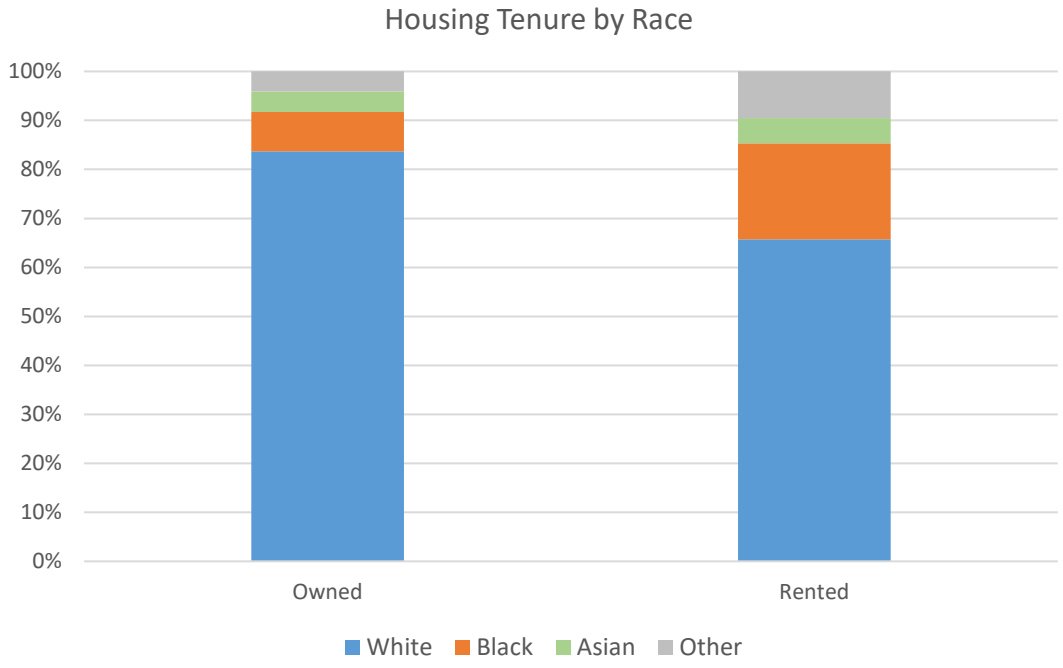
Appendix 2: Renter vs. Owner Demographics





Appendix 2: Renter vs. Owner Demographics, continued.





Appendix 3: State and Metro Market Tables

Total Population Growth 2016-30 (000)

	Age Cohort									
State	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**65+**
Alaska	-3	-16	-10	6	19	11	-4	-11	-6	73
Alabama	-17	-18	26	49	48	11	-32	-52	-34	281
Arkansas	-5	-12	5	18	25	11	-14	-23	-12	164
Arizona	72	97	167	185	173	116	80	58	103	812
California	-244	-457	-116	352	555	237	-24	-77	213	2,993
Colorado	8	14	46	105	120	64	9	-36	-15	398
Connecticut	-80	-43	-16	88	59	-11	-75	-88	-27	200
DC	-19	-42	-50	-1	31	36	16	4	1	36
Delaware	-1	-4	3	15	20	4	-10	-12	-2	70
Florida	142	11	163	350	468	296	104	171	401	2,946
Georgia	80	106	163	193	147	55	6	31	92	871
Hawaii	4	-16	-10	10	32	19	1	-9	-5	93
Iowa	-39	-17	-4	31	14	5	-25	-55	-33	187
Idaho	18	13	12	10	21	20	10	-3	-1	131
Illinois	142	54	-147	-363	-183	-92	-163	-158	-21	979
Indiana	-40	-9	21	68	37	-9	-57	-81	-36	449
Kansas	-10	-5	1	38	36	32	-1	-31	-15	223
Kentucky	0	1	31	29	23	-7	-29	-43	-17	295
Louisiana	-20	-73	-51	7	65	36	-27	-66	-32	316
Massachusetts	-123	-69	-22	122	102	11	-89	-93	-2	481
Maryland	-33	-30	-3	56	78	15	-57	-71	5	460
Maine	-17	-5	4	10	2	-16	-31	-34	-18	99
Michigan	-158	-98	35	110	35	-97	-170	-192	-88	671
Minnesota	-20	-24	-31	38	66	48	-24	-72	-13	443
Missouri	-35	-38	-12	44	63	29	-44	-85	-38	419
Mississippi	-5	-7	6	15	5	-9	-24	-31	-11	177
Montana	0	-5	0	16	20	13	0	-17	-16	73
North Carolina	138	186	233	242	171	74	32	44	80	804
North Dakota	-23	-13	6	29	21	11	-1	-12	-9	45
Nebraska	-11	1	-2	26	21	23	-1	-22	-15	130
New Hampshire	-27	-2	7	29	14	-9	-33	-36	-10	120
New Jersey	4	127	75	-97	-122	-157	-182	-147	6	674
New Mexico	-6	-8	1	24	27	17	-8	-24	-17	132
Nevada	66	59	69	46	38	33	42	48	54	274
New York	-259	-21	227	374	198	-154	-382	-419	-198	436
Ohio	-89	-96	-6	34	67	-57	-157	-202	-91	783
Oklahoma	4	-14	0	42	57	41	-7	-38	-23	232
Oregon	-8	-6	25	41	51	29	17	-18	-23	282
Pennsylvania	-202	-166	-69	103	99	-71	-209	-256	-110	813
Rhode Island	-27	-16	-4	20	11	-8	-20	-22	-6	73
South Carolina	34	31	66	89	80	22	-17	-23	4	392
South Dakota	9	4	10	15	16	11	6	-5	-5	26
Tennessee	-16	-24	34	73	69	7	-31	-24	16	512
Texas	187	169	283	517	569	464	275	179	259	2,263
Utah	57	44	43	26	51	70	70	27	16	200
Virginia	-42	-56	-28	83	105	39	-45	-54	24	666
Vermont	-21	-5	2	18	3	-4	-12	-16	-8	55
Washington	21	-30	13	77	141	89	28	-24	3	618
Wisconsin	-55	-18	0	64	39	2	-66	-106	-37	423
West Virginia	2	-4	-3	-6	-6	-14	-16	-31	-31	85
Wyoming	5	-2	-6	0	9	11	1	-11	-12	29

Source: Moody's Analytics

Appendix 3: State and Metro Market Tables, continued.

Apartment Demand by Metro Market

Metro Market	New Units Needed 2017-2030	Rank	Avg Annual Growth %	Rank	Avg Rank
Albuquerque, NM	8,897	44	0.9%	31	39
Atlanta, GA	170,095	5	2.2%	9	7
Austin, TX	114,076	10	2.9%	3	6
Baltimore, MD	22,965	31	0.7%	41	36
Birmingham, AL	5,283	47	0.6%	43	48
Boston, MA	66,109	19	1.1%	28	23
Charleston, SC	13,388	38	1.5%	16	29
Charlotte, NC	71,523	17	2.6%	4	10
Chicago, IL	47,826	22	0.5%	47	34
Cincinnati, OH	15,312	34	0.7%	40	38
Cleveland, OH	5,151	49	0.2%	50	50
Columbus, OH	33,048	27	1.2%	27	28
Dallas-Ft. Worth, TX	266,296	2	2.2%	7	1
Denver, CO	55,801	20	1.4%	19	20
Detroit, MI	15,467	33	0.4%	48	41
Honolulu, HI	15,131	35	0.9%	34	35
Houston, TX	214,176	3	2.2%	10	4
Indianapolis, IN	30,901	29	1.2%	26	30
Kansas City, KS	14,007	37	0.6%	44	42
Las Vegas, NV	87,280	12	2.4%	5	9
Little Rock, AR	5,827	46	0.8%	35	43
Los Angeles, CA	164,201	6	0.9%	32	17
Louisville, KY	9,295	43	0.7%	39	44
Memphis, TN	11,719	41	0.8%	37	40
Miami-Ft. Lauderdale,	185,414	4	2.2%	8	3
Milwaukee, WI	5,251	48	0.3%	49	49
Minneapolis, MN	70,783	18	1.6%	15	15
Nashville, TN	29,942	30	1.5%	17	24
New Orleans, LA	6,966	45	0.7%	42	46
New York, NY	278,634	1	0.8%	36	16
Oklahoma City, OK	12,915	39	0.9%	33	37
Orlando, FL	130,177	8	3.3%	2	2
Philadelphia, PA	38,407	25	0.7%	38	31
Phoenix, AZ	150,302	7	2.3%	6	5
Pittsburgh, PA	9,545	42	0.5%	46	47
Portland. OR	46,788	23	1.3%	22	21
Raleigh, NC	74,323	13	3.8%	1	8
Richmond, VA	14,787	36	1.0%	30	33
Riverside, CA	40,499	24	1.1%	29	26
Sacramento, CA	31,914	28	1.2%	25	27
Salt Lake City, UT	16,478	32	1.4%	18	25
San Antonio, TX	53,890	21	1.8%	11	14
San Diego, CA	72,775	15	1.3%	24	18
San Francisco, CA	71,668	16	1.3%	23	19
San Jose, CA	35,942	26	1.3%	20	22
Seattle, WA	98,228	11	1.6%	14	11
Sioux Falls, SD	4,661	50	1.7%	13	32
St. Louis, MO	12,325	40	0.6%	45	45
Tampa, FL	72,933	14	1.8%	12	12
Washington DC	127,962	9	1.3%	21	13

Appendix 3: State and Metro Market Tables, continued.

Changes in Metro Market Population (000s)

	2010-2016		2016-2030	
Metro Market	**Natural Increase**	**Net Migration**	**Natural Increase**	**Net Migration**
Albuquerque, NM	3.5	-1.0	2.0	4.1
Atlanta, GA	38.7	42.1	34.0	90.9
Austin, TX	16.9	36.8	19.7	45.6
Baltimore, MD	10.1	4.4	7.0	1.4
Birmingham, AL	3.0	0.0	0.8	3.9
Boston, MA	16.3	22.7	14.3	11.9
Charleston, SC	4.1	10.3	3.1	8.2
Charlotte, NC	12.3	27.7	9.9	56.6
Chicago, IL	50.8	-39.3	42.5	-30.2
Cincinnati, OH	8.4	0.0	5.5	4.2
Cleveland, OH	2.1	-5.6	0.2	-6.9
Columbus, OH	12.2	10.4	10.9	11.0
Dallas-Ft. Worth, TX	57.8	71.6	60.7	91.0
Denver, CO	18.3	32.0	15.6	20.2
Detroit, MI	9.8	-7.2	5.1	-5.1
Honolulu, HI	5.9	0.9	4.6	-0.3
Houston, TX	59.4	77.9	63.8	72.8
Indianapolis, IN	11.1	7.7	9.3	10.5
Kansas City, KS	11.0	2.4	8.1	-0.7
Las Vegas, NV	11.9	21.9	11.3	49.1
Little Rock, AR	3.5	2.2	2.4	2.7
Los Angeles, CA	88.5	0.6	84.4	-3.2
Louisville, KY	4.0	4.0	1.9	5.0
Memphis, TN	7.5	-3.2	5.0	3.2
Miami-Ft. Lauderdale, FL	19.2	65.8	12.0	102.0
Milwaukee, WI	6.7	-3.0	4.4	-1.5
Minneapolis, MN	23.6	11.1	20.8	18.5
Nashville, TN	9.8	21.7	8.3	16.8
New Orleans, LA	4.9	6.9	3.4	2.6
New York, NY	107.0	-3.2	98.9	-31.7
Oklahoma City, OK	7.8	9.7	6.5	4.0
Orlando, FL	11.6	39.5	11.4	71.8
Philadelphia, PA	18.3	-0.9	12.2	-1.6
Phoenix, AZ	29.2	44.0	28.0	91.1
Pittsburgh, PA	-3.2	2.6	-4.8	4.7
Portland. OR	11.4	22.6	9.1	21.3
Raleigh, NC	8.8	18.4	8.9	46.7
Richmond, VA	4.8	6.2	3.7	5.3
Riverside, CA	33.1	10.5	32.7	2.6
Sacramento, CA	11.3	10.6	10.9	12.5
Salt Lake City, UT	12.6	3.7	11.6	3.6
San Antonio, TX	16.5	27.3	17.2	25.0
San Diego, CA	23.6	11.2	23.7	7.1
San Francisco, CA	22.6	35.0	22.4	20.8
San Jose, CA	14.4	10.4	14.3	4.5
Seattle, WA	22.2	36.6	20.5	33.5
Sioux Falls, SD	2.1	2.3	1.9	1.4
St. Louis, MO	8.3	-4.8	3.8	0.7
Tampa, FL	1.6	35.6	-3.3	56.1
Washington DC	47.8	30.8	44.6	12.2

Appendix 3: State and Metro Market Tables, continued.

Supply Restriction Metrics

Metro Market	Land Area Undevelopable	Rank	Wharton Restriction Index	Rank	Supply Restriction Score	Supply Restriction Rank
Albuquerque, NM	11.6%	34	0.37	32	3.00	29
Atlanta, GA	4.1%	6	0.03	24	0.36	22
Austin, TX	3.8%	5	(0.28)	16	(1.82)	16
Baltimore, MD	21.9%	28	1.60	48	11.93	48
Birmingham, AL	14.4%	24	(0.23)	17	(1.09)	19
Boston, MA	33.9%	32	1.70	49	13.06	49
Charleston, SC	60.5%	43	(0.81)	3	(3.47)	9
Charlotte, NC	4.7%	7	(0.53)	9	(3.52)	8
Chicago, IL	40.0%	36	0.02	23	1.58	24
Cincinnati, OH	10.3%	15	(0.58)	8	(3.67)	6
Cleveland, OH	40.5%	38	(0.16)	21	0.34	21
Columbus, OH	2.5%	3	0.26	28	1.90	26
Dallas-Fort Worth, TX	9.2%	12	(0.23)	17	(1.27)	18
Denver, CO	16.7%	26	0.84	43	6.45	42
Detroit, MI	24.5%	29	0.05	25	1.23	23
Honolulu, HI (urban)	92.0%	50	2.32	50	19.47	50
Houston, TX	8.4%	10	(0.40)	13	(2.49)	13
Indianapolis, IN	1.4%	1	(0.74)	5	(5.10)	4
Kansas City, MO-KS	5.8%	8	(0.79)	4	(5.30)	3
Las Vegas, NV	32.1%	31	(0.69)	7	(3.65)	7
Little Rock, AR	13.7%	21	(0.85)	2	(5.43)	2
Los Angeles, CA	52.5%	42	0.49	36	5.30	39
Louisville, KY-IN	12.7%	19	(0.47)	11	(2.82)	11
Memphis, TN-MS-AR	12.2%	18	1.18	47	8.66	46
Miami, FL	76.6%	49	0.94	45	9.30	47
Milwaukee, WI	41.8%	40	0.46	34	4.71	35
Minneapolis-St. Paul, MN-WI	19.2%	27	0.38	33	3.34	31
Nashville, TN	12.8%	20	(0.41)	12	(2.40)	14
New Orleans, LA	74.9%	48	(1.24)	1	(5.95)	1
New York, NY-NJ-PA	40.4%	37	0.65	41	5.98	41
Oklahoma City, OK	2.5%	2	(0.37)	15	(2.49)	12
Orlando, FL	36.1%	33	0.32	31	3.53	32
Philadelphia, PA-NJ-DE-MD	10.2%	14	1.13	46	8.24	45
Phoenix, AZ	14.0%	22	0.61	39	4.75	37
Pittsburgh, PA	30.0%	30	0.10	26	1.78	25
Portland, OR-WA	37.5%	34	0.27	29	3.23	30
Raleigh, NC	8.1%	9	0.64	40	4.75	36
Richmond, VA	8.8%	11	(0.38)	14	(2.33)	15
Riverside-San Bernardino, CA	37.9%	35	0.53	38	5.06	38
Sacramento, CA	15.0%	25	0.52	37	4.13	34
Salt Lake City, UT	72.0%	46	(0.03)	22	2.38	27
San Antonio, TX	3.2%	4	(0.21)	20	(1.35)	17
San Diego, CA	63.4%	44	0.46	34	5.48	40
San Francisco, CA	73.1%	47	0.72	42	7.65	43
San Jose, CA	63.8%	45	0.21	27	3.76	33
Seattle, WA	43.6%	41	0.92	44	7.98	44
Sioux Falls, SD	10.0%	13	(0.50)	10	(3.12)	10
St. Louis, MO-IL	11.1%	16	(0.73)	6	(4.69)	5
Tampa, FL	41.6%	39	(0.22)	19	(0.04)	20
Washington, DC-VA-MD-WV	14.0%	22	0.31	30	2.66	28

Appendix 3: State and Metro Market Tables, continued.

Second Tier Affordable Rental (STAR) Units

Metro Market	STAR Share	Rank
Albuquerque, NM	36%	27
Atlanta, GA	22%	42
Austin, TX	17%	50
Baltimore, MD	31%	34
Birmingham, AL	32%	31
Boston, MA	40%	18
Charleston, SC	35%	28
Charlotte, NC	18%	49
Chicago, IL	39%	21
Cincinnati, OH	48%	6
Cleveland, OH	46%	9
Columbus, OH	39%	19
Dallas-Fort Worth, TX	19%	46
Denver, CO	29%	38
Detroit, MI	52%	5
Honolulu, HI (urban)	41%	16
Houston, TX	22%	43
Indianapolis, IN	25%	39
Kansas City, MO-KS	35%	29
Las Vegas, NV	21%	44
Little Rock, AR	33%	30
Los Angeles, CA	61%	1
Louisville, KY-IN	42%	15
Memphis, TN-MS-AR	38%	22
Miami, FL	37%	26
Milwaukee, WI	43%	13
Minneapolis-St. Paul, MN-WI	44%	11
Nashville, TN	29%	36
New Orleans, LA	41%	17
New York, NY-NJ-PA	48%	7
Oklahoma City, OK	44%	10
Orlando, FL	18%	48
Philadelphia, PA-NJ-DE-MD	37%	23
Phoenix, AZ	30%	35
Pittsburgh, PA	54%	4
Portland, OR-WA	37%	24
Raleigh, NC	19%	45
Richmond, VA	37%	25
Riverside-San Bernardino, CA	48%	8
Sacramento, CA	42%	14
Salt Lake City, UT	29%	37
San Antonio, TX	24%	40
San Diego, CA	58%	2
San Francisco, CA	54%	3
San Jose, CA	43%	12
Seattle, WA	32%	33
Sioux Falls, SD	23%	41
St. Louis, MO-IL	39%	20
Tampa, FL	32%	32
Washington, DC-VA-MD-WV	19%	47

Appendix 3: State and Metro Market Tables, continued.

Owner and Renter Housing Affordability

Metro Market	SF Owned Housing Affordability Index	Rank	Renters Spending over 35% Income on Rent	Rank
Albuquerque, NM	182	22	44%	41
Atlanta, GA	192	18	40%	28
Austin, TX	157	31	38%	16
Baltimore, MD	199	17	41%	31
Birmingham, AL	203	16	42%	34
Boston, MA	141	38	40%	25
Charleston, SC	147	35	40%	27
Charlotte, NC	147	35	39%	23
Chicago, IL	191	19	42%	36
Cincinnati, OH	272	2	37%	9
Cleveland, OH	291	1	39%	18
Columbus, OH	231	9	37%	11
Dallas-Ft. Worth, TX	174	27	38%	12
Denver, CO	122	42	38%	15
Detroit, MI	260	3	43%	38
Honolulu, HI	71	48	50%	49
Houston, TX	181	24	39%	22
Indianapolis, IN	254	4	40%	29
Kansas City, KS	234	8	34%	2
Las Vegas, NV	146	37	42%	37
Little Rock, AR	244	6	41%	33
Los Angeles, CA	70	49	49%	47
Louisville, KY	228	10	37%	10
Memphis, TN	222	11	42%	35
Miami-Ft. Lauderdale, FL	105	45	54%	50
Milwaukee, WI	181	23	40%	26
Minneapolis, MN	211	14	38%	14
Nashville, TN	175	26	37%	8
New Orleans, LA	180	25	47%	46
New York, NY	122	43	45%	42
Oklahoma City, OK	235	7	37%	5
Orlando, FL	149	34	46%	45
Philadelphia, PA	212	13	44%	40
Phoenix, AZ	155	32	40%	24
Pittsburgh, PA	204	15	37%	7
Portland. OR	125	40	41%	32
Raleigh, NC	183	21	35%	3
Richmond, VA	188	20	41%	30
Riverside, CA	113	44	50%	48
Sacramento, CA	137	39	45%	43
Salt Lake City, UT	153	33	36%	4
San Antonio, TX	166	29	38%	13
San Diego, CA	76	46	46%	44
San Francisco, CA	72	47	39%	19
San Jose, CA	69	50	39%	20
Seattle, WA	124	41	37%	6
Sioux Falls, SD	213	12	31%	1
St. Louis, MO	252	5	39%	21
Tampa, FL	174	28	43%	39
Washington DC	159	30	38%	17

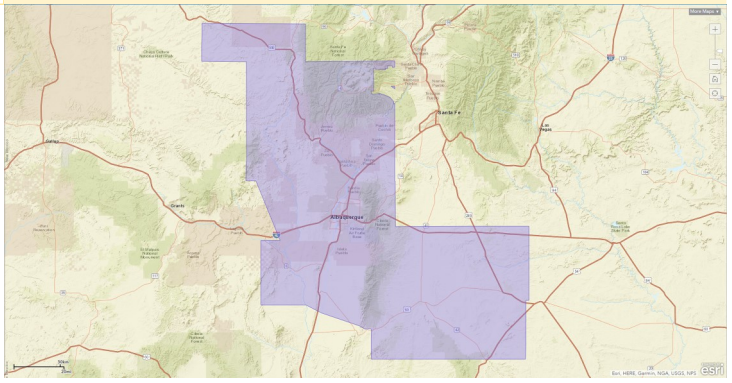
Appendix 4: Metro Market Overviews

The following Metro Market Overviews provide key metrics on each of 50 select metropolitan rental markets that invite local market leadership response.

METRO MULTIFAMILY DEMAND OVERVIEW

ALBUQUERQUE

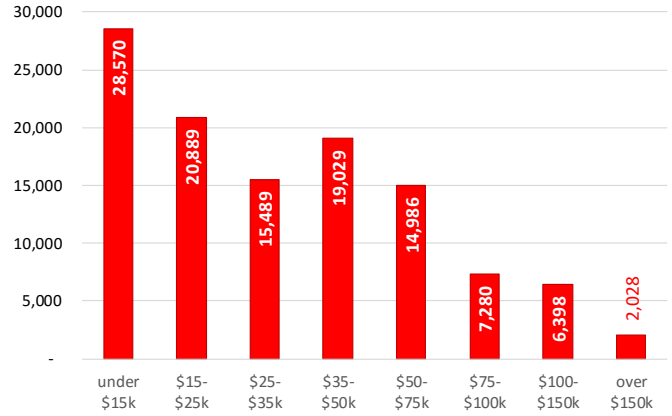
Net migration prior to 2010 was strong, has since reversed to slightly negative with more expected growth ahead. This remains a key component to rental household growth. Sluggish economic growth hampers new multifamily development and existing rent growth. Multifamily demand begins to ramp up after 2020.



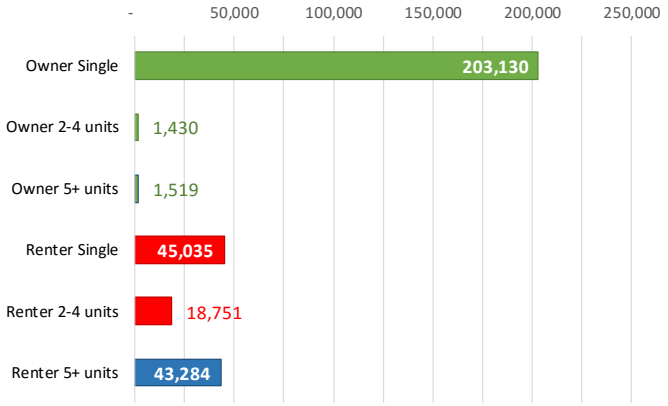
Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
39	182	3.0	36%

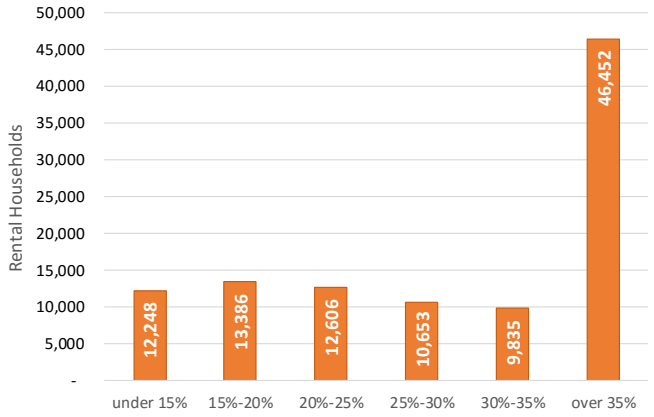
Rental Households by Income



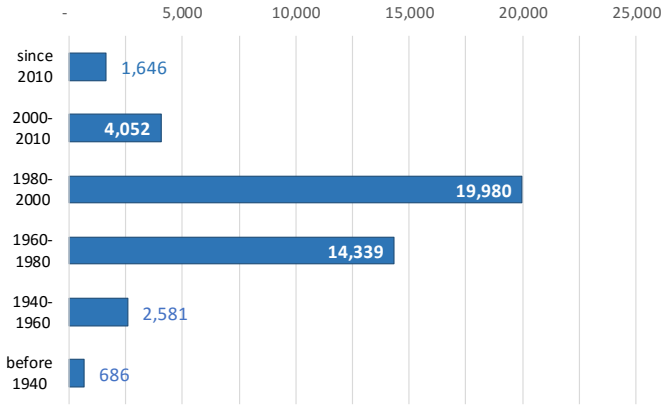
Housing Stock by Tenure & Type



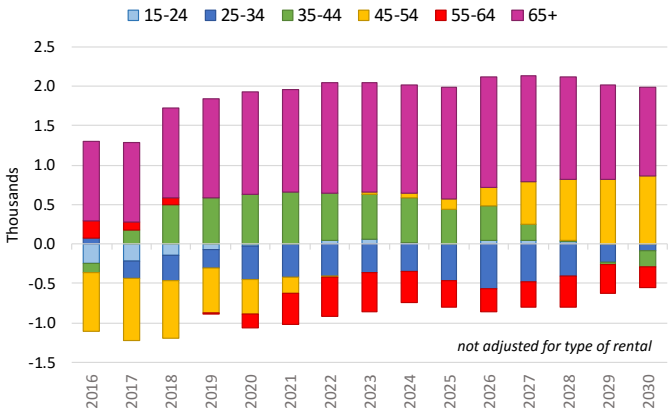
Rent as a Percent of Household Income



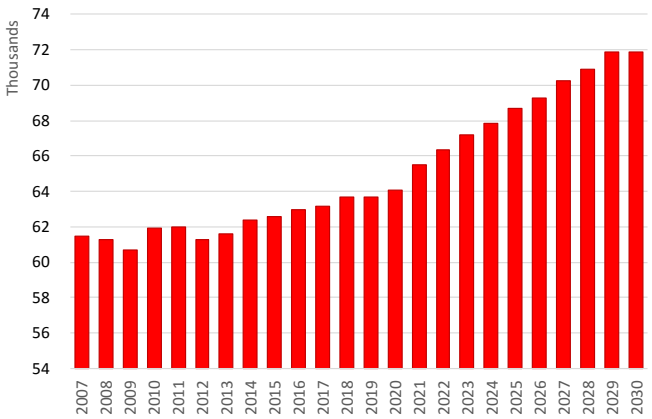
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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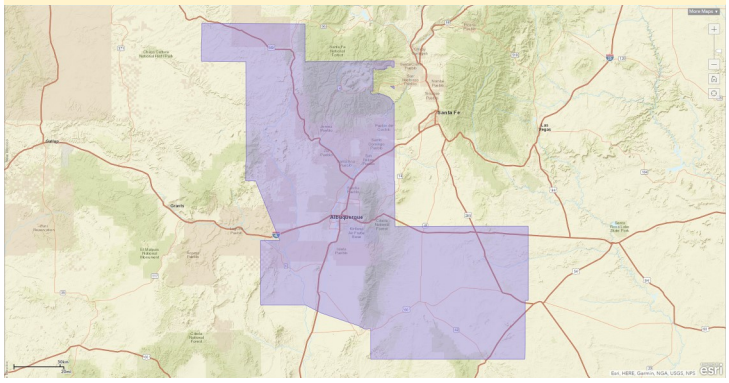
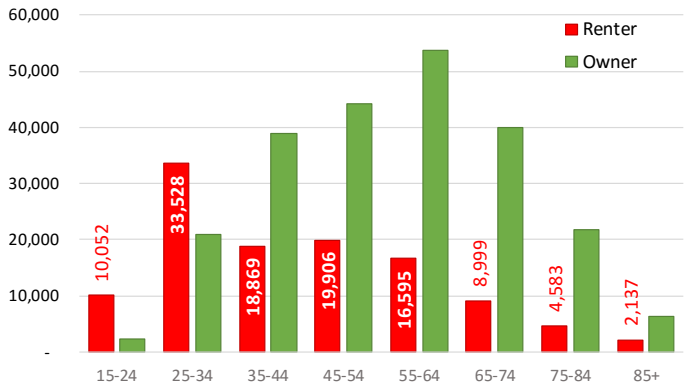
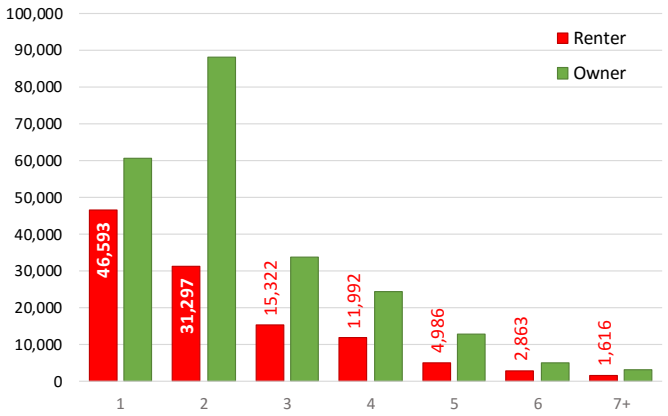
ALBUQUERQUE page 2



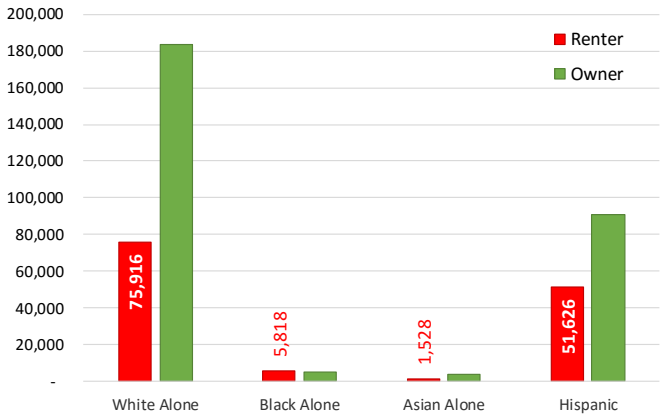
Households by Age Cohort



Households by Occupants

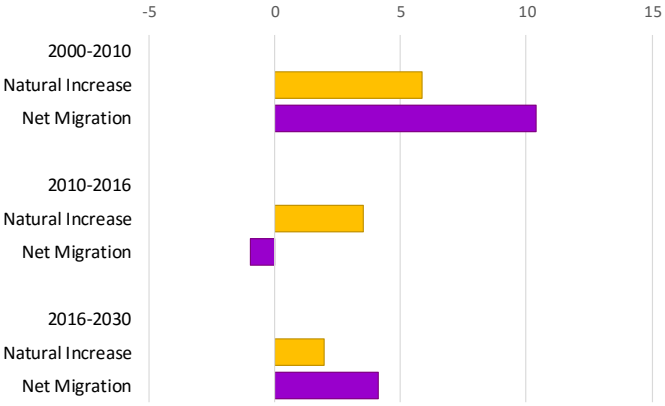


Households by Ethnicity and Origin



Employment Growth by Sector ('000s)

Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

METRO RANKING is the relative rank among 50 multifamily Metro markets based upon the average of HAS forecasted total Metro multifamily demand 2017-2030 and its percent of current Metro rental households, ranging from 1 (Dallas-Fort Worth) to 50 (Cleveland).

AFFORDABILITY INDEX is the ratio of median family income to the minimum income to qualify for purchase of a single-family home at the median existing home resale price under standard mortgage underwriting today, then multiplied by 100 to convert to a 100 point index (e.g., an index of 100 indicates that the median family income equals the qualifying income). This index ranges from 69.4 (San Jose) to 290.7 (Cleveland) with a Metro average of 178.0

MF SUPPLY RESTRICTIONS is an HAS composite of the Wharton Residential Land Use Restrictions Index and the Lacroix percent of available Metro land not yet developed. This index ranges from 19.5 (Honolulu) to –6.0 (New Orleans) with a Metro average of 2.0.

STAR SHARE is that share of Metro rental housing stock with five or more units HAS qualified as ***S**econd-**T**ier **A**ffordable **R**entals or those non-institutional sites of typically lower unit count, lower quality and greater age, a critical and ongoing multifamily supply component. Using CoStar® ratings of 1-5 for sites of five units or more, STAR is the lower ratings of 1-2. This share ranges from 61% (Los Angeles) to 17% (Austin) with a Metro average of 36%.

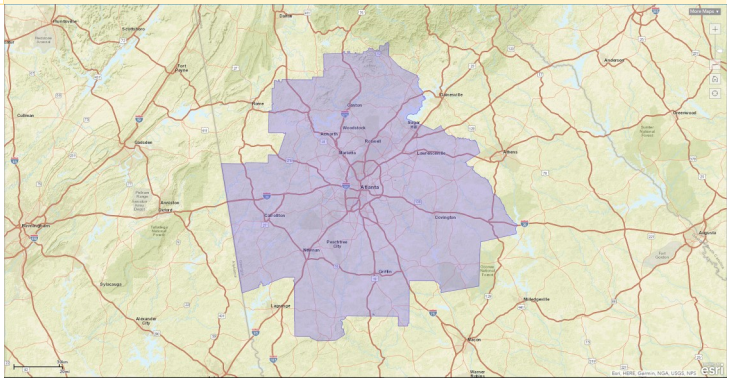
METRO MULTIFAMILY DEMAND OVERVIEW

ATLANTA

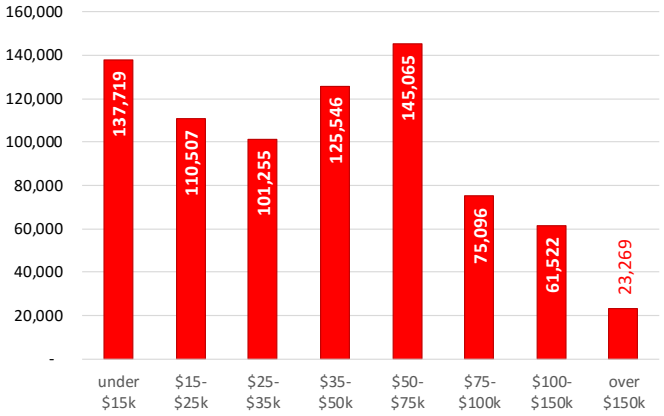
Strong in migrations exceed natural population increases. Solid economic growth expected across all sectors but mining, manufacturing and information. Positive new rental household growth across all age cohorts and consistent demand growth through 2030. Today's rental householders are younger and 40% pay over 35% of household income on rent.

Definitions on back

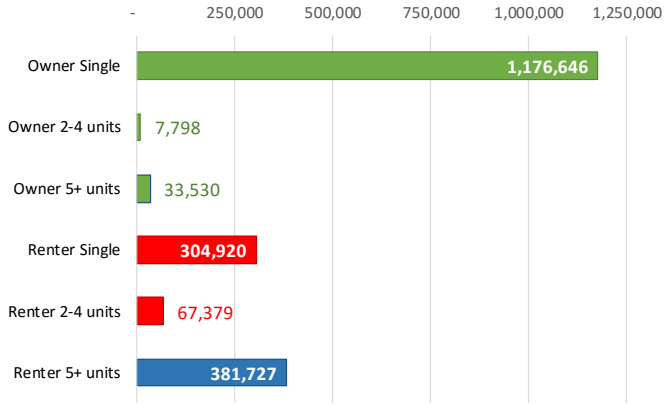
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
7	217	0.4	22%



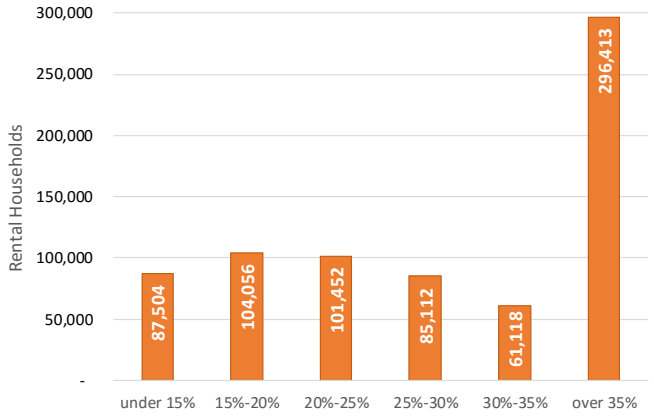
Rental Households by Income



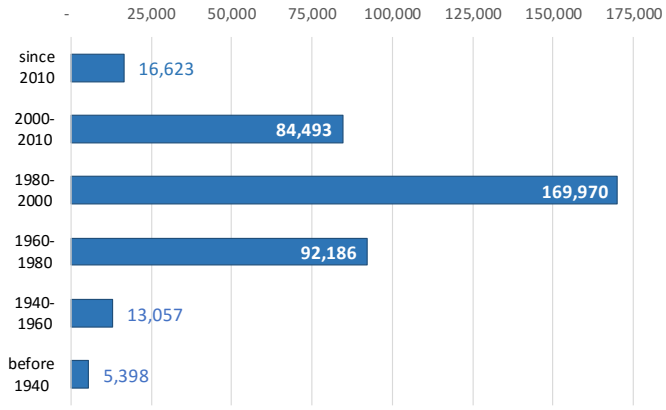
Housing Stock by Tenure & Type



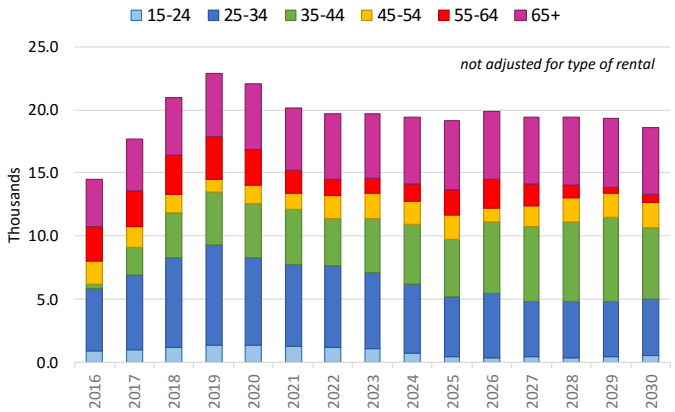
Rent as a Percent of Household Income



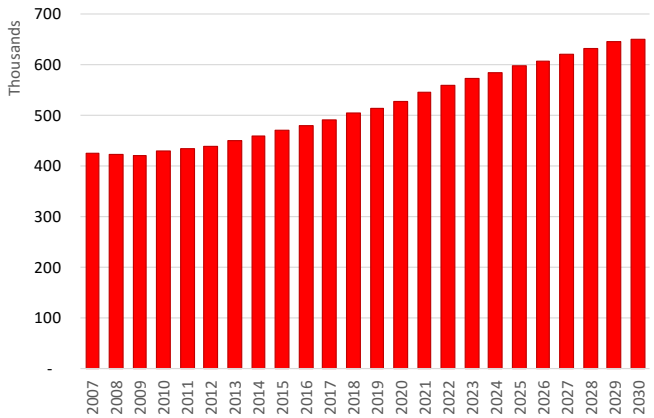
5+ Unit Rental Stock by Year Built



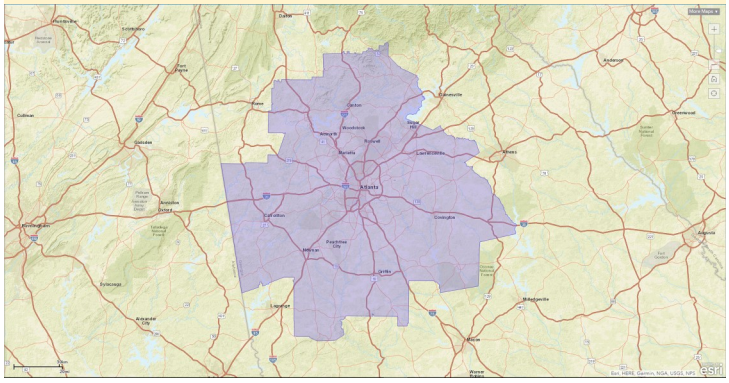
New Rental Households by Age Cohort



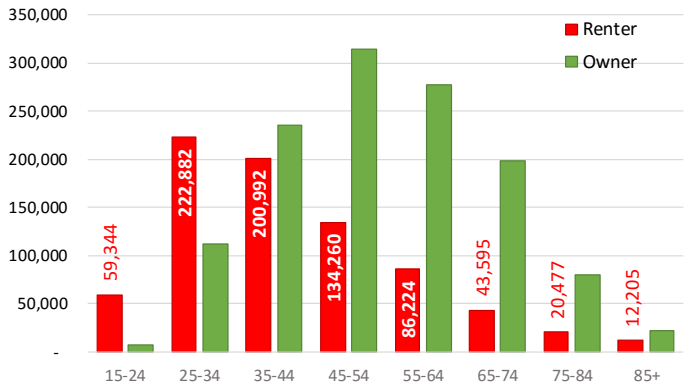
5+ Unit Apartment Demand Forecast



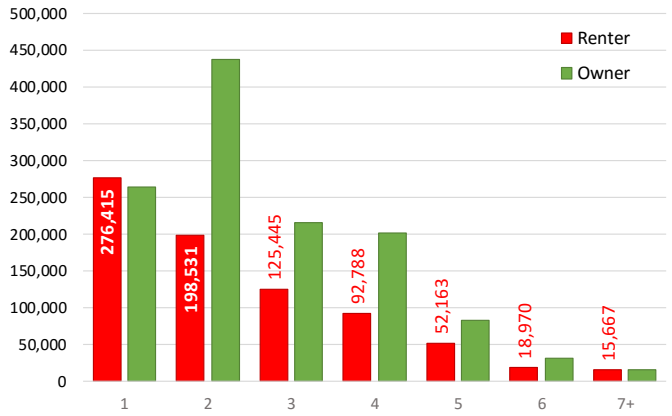
ATLANTA page 2



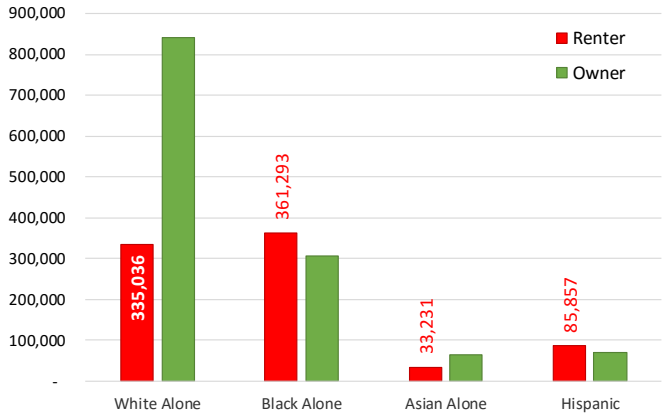
Households by Age Cohort



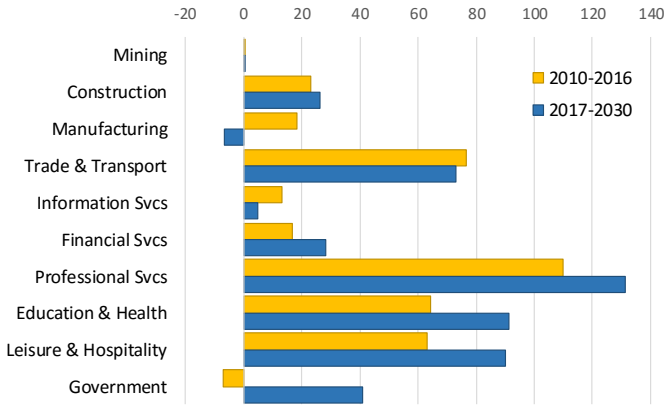
Households by Occupants



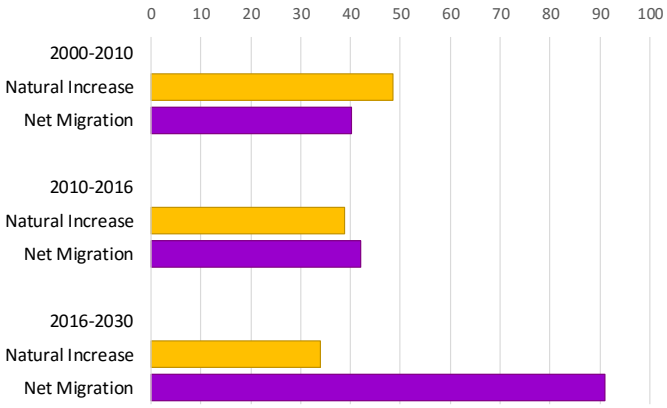
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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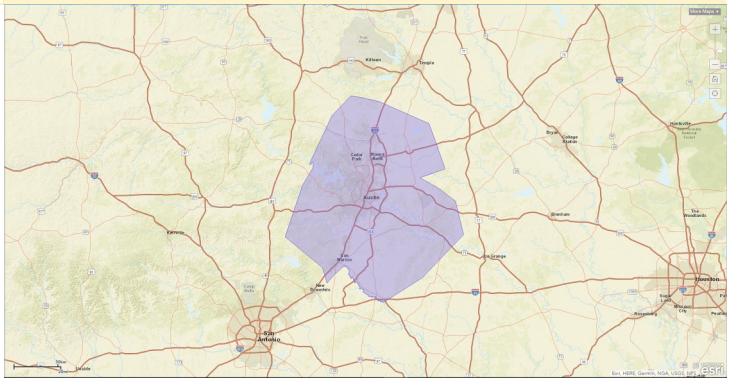
METRO MULTIFAMILY DEMAND OVERVIEW

AUSTIN

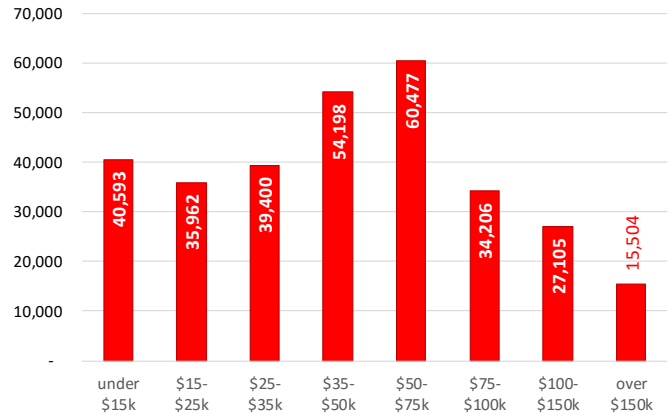
Strong in migrations are double the natural population increases. Good economic growth ahead in most sectors. Growth in new rental households expected in all age cohorts with steady, significant rental demand growth through 2030. Some of the youngest multifamily housing stock seen in the nation, smaller STAR share of affordable rentals.

Definitions on back

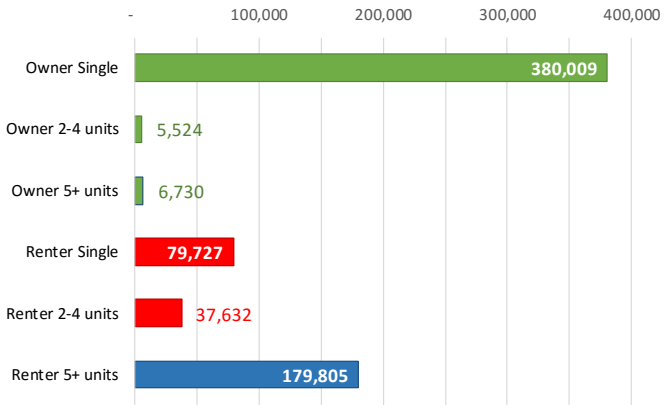
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
6	157	-1.8	17%



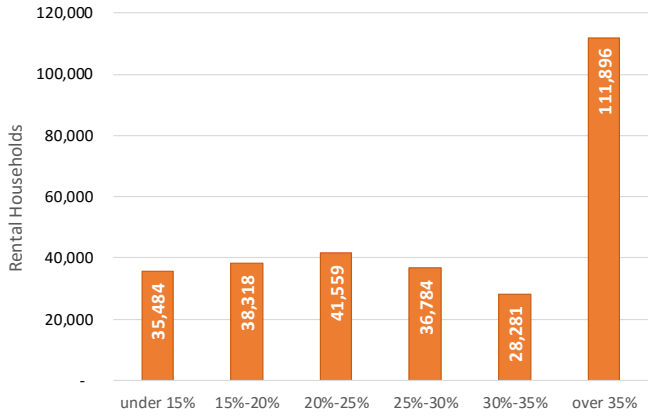
Rental Households by Income



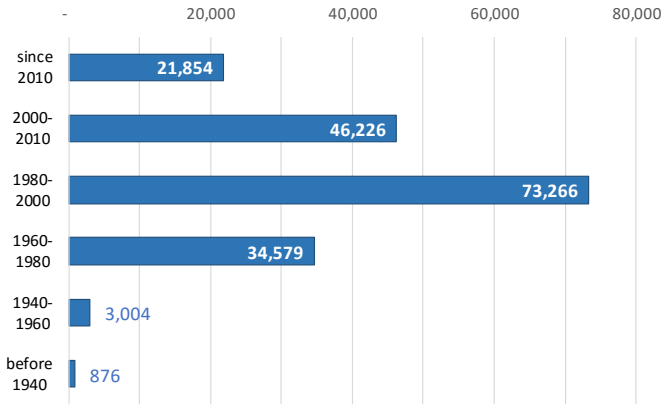
Housing Stock by Tenure & Type



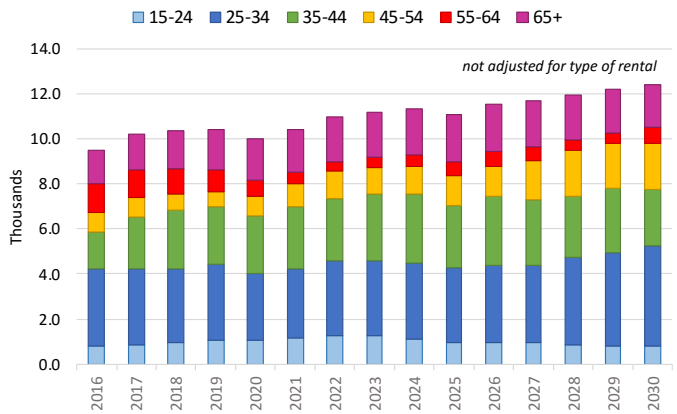
Rent as a Percent of Household Income



5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



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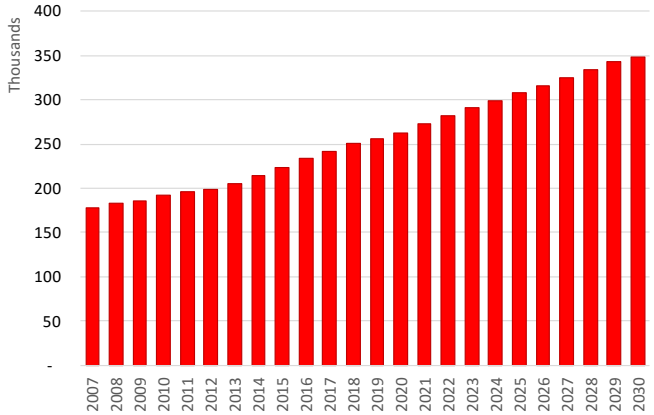
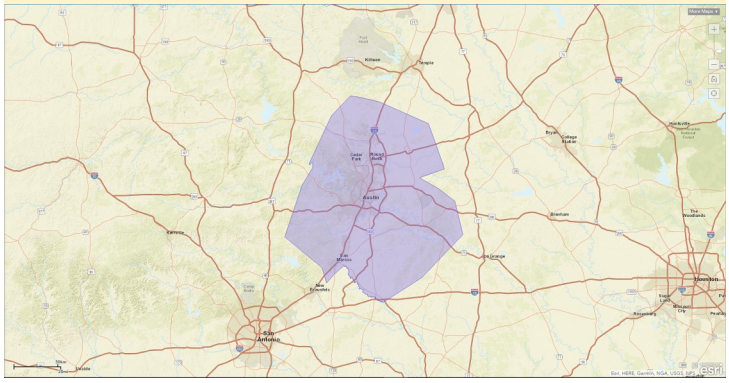
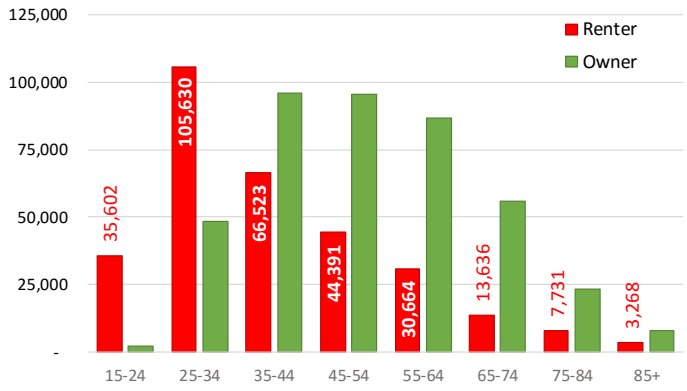


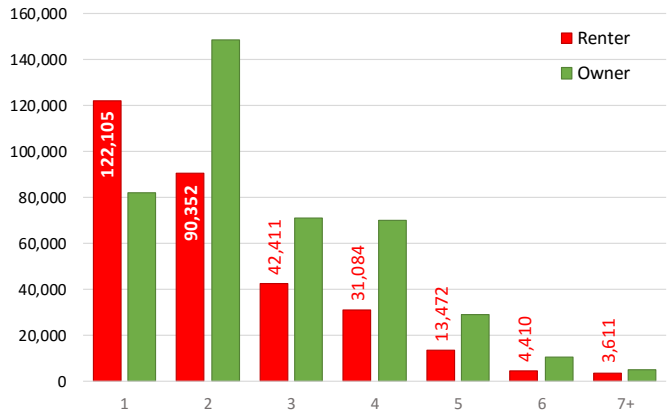
AUSTIN page 2



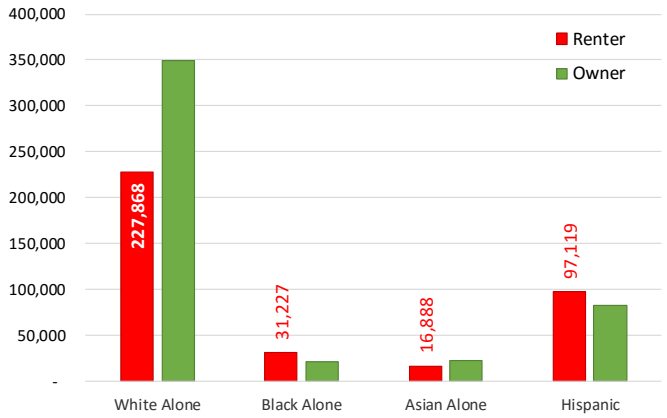
Households by Age Cohort



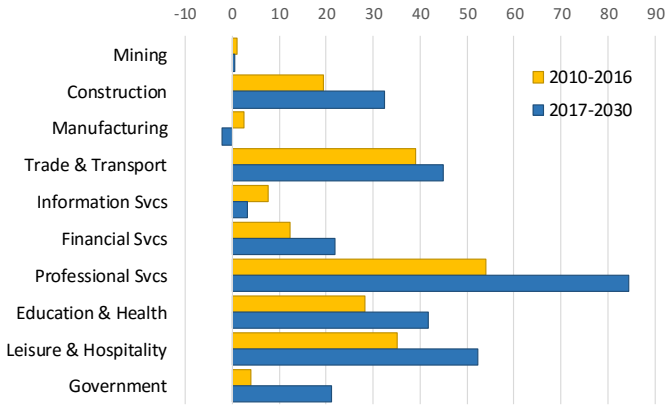
Households by Occupants



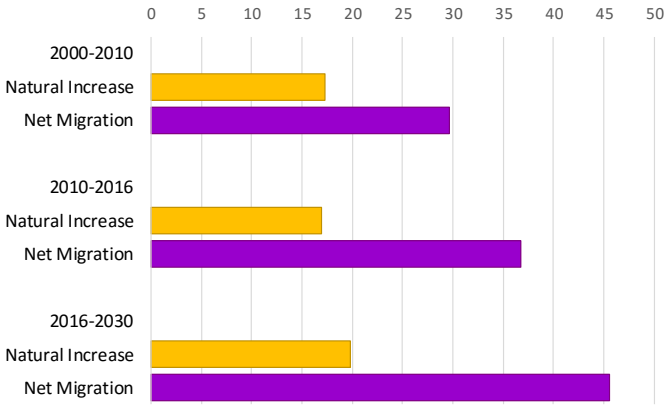
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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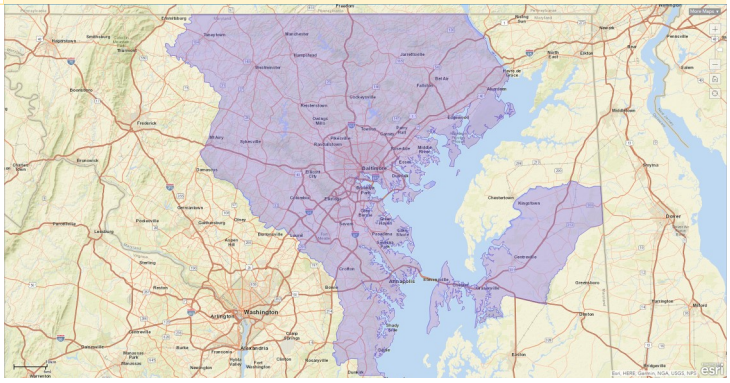
METRO MULTIFAMILY DEMAND OVERVIEW

BALTIMORE

Fewer in migrations now and ahead leave natural population increases as to source household growth. Economic growth expected in most sectors. Rental household growth strongest in ages 35-44 and seniors over 65, while fairly diverse in range of incomes, ages and household size. Multi-family demand consistently increases after 2009.

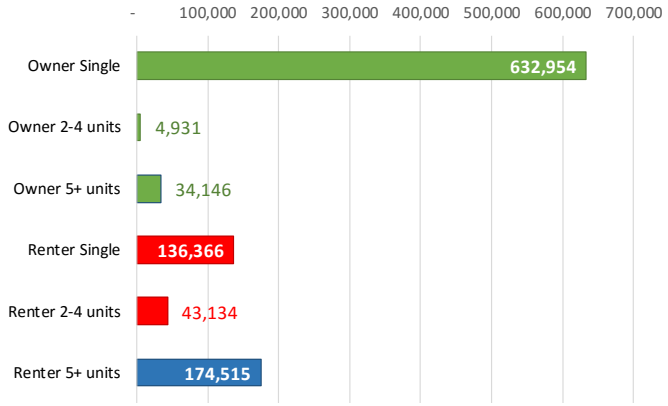
Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
36	199	11.9	31%

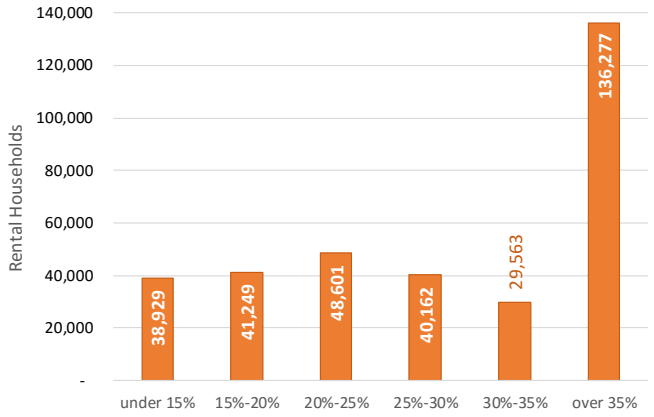


Rental Households by Income

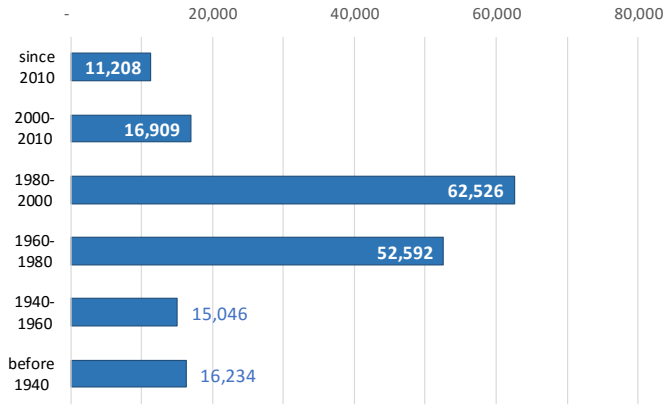
Housing Stock by Tenure & Type



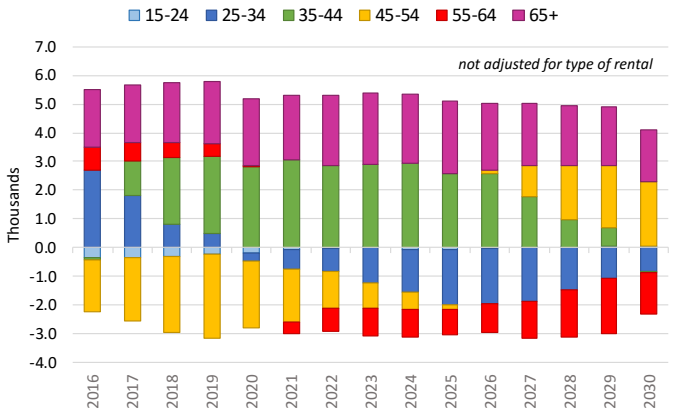
Rent as a Percent of Household Income



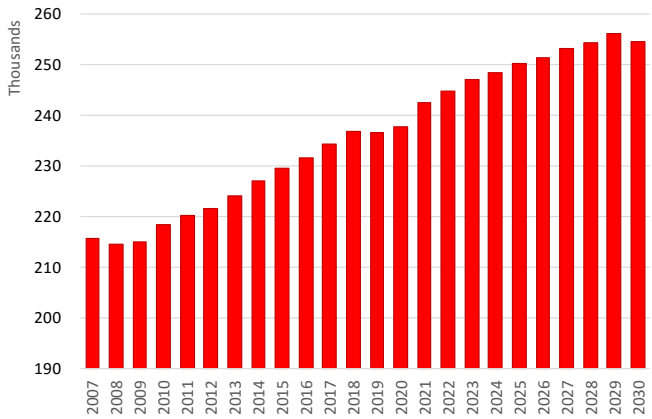
5+ Unit Rental Stock by Year Built



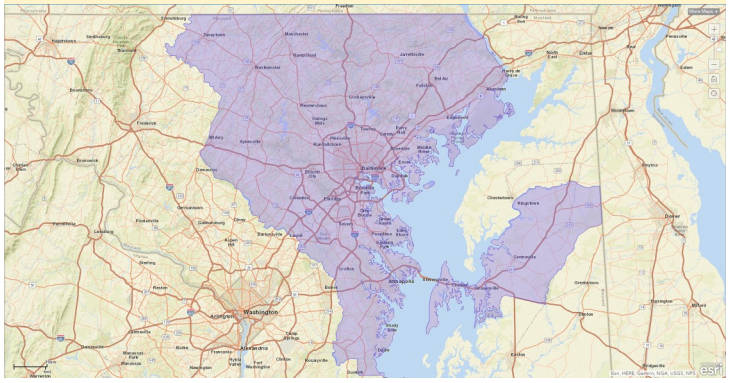
New Rental Households by Age Cohort



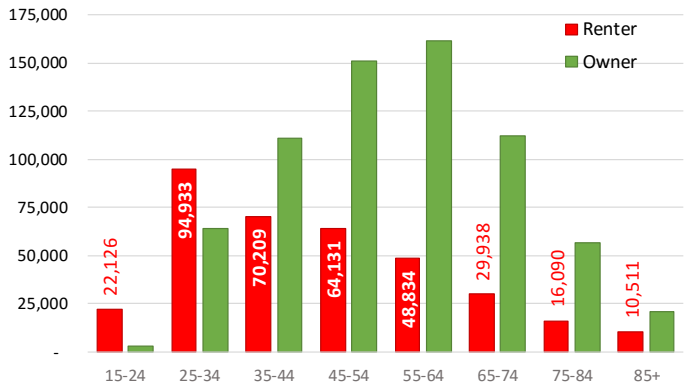
5+ Unit Apartment Demand Forecast



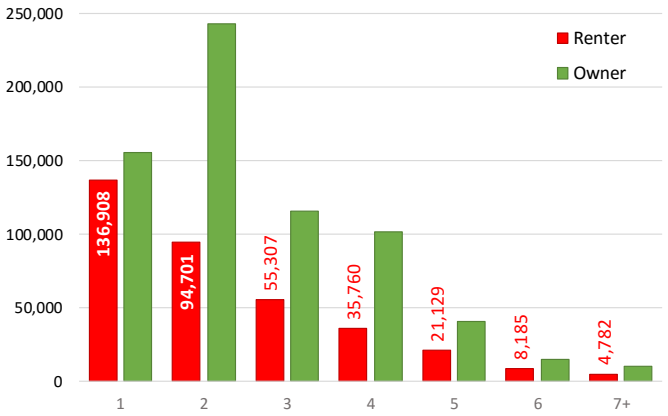
BALTIMORE page 2



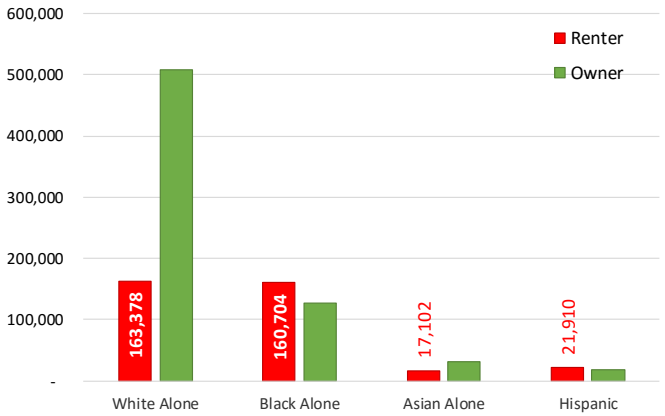
Households by Age Cohort



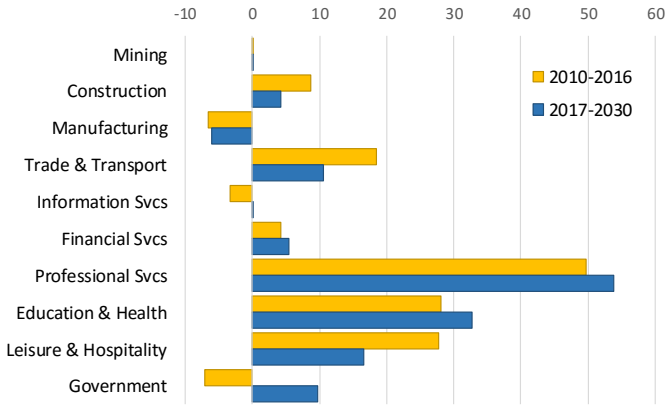
Households by Occupants



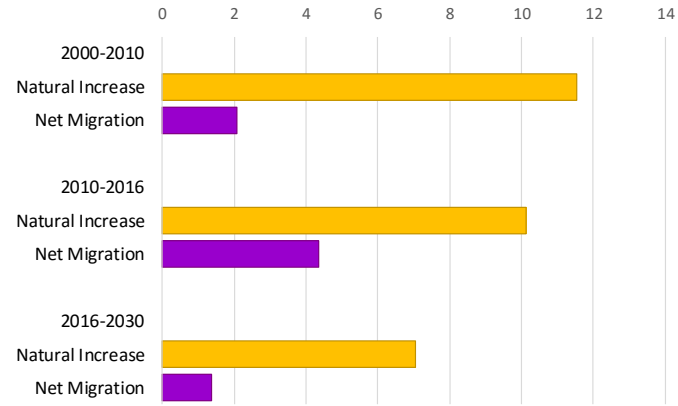
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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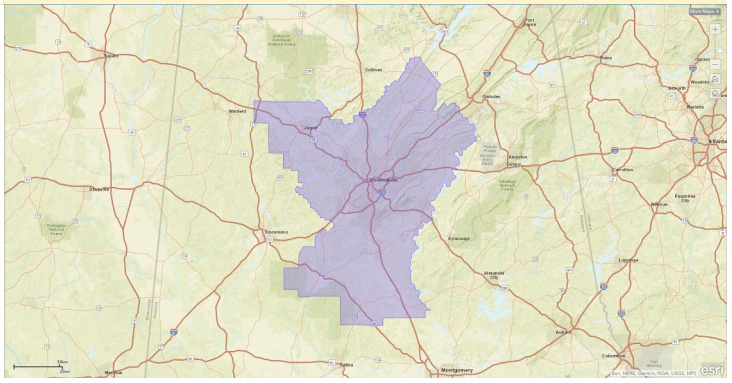
NMHC NATIONAL MULTIFAMILY HOUSING COUNCIL · NAA NATIONAL APARTMENT ASSOCIATION · HAS · University of San Diego SCHOOL OF BUSINESS · WREA · dfm

Version 1

METRO MULTIFAMILY DEMAND OVERVIEW

BIRMINGHAM

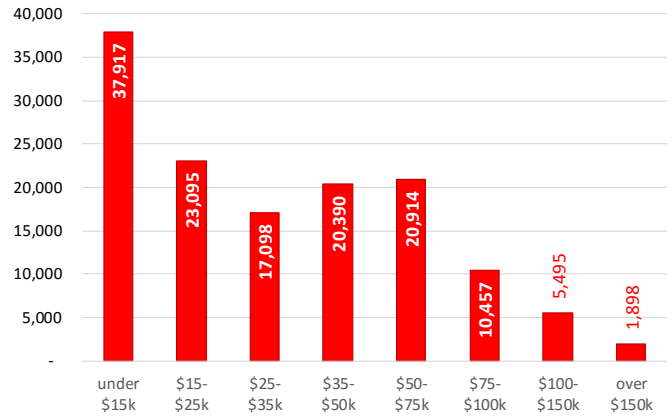
Though minor in the last six years, in migrations will source the greatest share of new renter households. Fair economic prospects with job growth in most sectors. Rental market is led by smaller households, varied ages and incomes up to $75,000. Nearly a third of multifamily units are seen in affordable STAR product. Modest increasing demand ahead.



Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
48	203	-1.1	32%

Rental Households by Income



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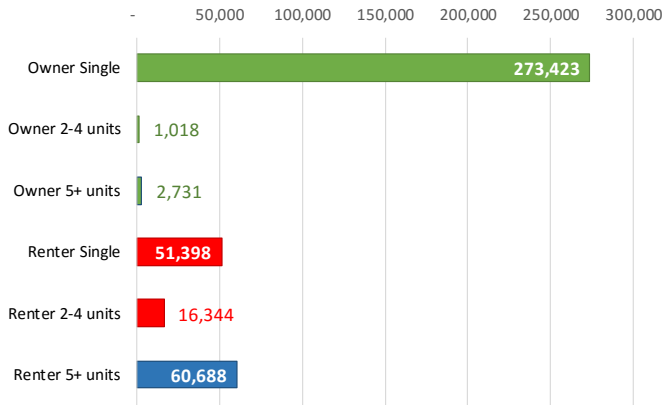
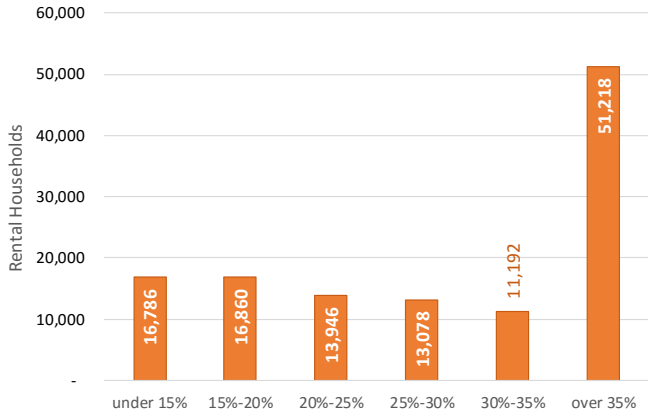
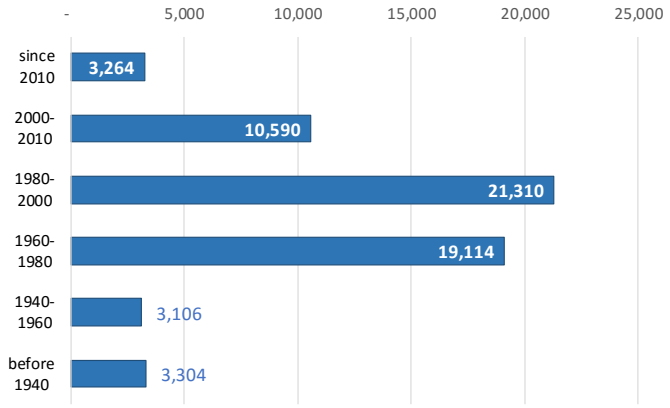


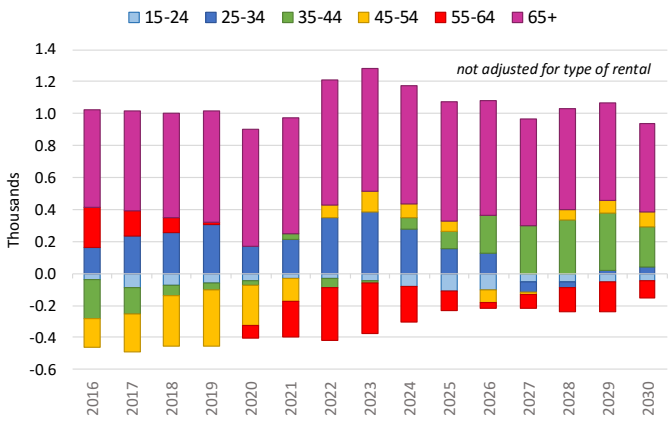
Rent as a Percent of Household Income



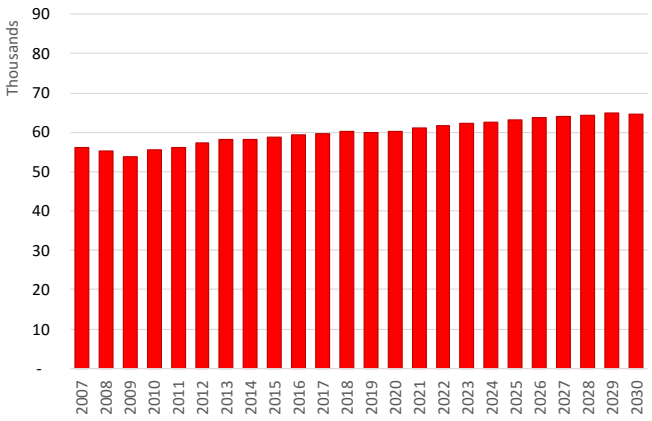
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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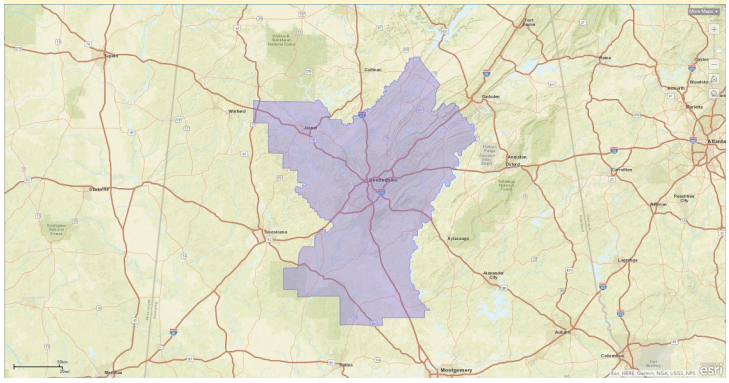
BIRMINGHAM page 2



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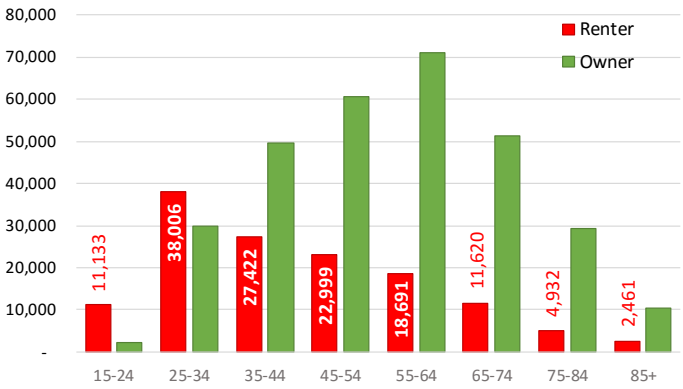

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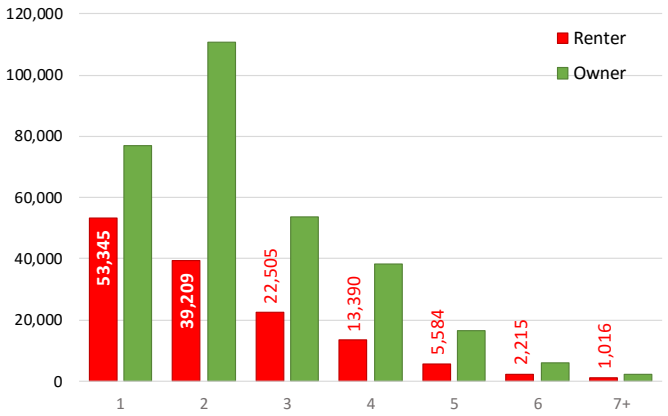

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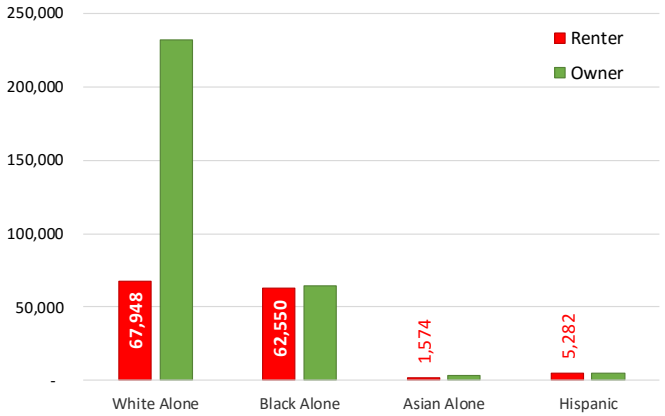
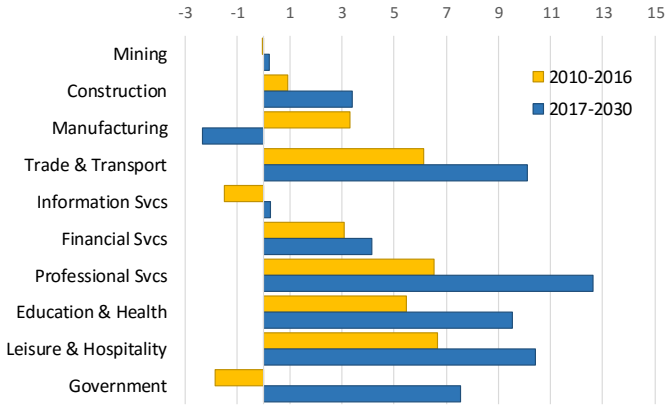


Employment Growth by Sector ('000s)



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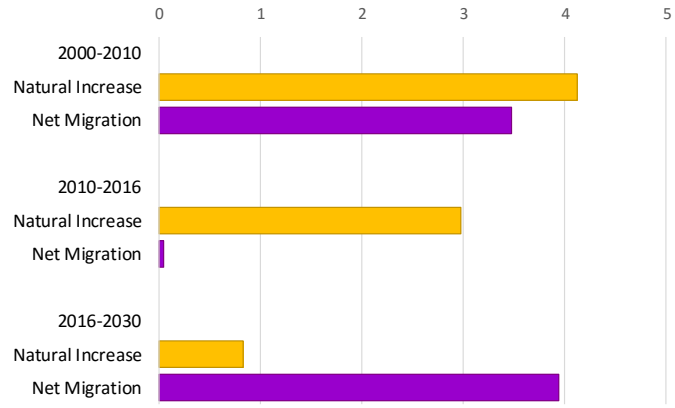

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METRO MULTIFAMILY DEMAND OVERVIEW

BOSTON

Strong economic growth prospects. Net in migration exceeds local population increases and is important to the metro economy. Supply restrictions are led by land use regulation that ranks Boston near the bottom of supply opportunities. Most rents are over 35% of income amid younger rental householders, good housing affordability and smaller household size.

Definitions on back

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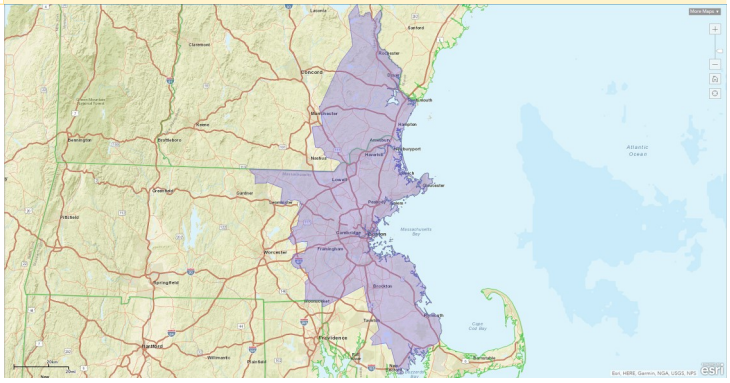
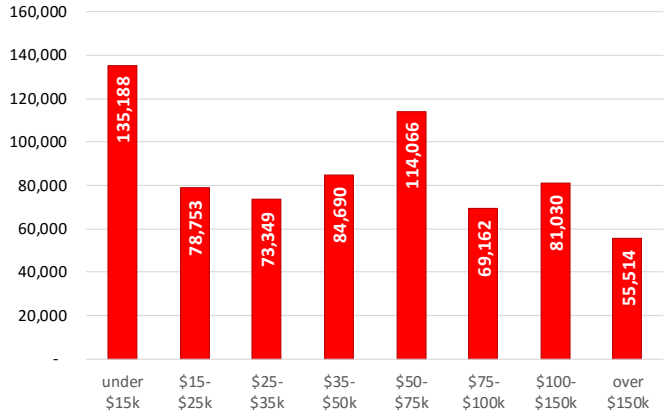
23	141	13.1	40%



Rental Households by Income



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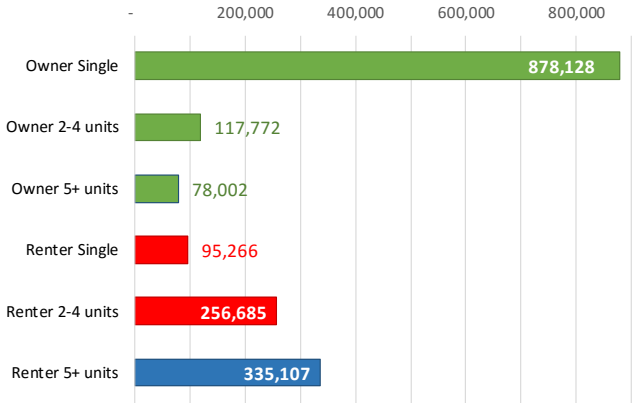
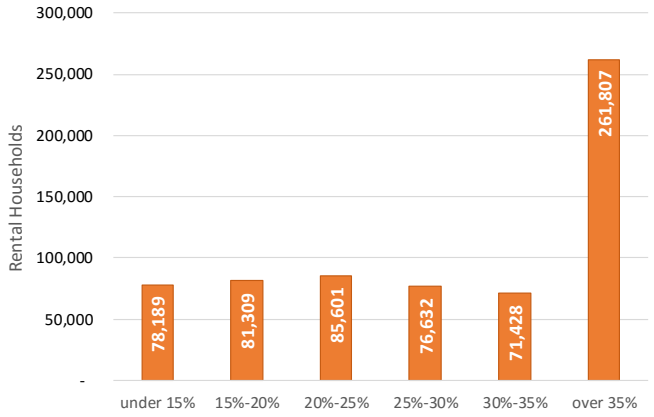
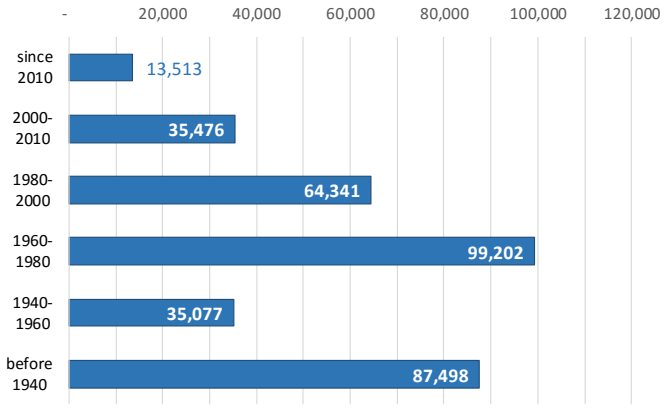


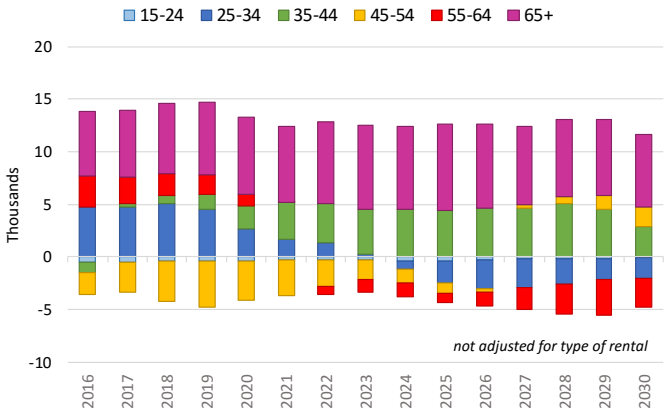
Rent as a Percent of Household Income



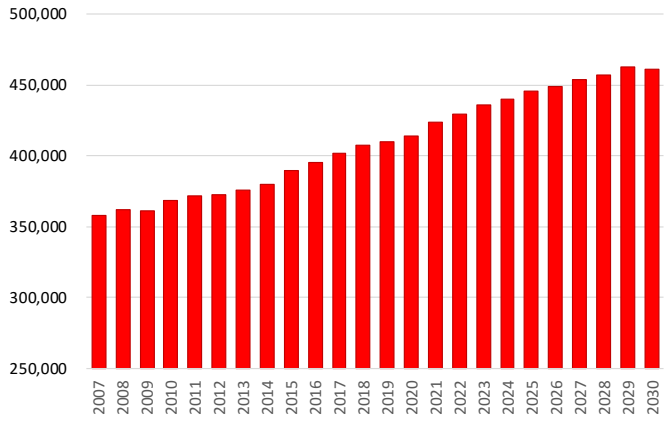
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort

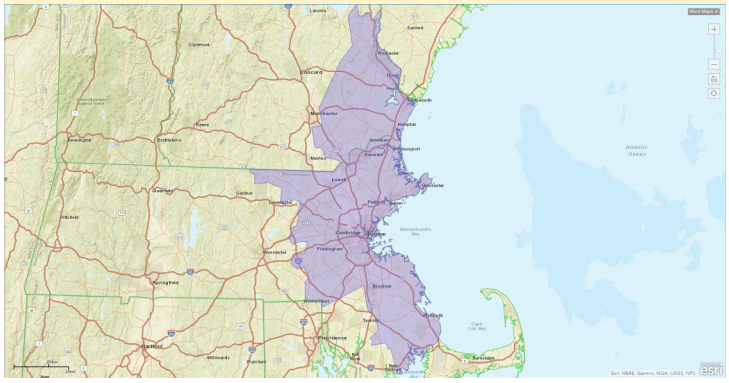


5+ Unit Apartment Demand Forecast

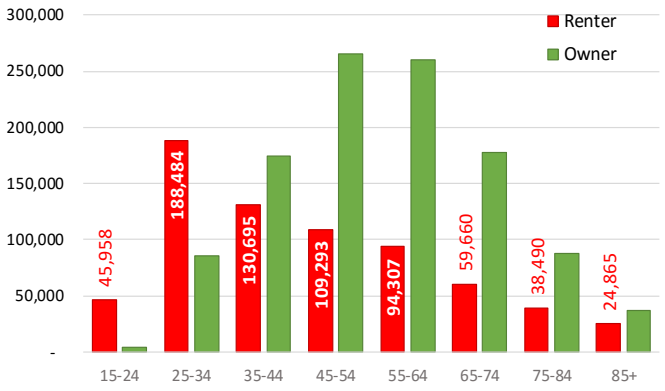


Version 1

BOSTON page 2



Households by Age Cohort



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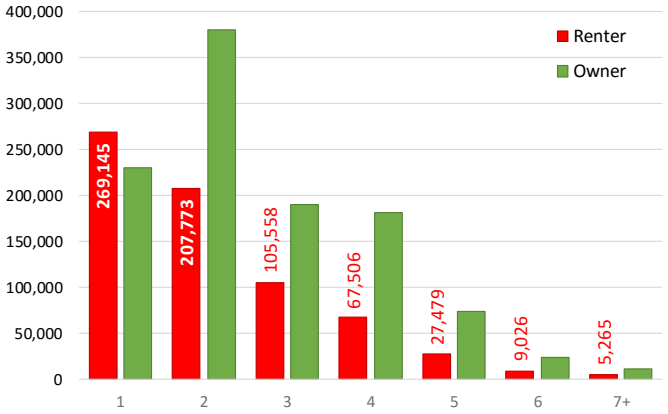

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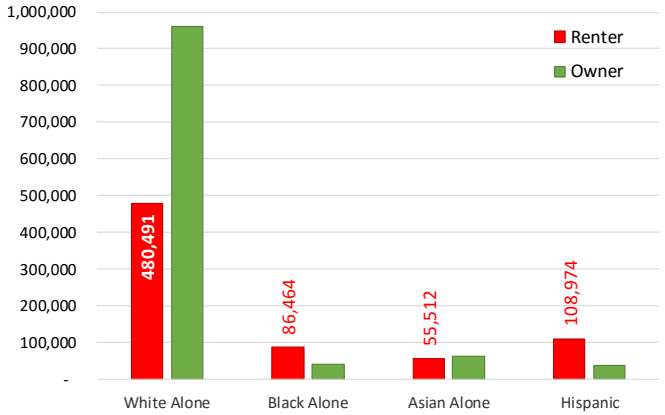
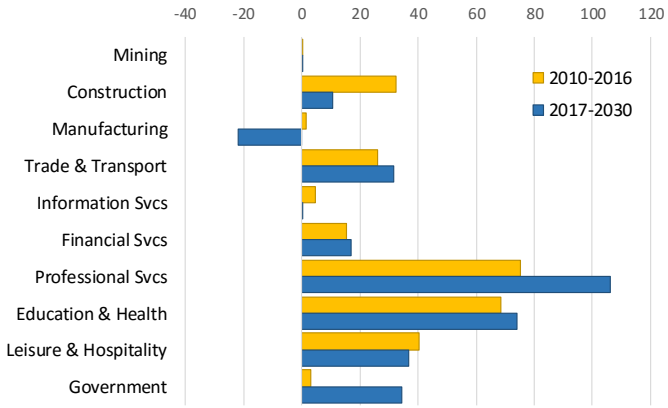
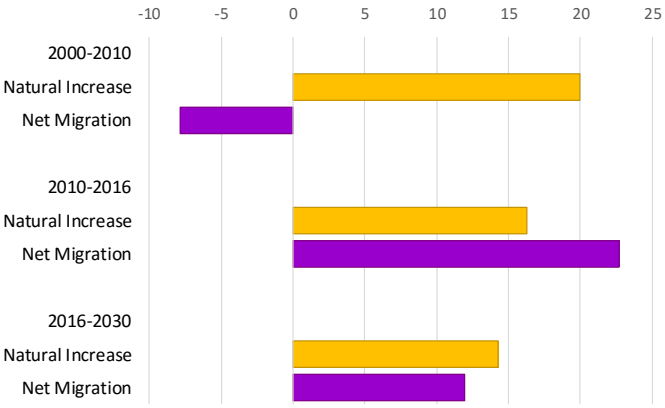


Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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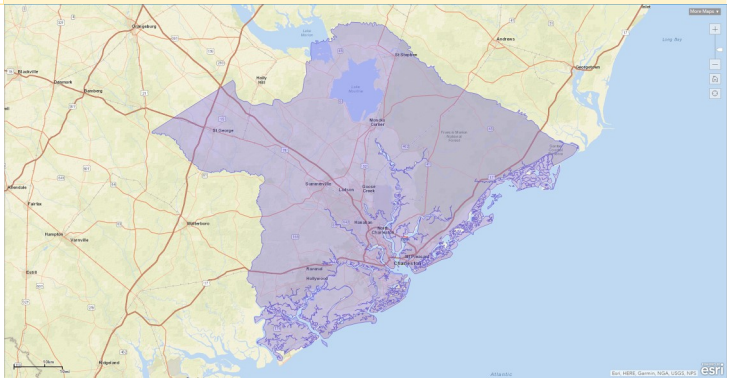
METRO MULTIFAMILY DEMAND OVERVIEW

CHARLESTON

Net in migration significantly exceeds local natural population increases and is important to the economy. New rental households will span all the age cohorts. Reasonable economic growth seen in all major job sectors. Rental housing stock is relatively new compared with other metros, yet over a third is seen in more affordable STAR units.

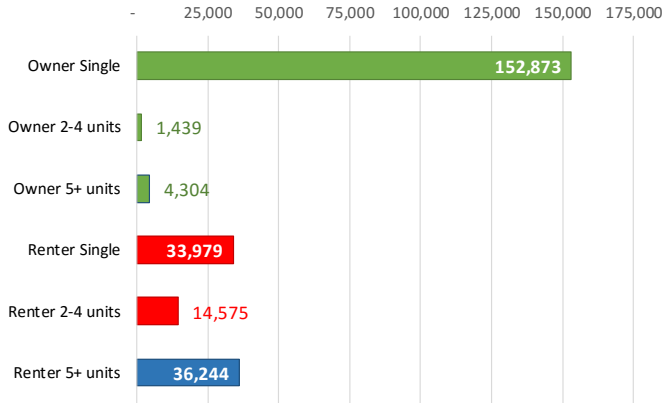
Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
29	163	-3.5	35%

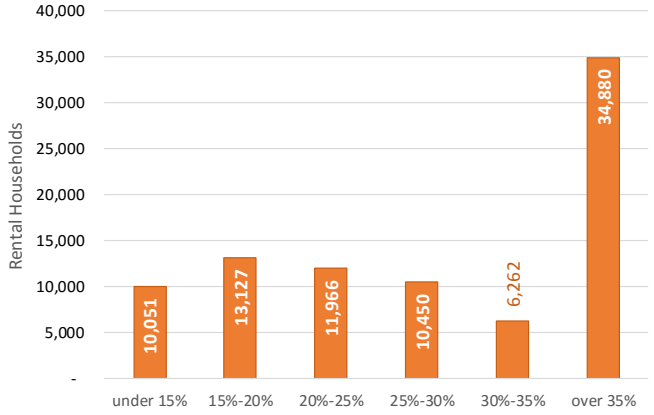


Rental Households by Income

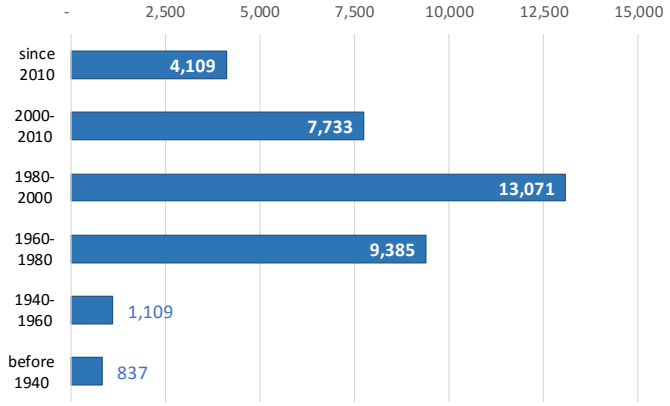
Housing Stock by Tenure & Type



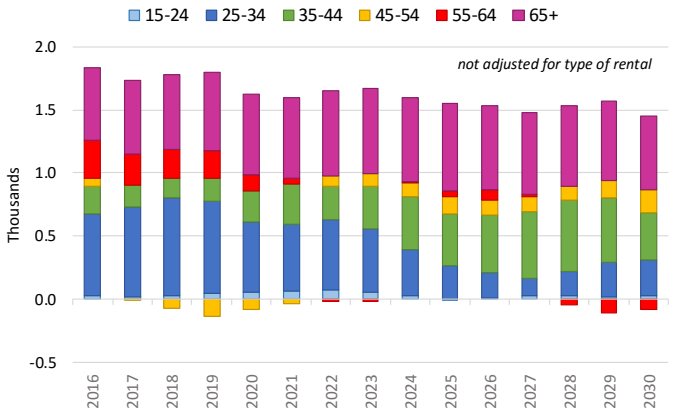
Rent as a Percent of Household Income



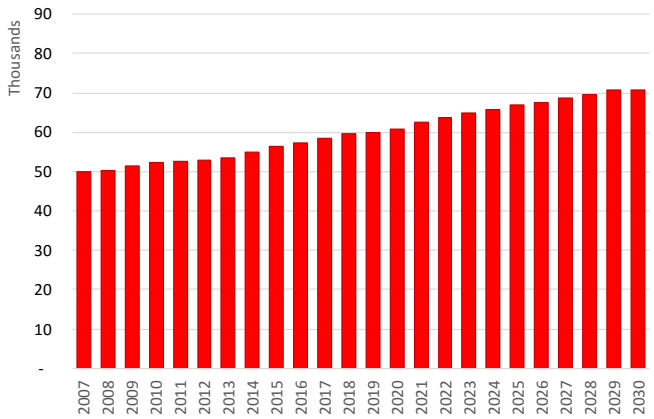
5+ Unit Rental Stock by Year Built



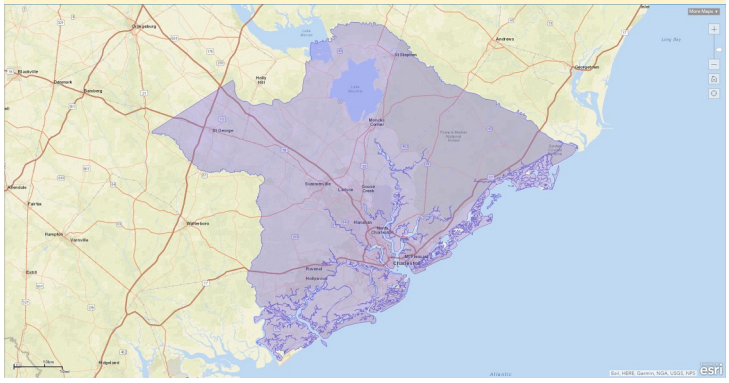
New Rental Households by Age Cohort



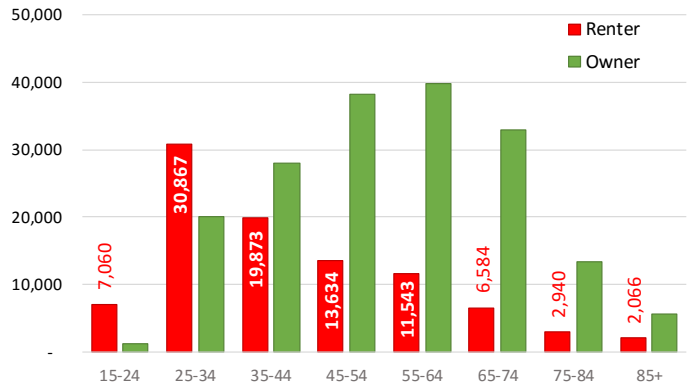
5+ Unit Apartment Demand Forecast



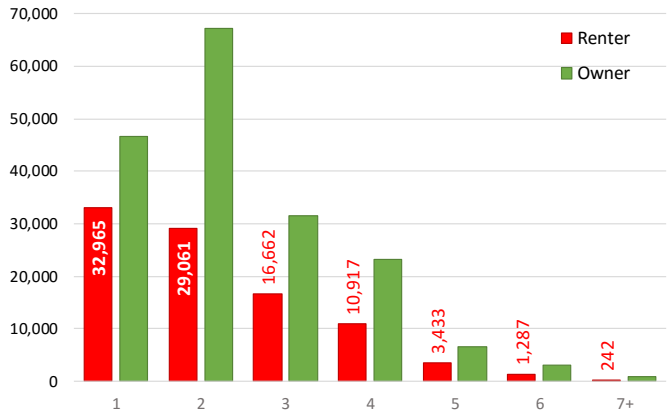
CHARLESTON page 2



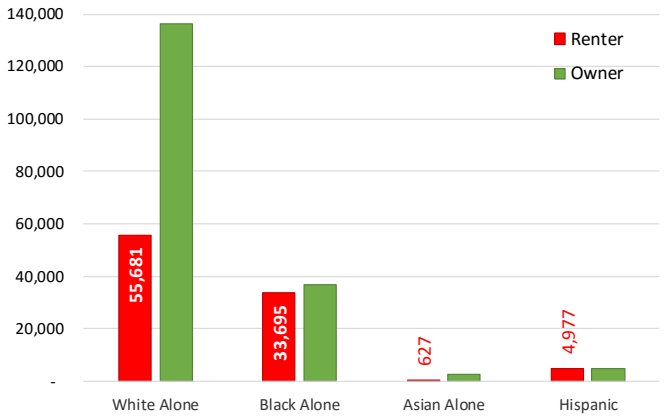
Households by Age Cohort



Households by Occupants



Households by Ethnicity and Origin



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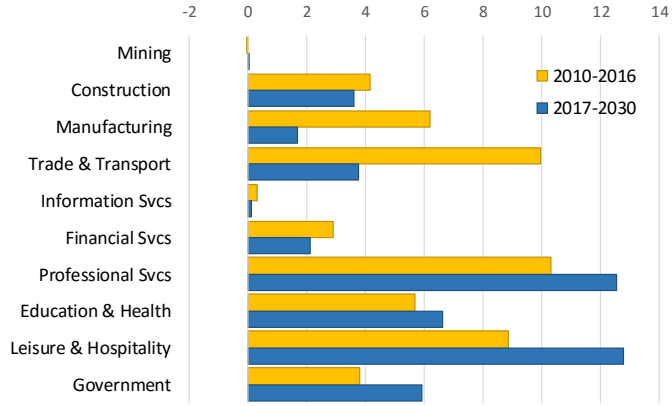
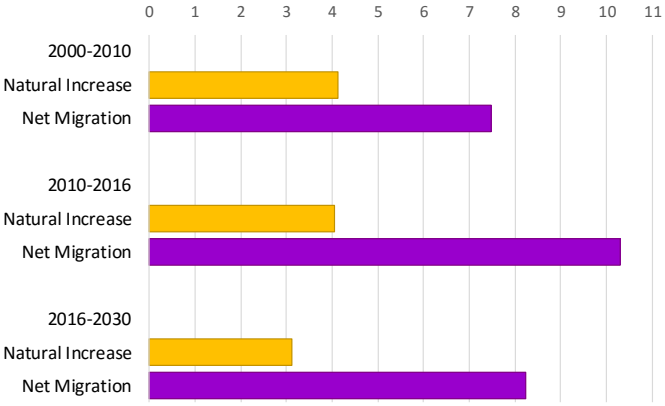


Avg Annual Population Change (000's)



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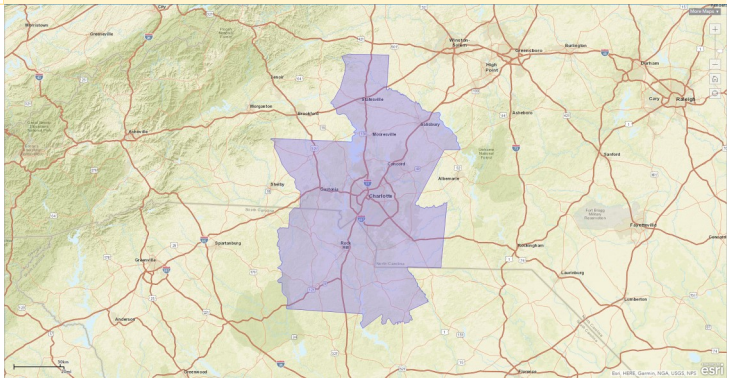
METRO MULTIFAMILY DEMAND OVERVIEW

CHARLOTTE

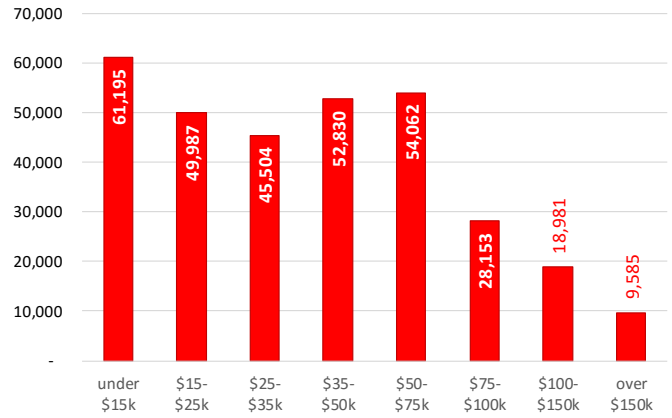
Already significant, net in migrations become a larger source of new renter households ahead. Good economic prospects are led by professional services and trade. Rental stock is young and scaled. Like Raleigh, Orlando and Austin, more affordable STAR units account for less than a fifth of metro rentals. Well located metro with an excellent airport.



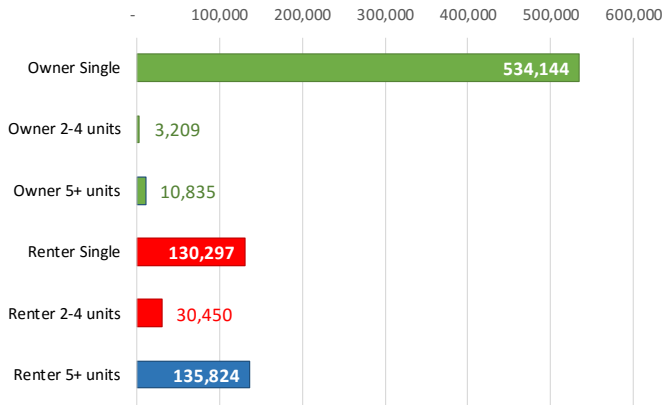
Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
10	182	-3.5	18%

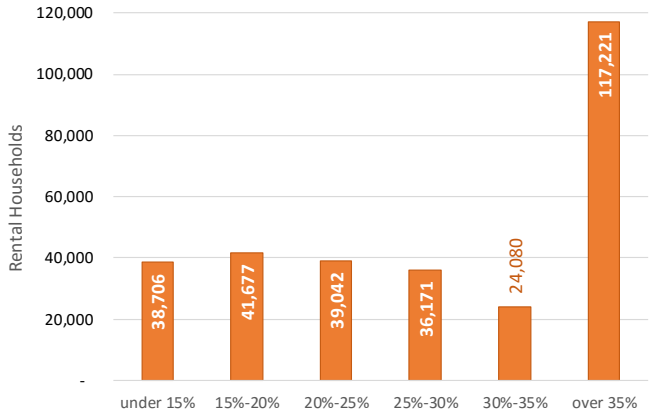
Rental Households by Income



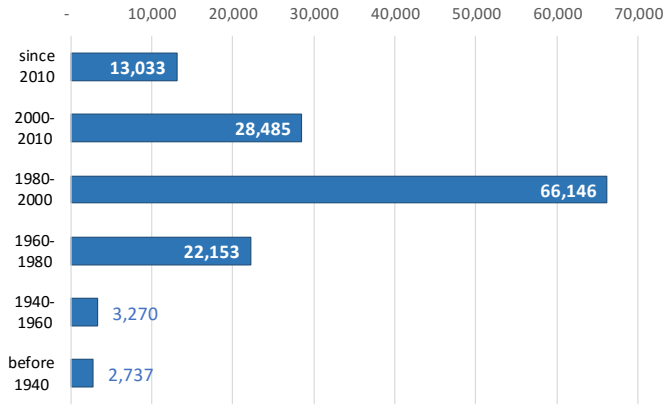
Housing Stock by Tenure & Type



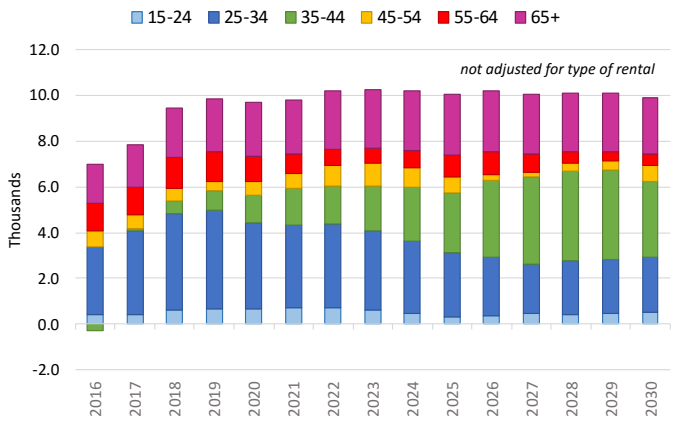
Rent as a Percent of Household Income



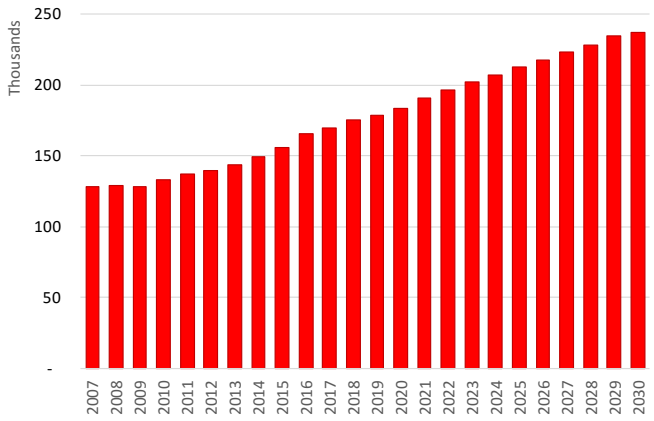
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

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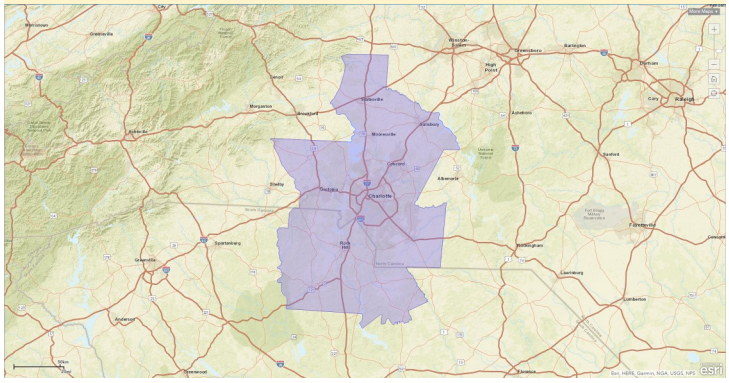
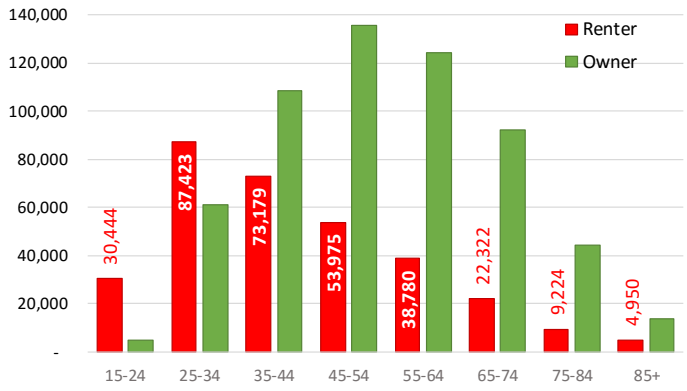
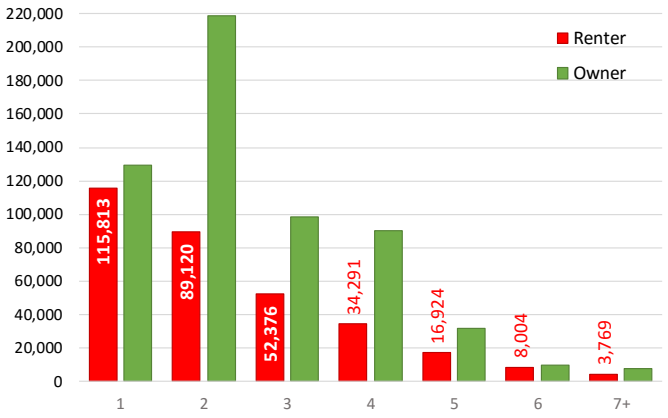


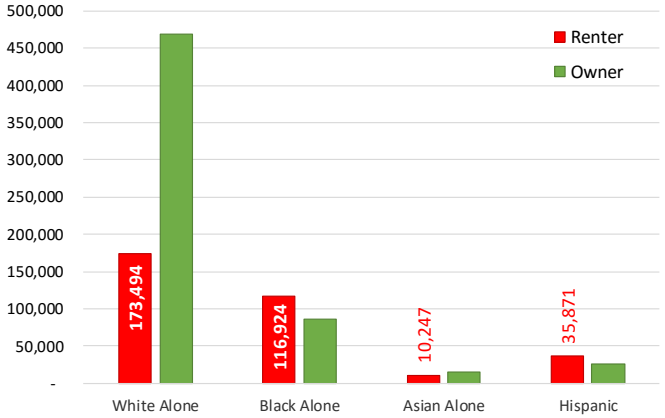
Households by Age Cohort



Households by Occupants



Households by Ethnicity and Origin



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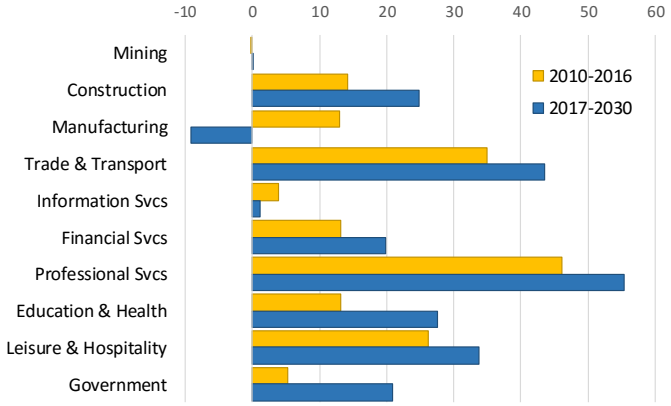

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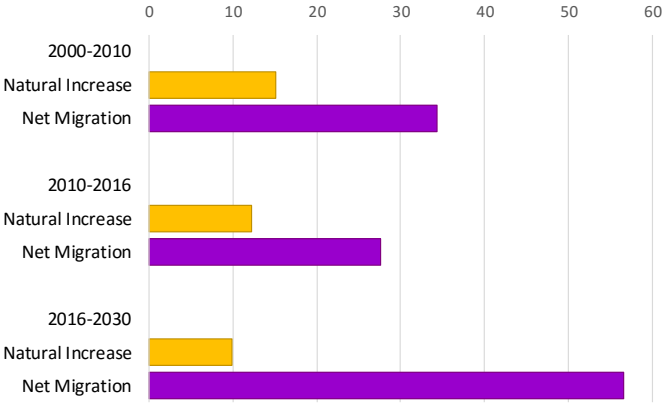

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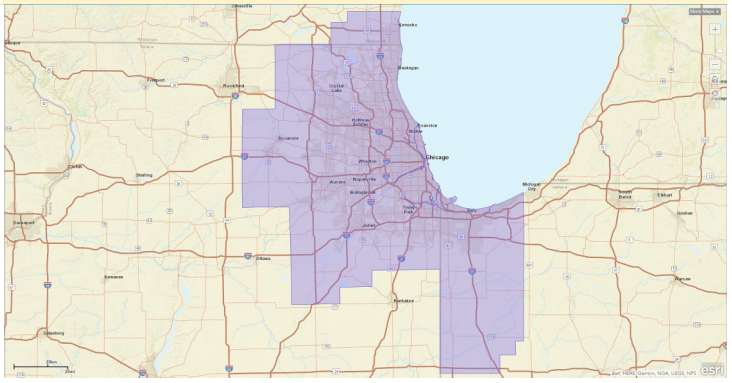
METRO MULTIFAMILY DEMAND OVERVIEW

CHICAGO

Net in migrations have been and are expected to remain negative, relying upon natural population increases for renter household growth. Reasonable economic prospects with good job growth and a heavy dependence on Mexico and Canada. Nearly 40% of multifamily is in affordable STAR units. Single and two-person households dominate rental homes.

Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
34	191	1.6	39%



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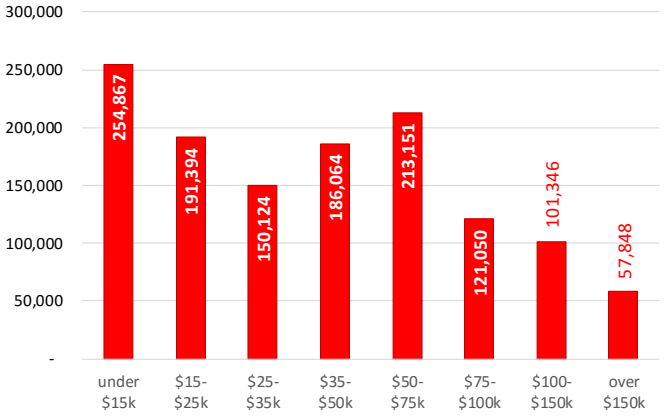

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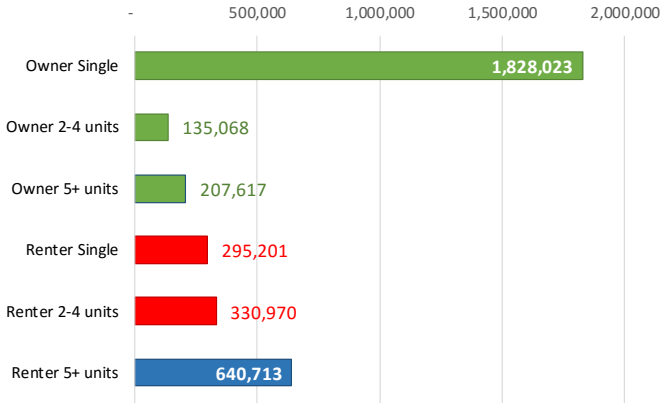
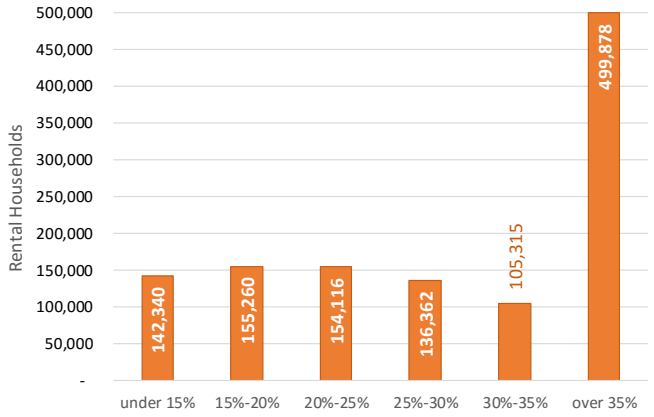
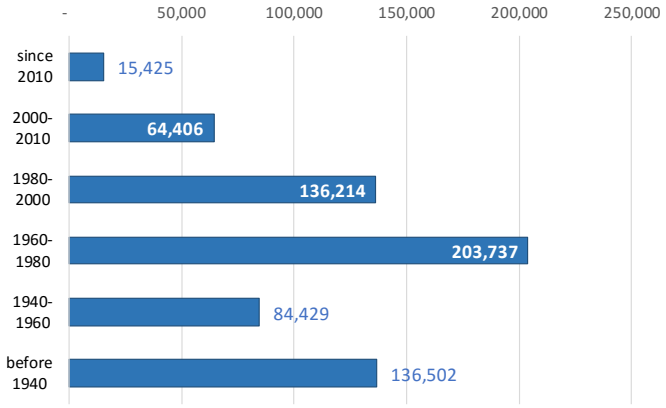


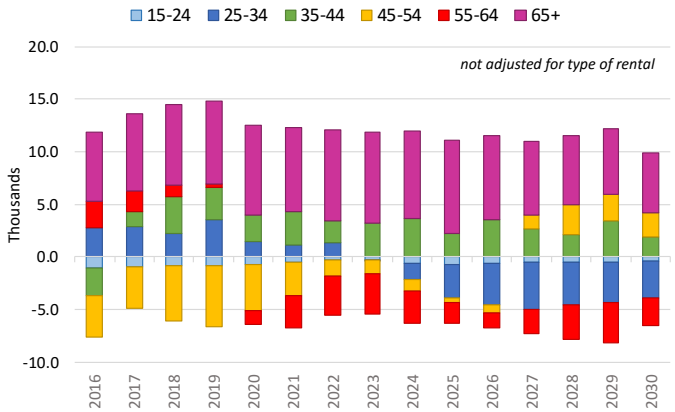
Rent as a Percent of Household Income



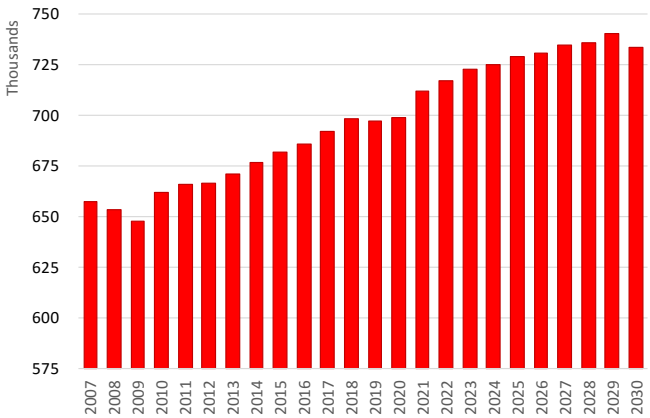
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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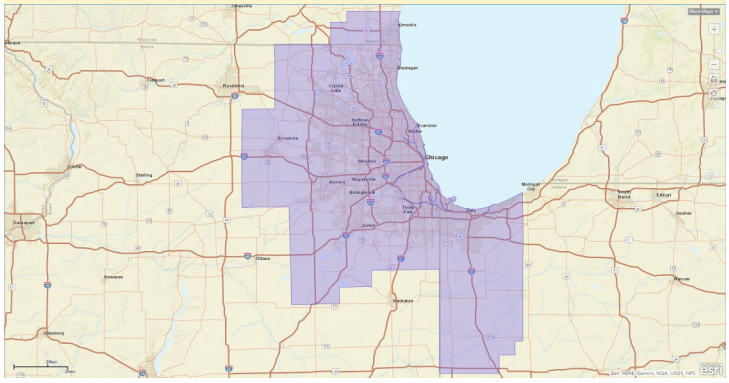
CHICAGO page 2



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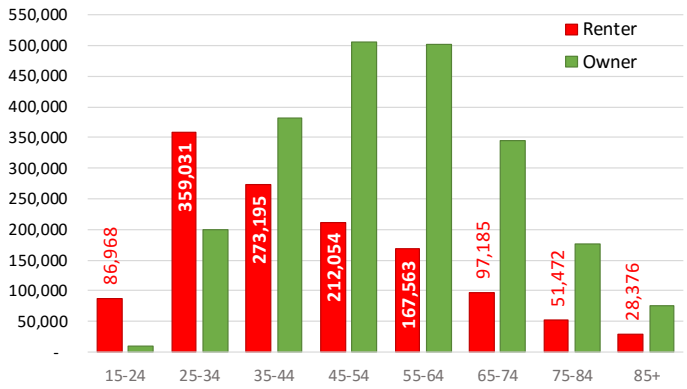
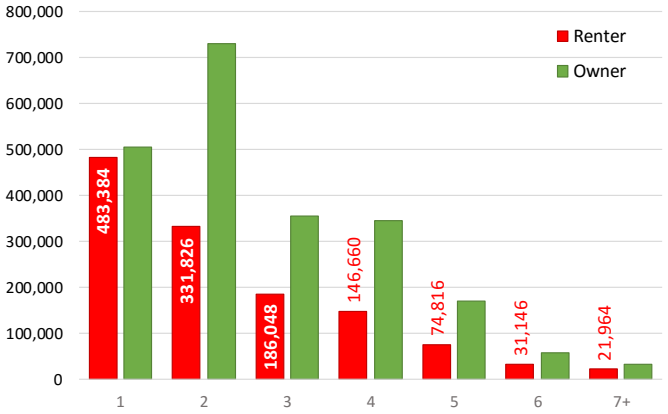


Households by Occupants



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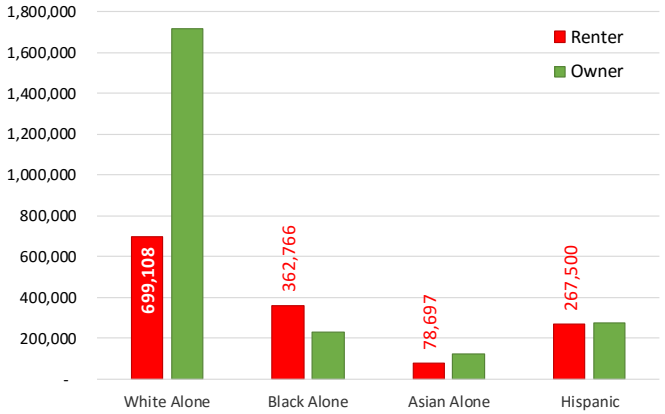

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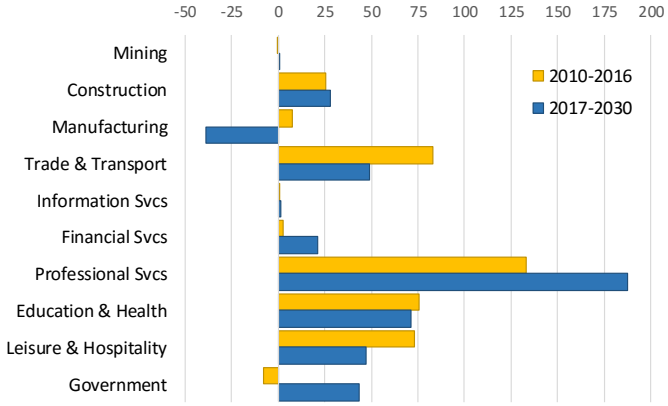

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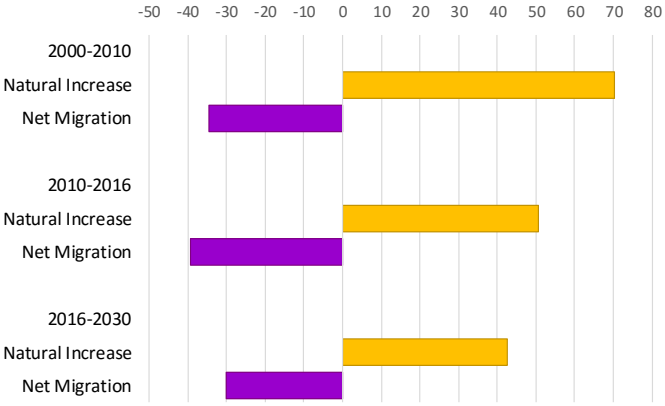

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METRO MULTIFAMILY DEMAND OVERVIEW

CINCINNATI

Metro has relied on natural growth for rental household formations, though modest in migrations will contribute ahead. Economy is stable and growing, despite declines in key manufacturing sector. Rental stock is older with nearly half seen in more affordable STAR units. Annual multi-family demand is flat for next two years, then steadily increases to 2030.

Definitions on back

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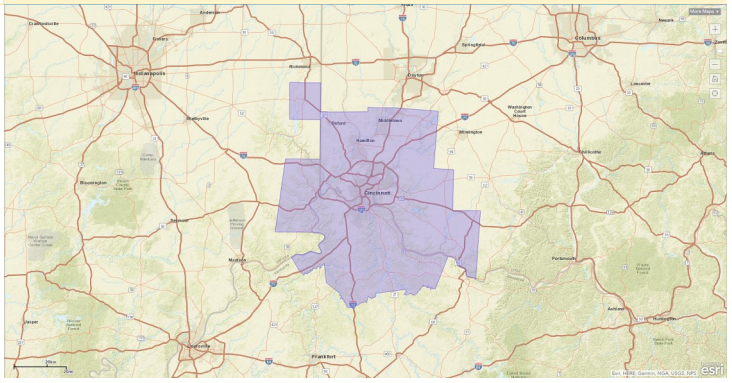
38	272	-3.7	48%



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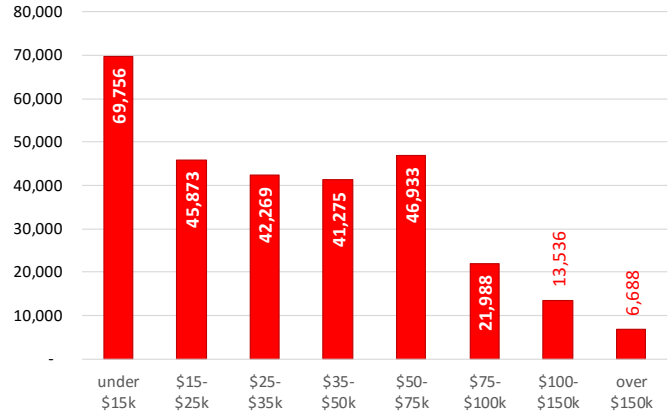

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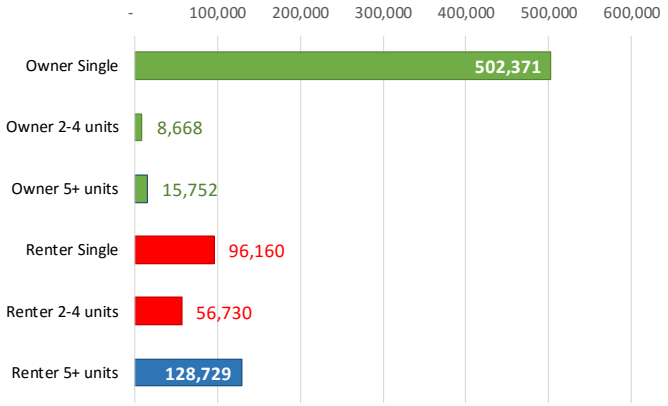
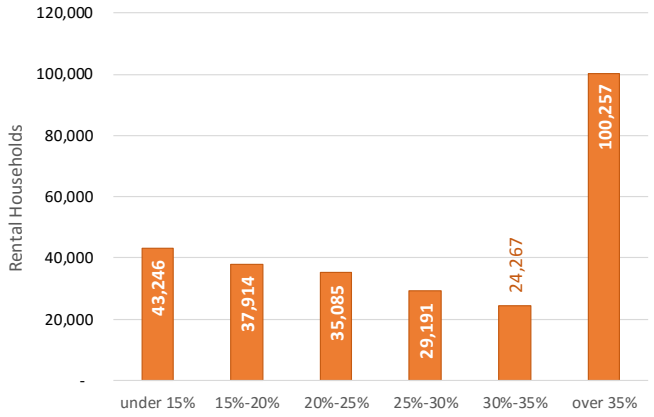
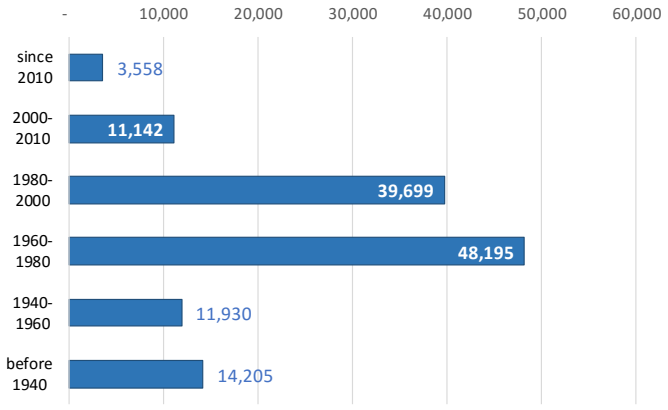


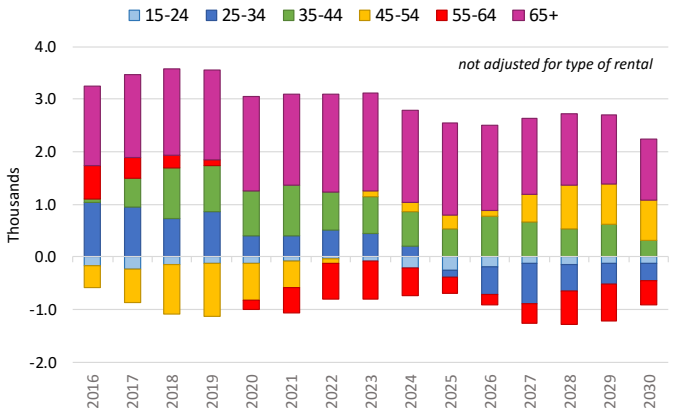
Rent as a Percent of Household Income



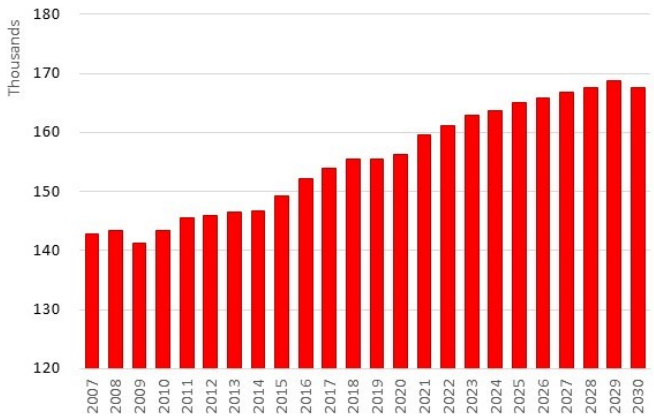
5+ Unit Rental Stock by Year Built



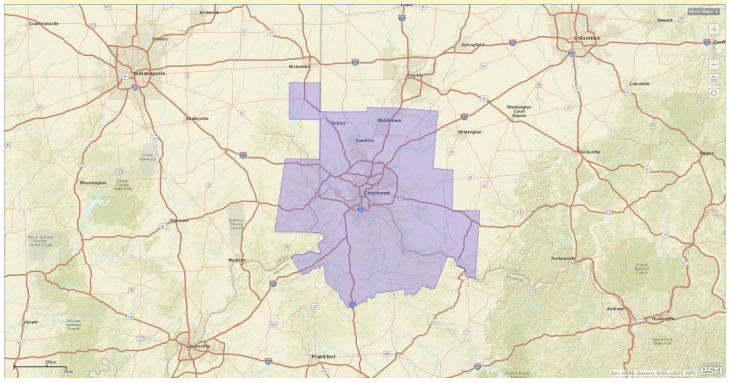
New Rental Households by Age Cohort



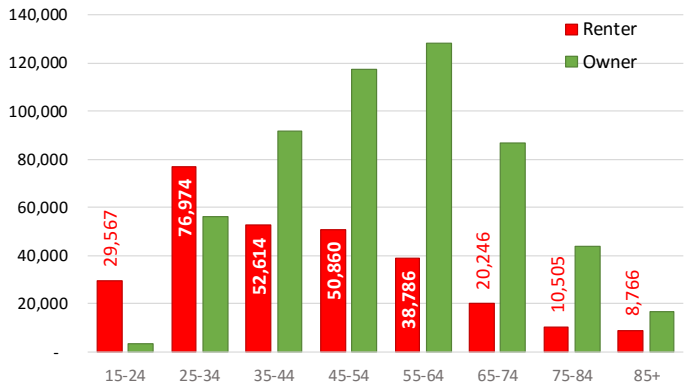
5+ Unit Apartment Demand Forecast



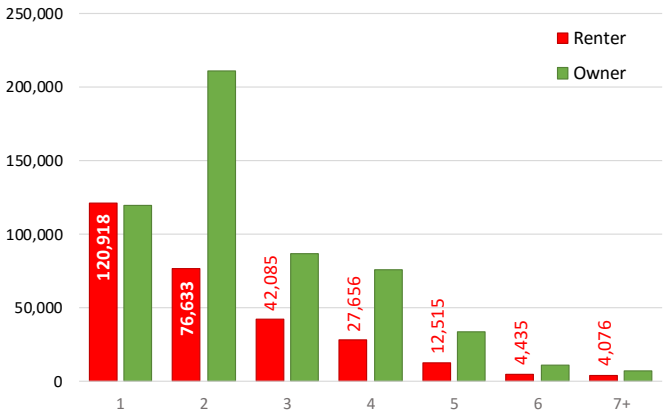
CINCINNATI page 2



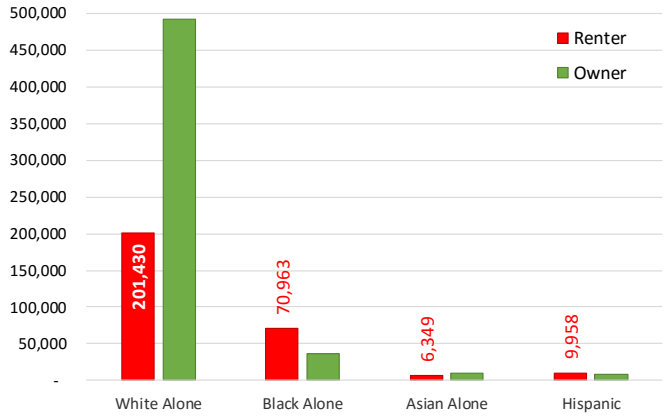
Households by Age Cohort



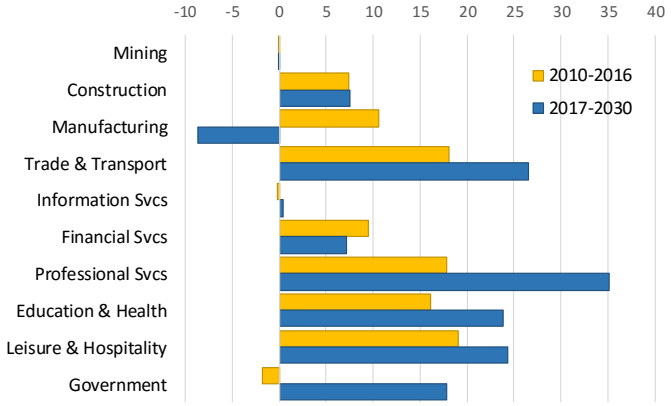
Households by Occupants



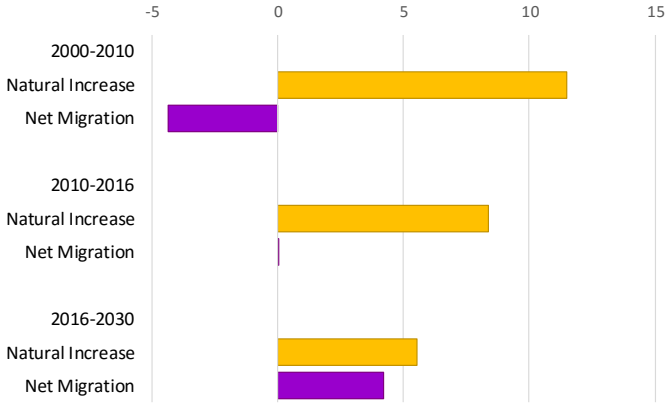
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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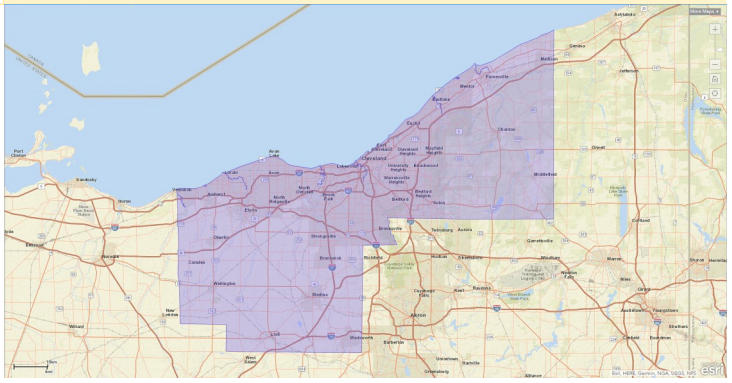
METRO MULTIFAMILY DEMAND OVERVIEW

CLEVELAND

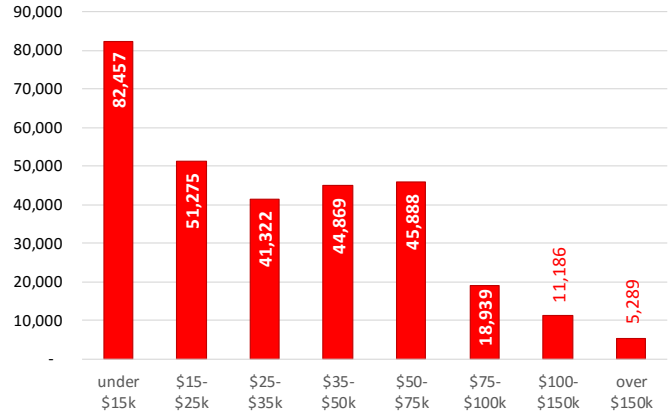
Growth likely to be concentrated in certain neighborhoods as overall net in -migration is negative with little natural growth. Renter household growth ahead primarily in the 65+ aged cohorts. Although forecast to decline, the manufacturing sector grew slightly in 2010-16; thus could surprise on the upside if it continues to grow. Older stock and nearly half in STAR units.

Definitions on back

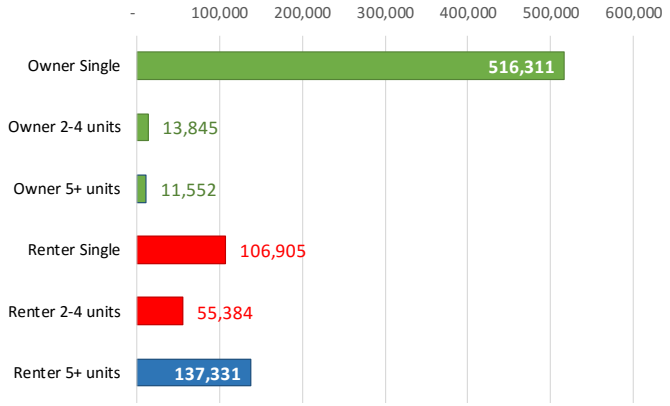
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
50	291	0.3	46%



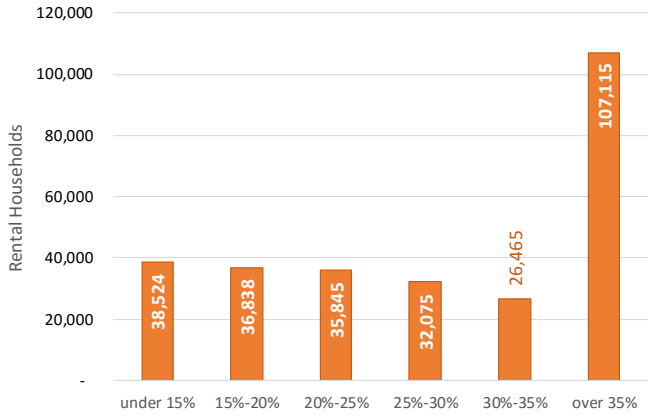
Rental Households by Income



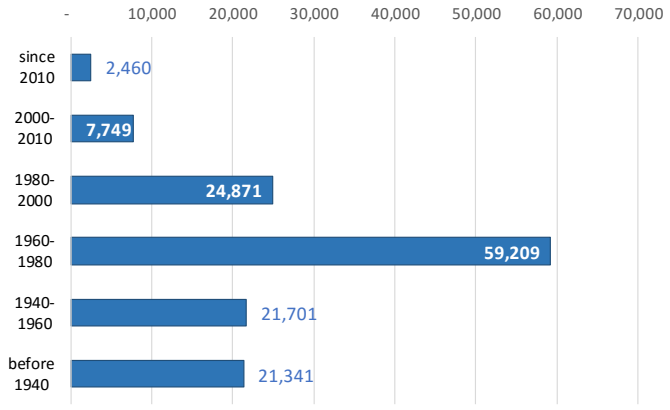
Housing Stock by Tenure & Type



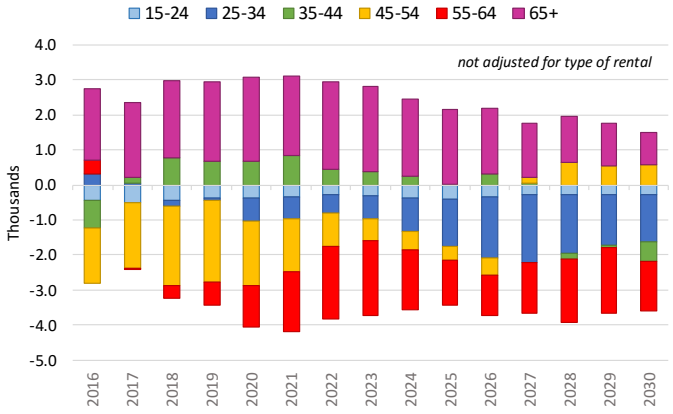
Rent as a Percent of Household Income



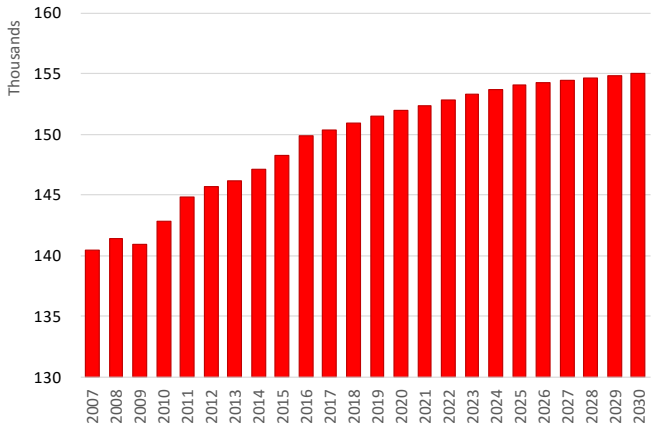
5+ Unit Rental Stock by Year Built



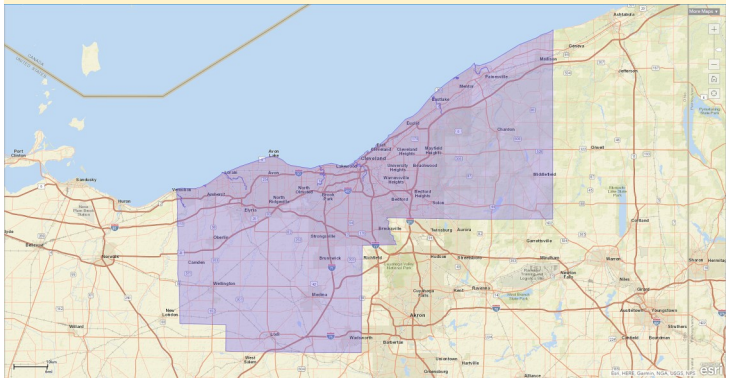
New Rental Households by Age Cohort



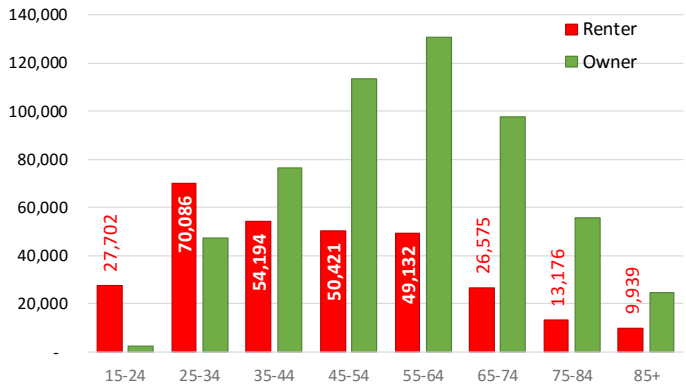
5+ Unit Apartment Demand Forecast



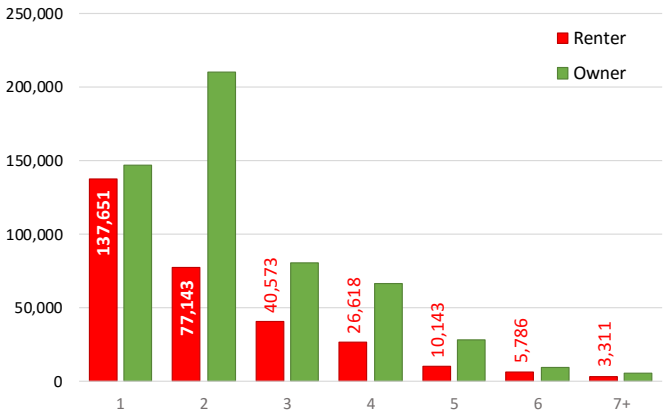
CLEVELAND page 2



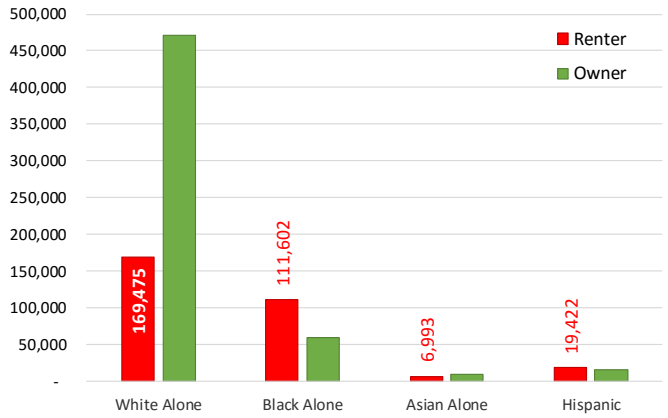
Households by Age Cohort



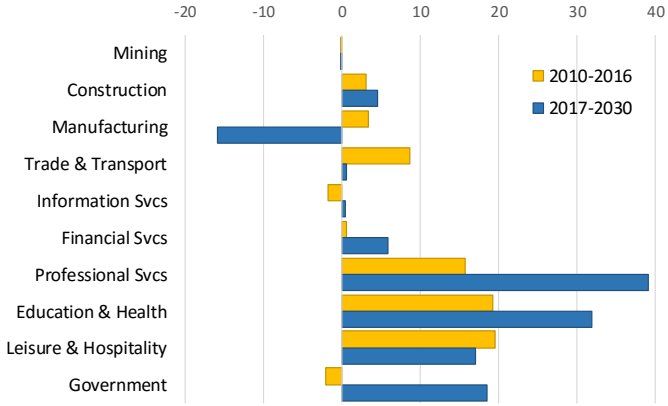
Households by Occupants



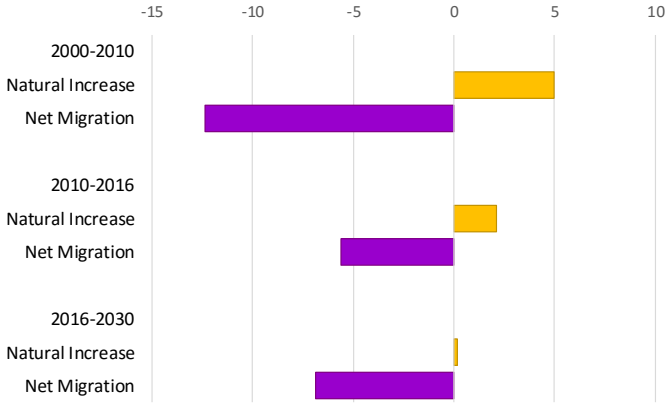
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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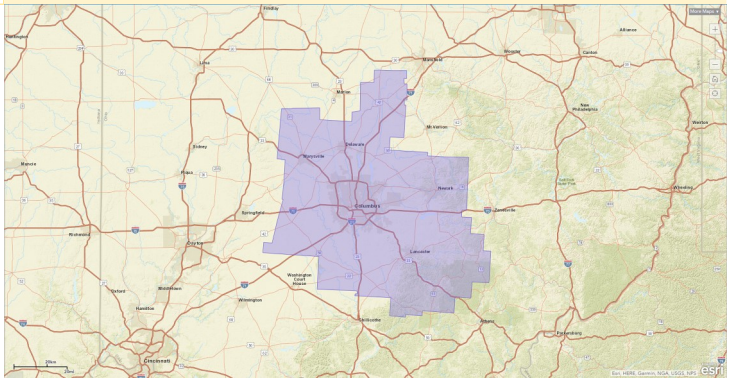
METRO MULTIFAMILY DEMAND OVERVIEW

COLUMBUS

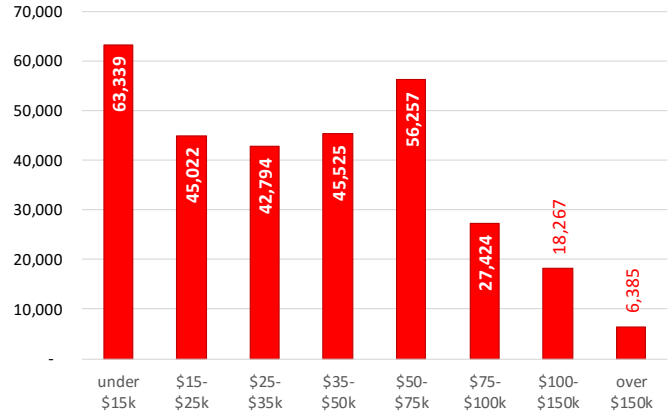
Net in migrations account for half of the new household formations. Good renter depth in younger, single households with incomes up to $75,000. Older rental stock, with most units over 20 years old. Government and education sectors result in extremely stable economy. Rental vacancies are in balance with steady multifamily demand ahead.

Definitions on back

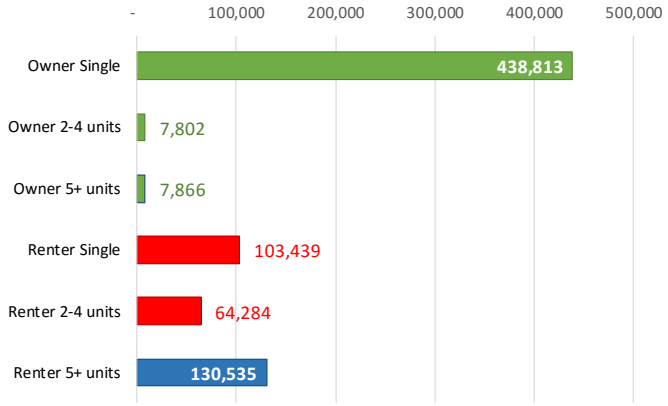
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
28	231	1.9	39%



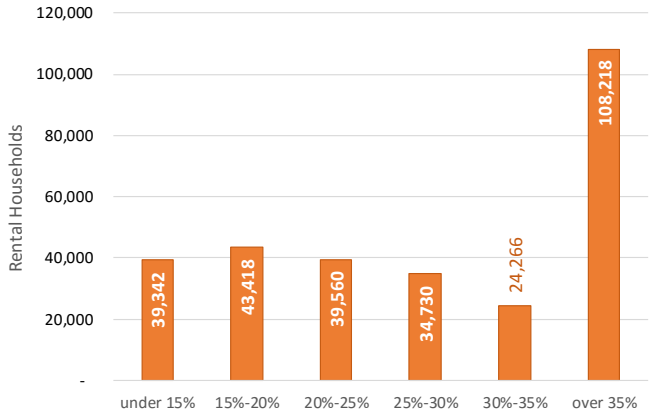
Rental Households by Income



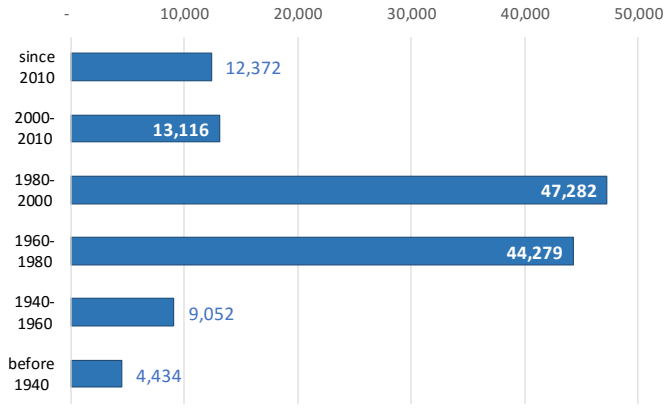
Housing Stock by Tenure & Type



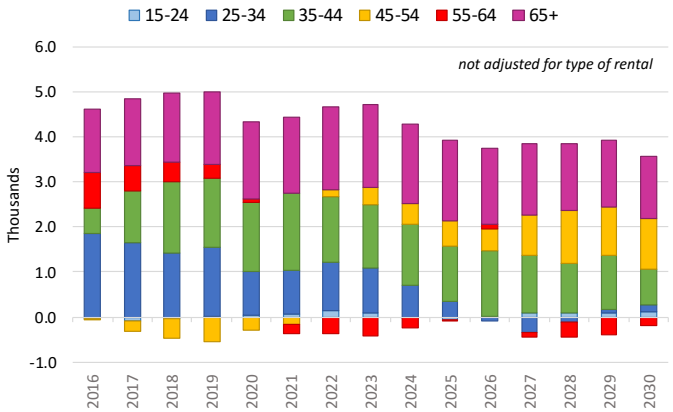
Rent as a Percent of Household Income



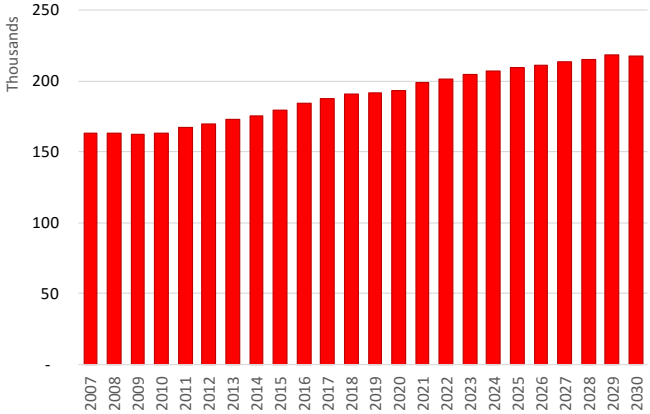
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

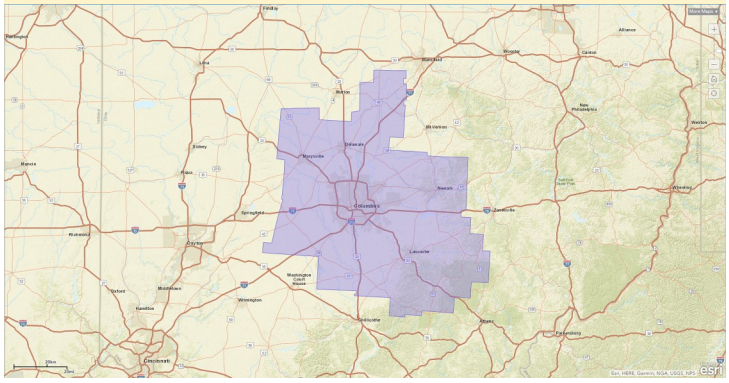
University of San Diego SCHOOL OF BUSINESS

WREA

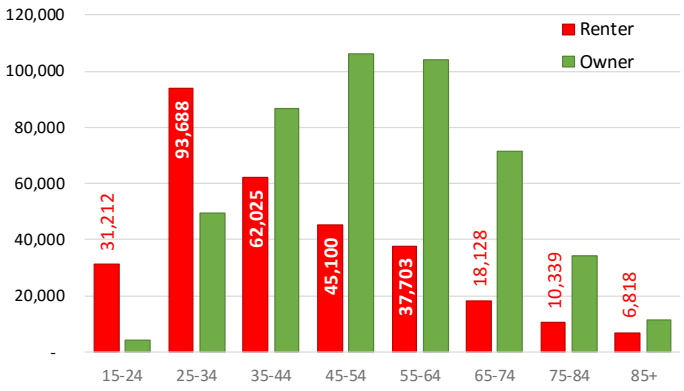
dfm

Version 1

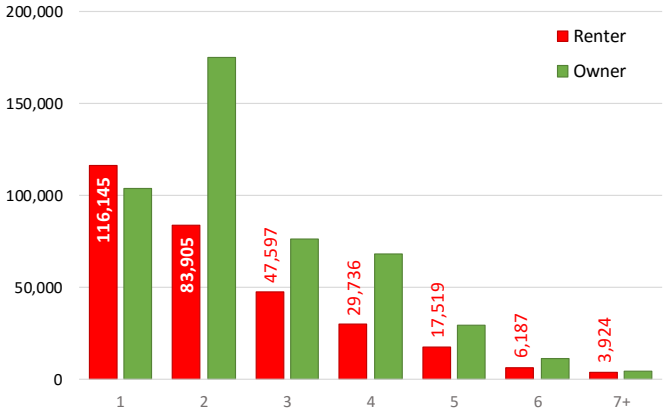
COLUMBUS page 2



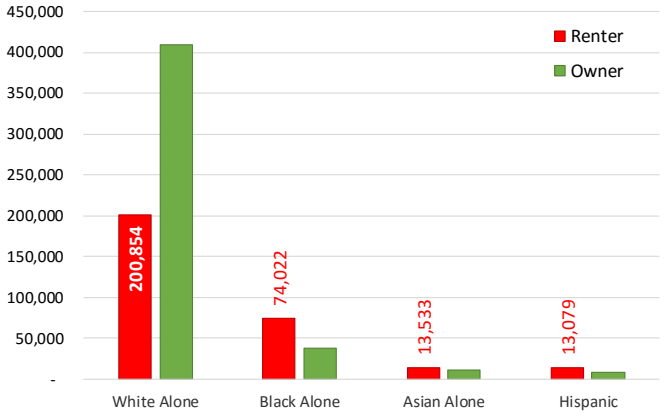
Households by Age Cohort



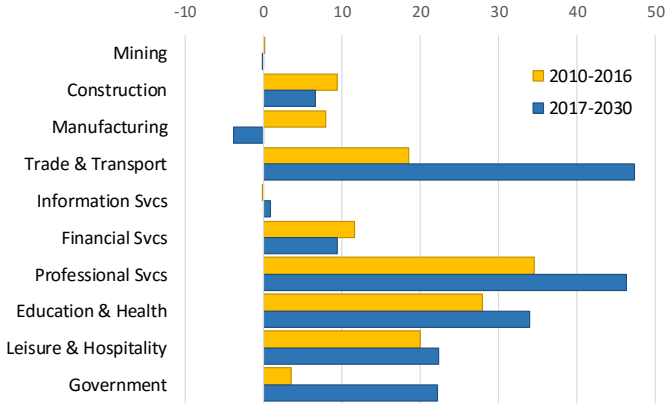
Households by Occupants



Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



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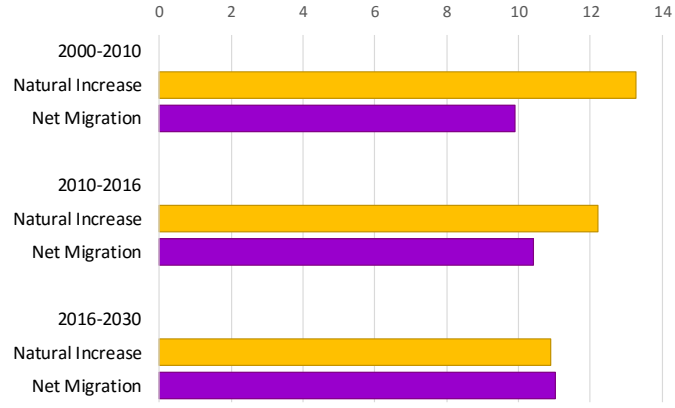

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METRO MULTIFAMILY DEMAND OVERVIEW

DALLAS

Strong net in migrations now exceed strong natural population growth. Economic strength now and ahead led by professional services, trade and education. Good renter incomes up to $75,000, though 40% are paying more than 35% of income on rent. New rental households are expected from most age cohorts with strong, steady multifamily demand ahead.

Definitions on back

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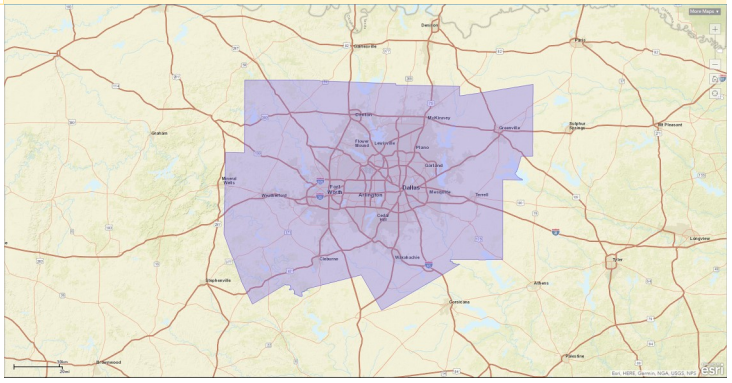
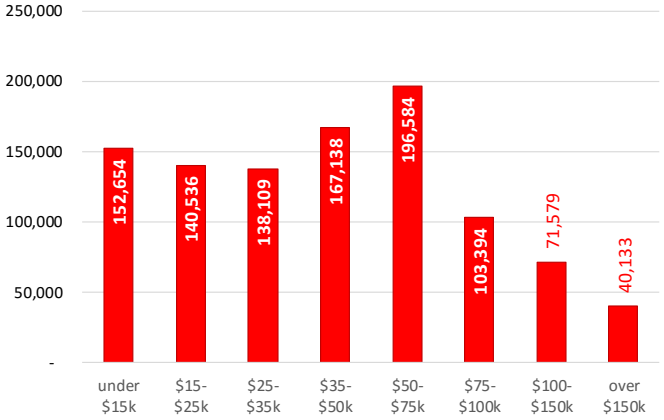
1	174	-1.3	19%



Rental Households by Income



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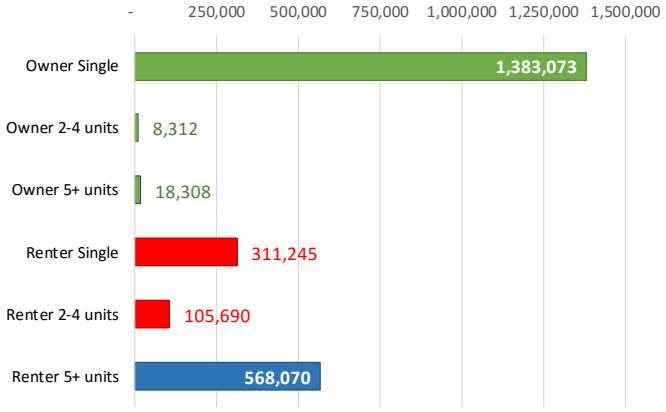
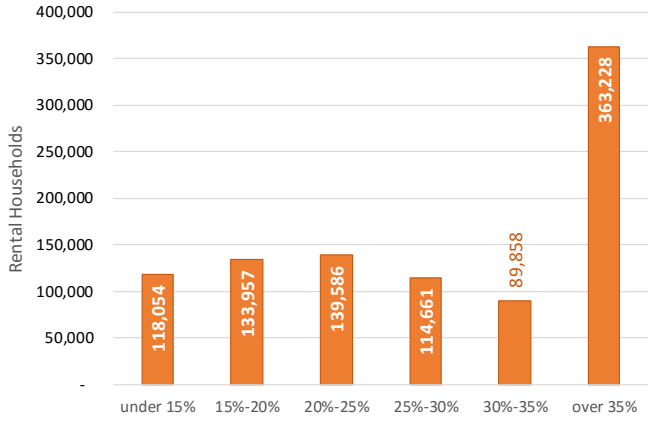
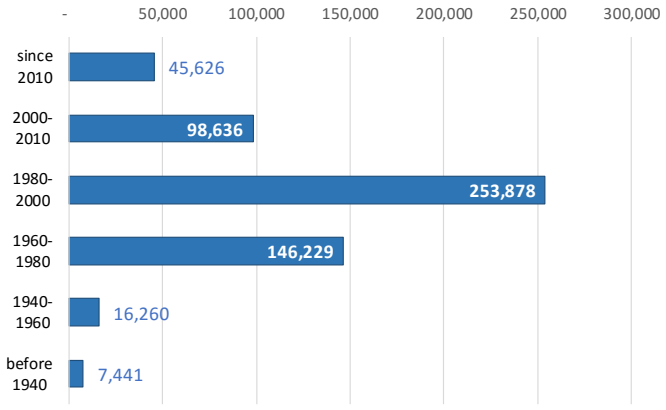


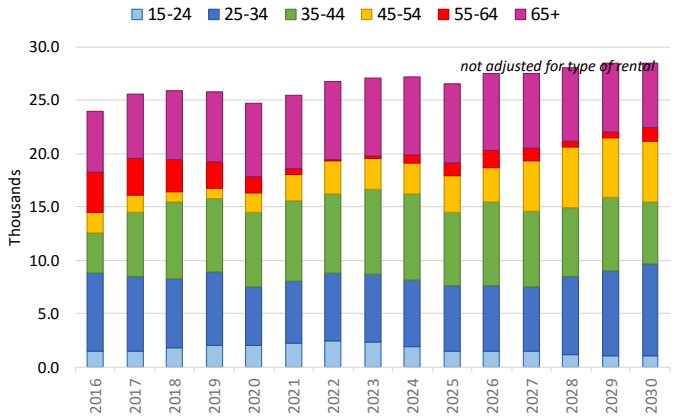
Rent as a Percent of Household Income



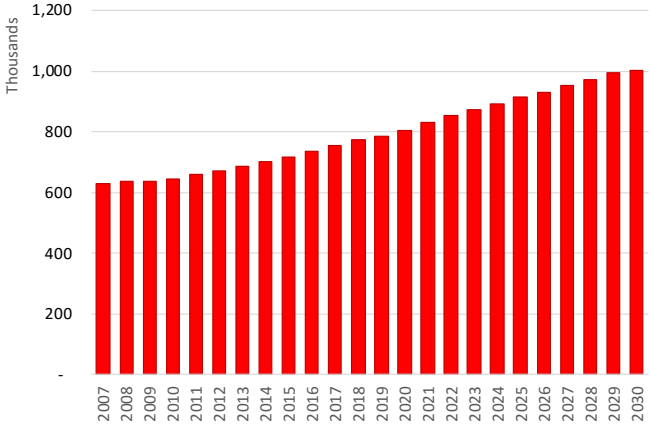
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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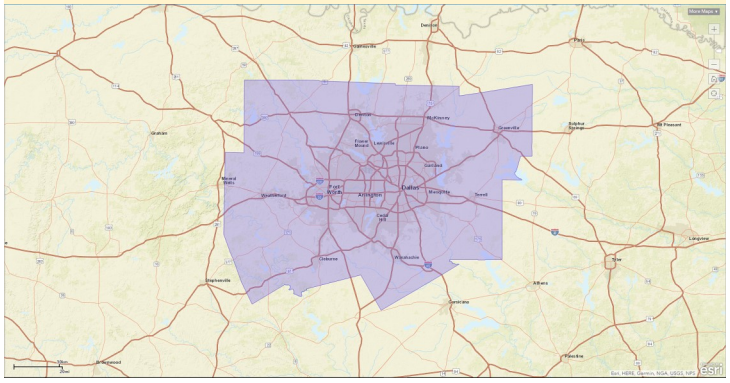
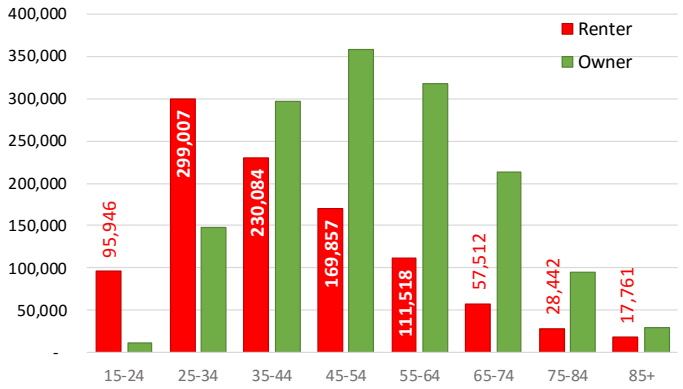
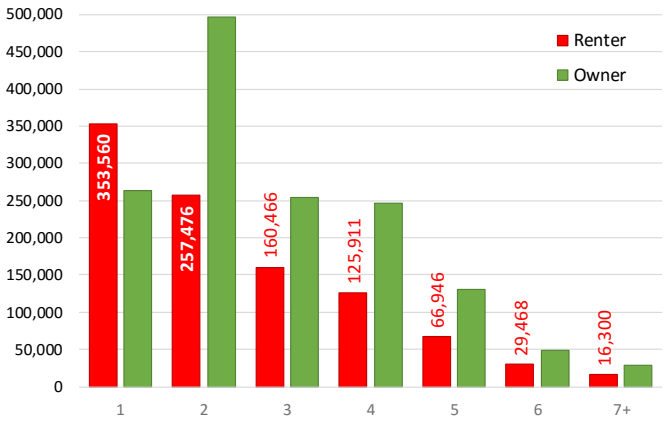


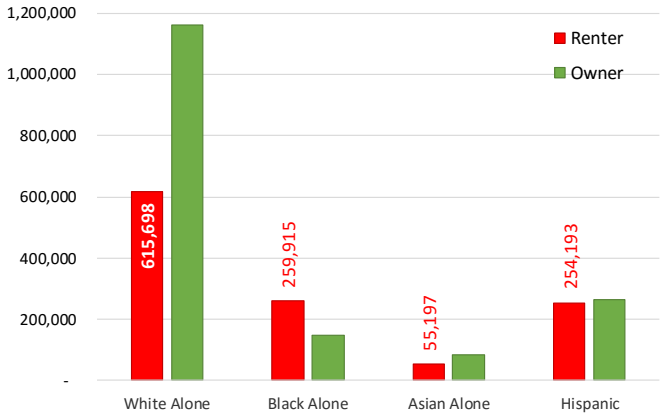
Households by Age Cohort



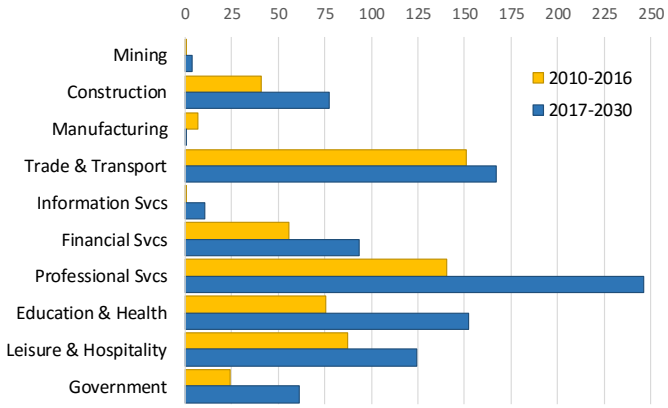
Households by Occupants



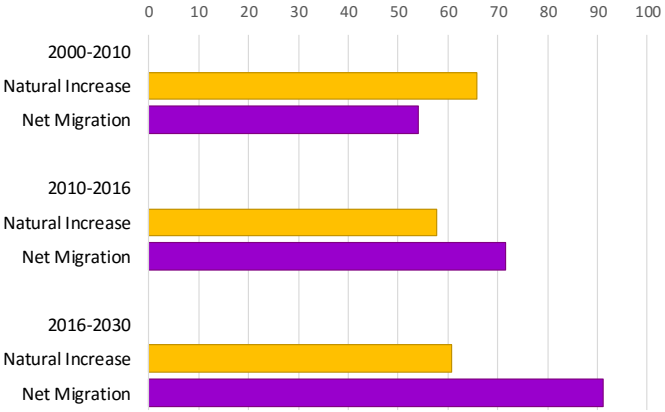
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

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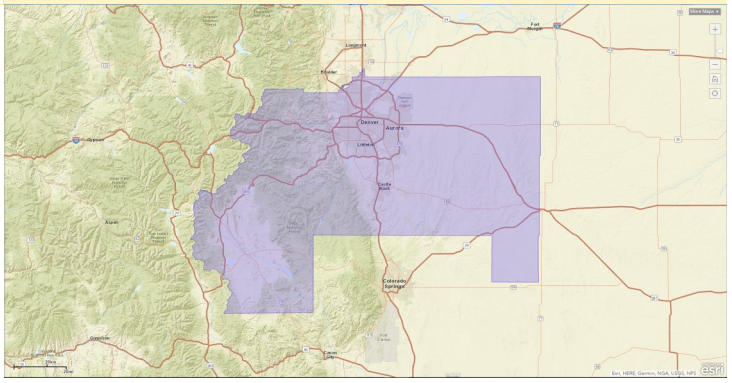
METRO MULTIFAMILY DEMAND OVERVIEW

DENVER

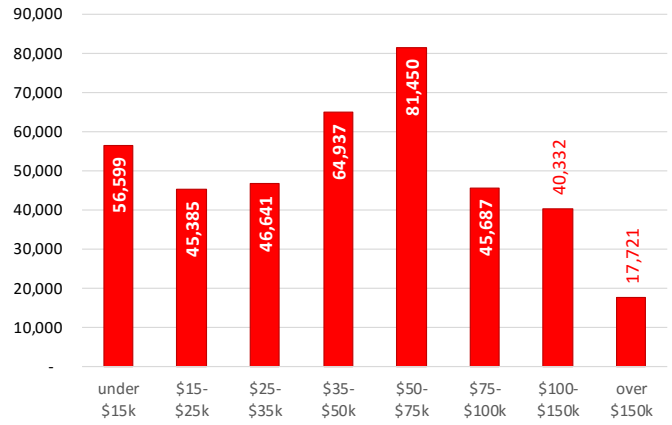
Net in migrations exceed natural population growth and fuel new rental households from most age cohorts. Good renter incomes with diverse ages and household sizes. Strong economic growth prospects in all but a few sectors. Long term supply restrictions may impact multifamily growth as annual demand steadily increases ahead.

Definitions on back

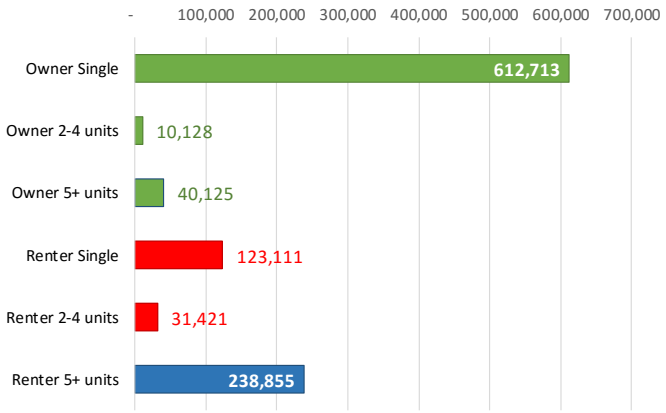
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
20	122	6.5	29%



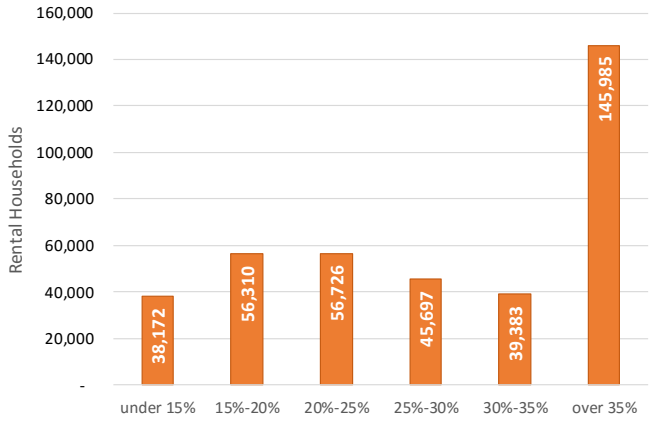
Rental Households by Income



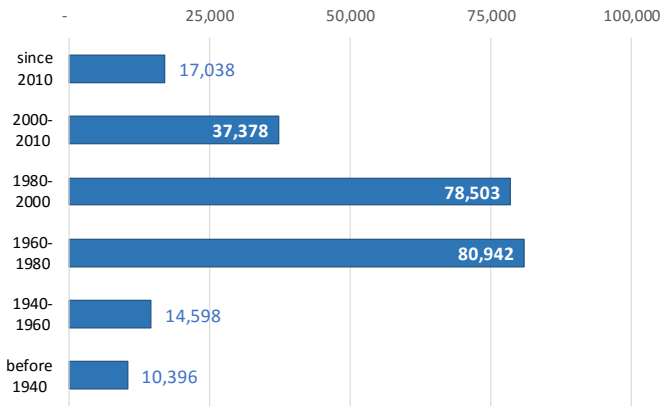
Housing Stock by Tenure & Type



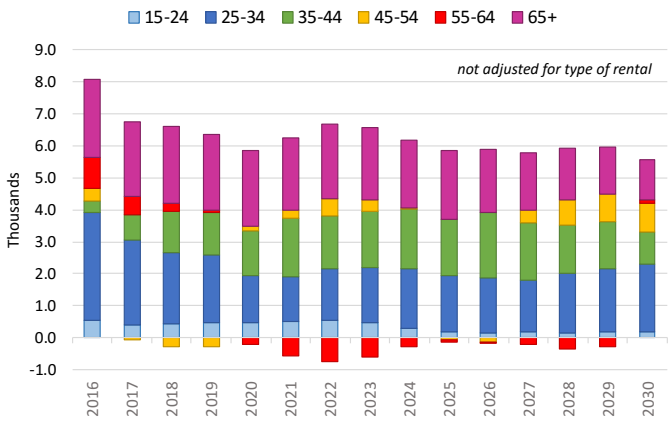
Rent as a Percent of Household Income



5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



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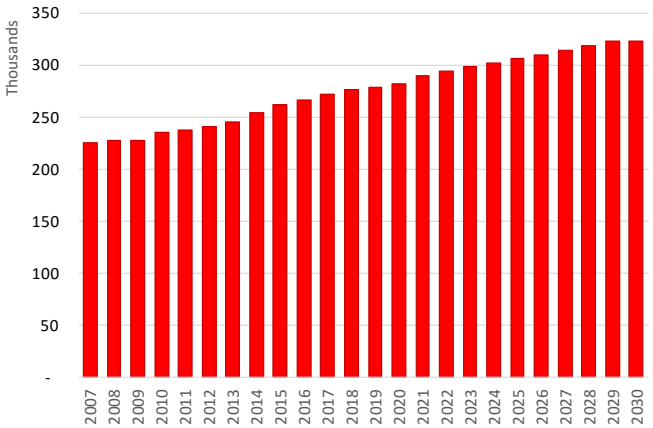
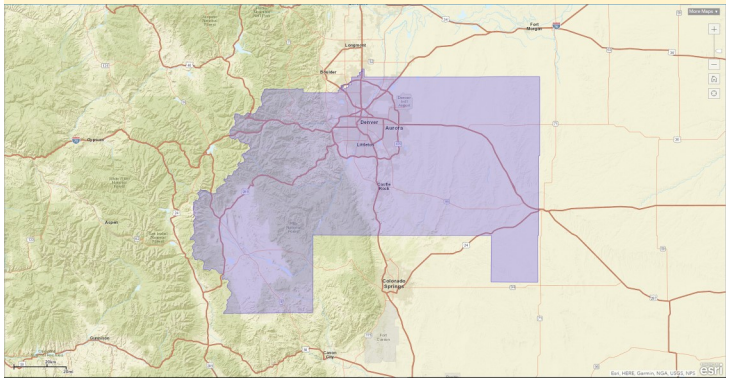
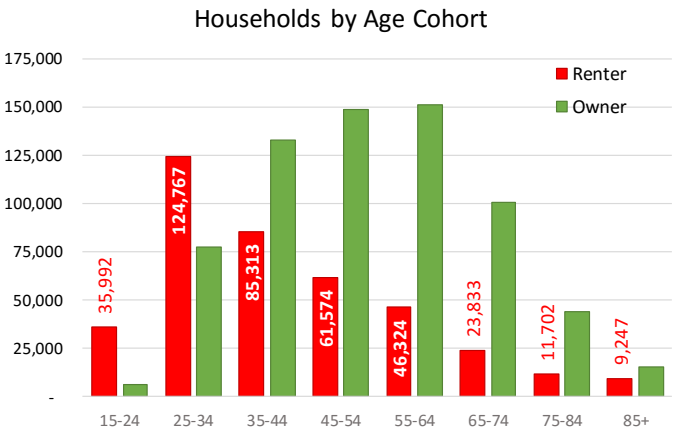
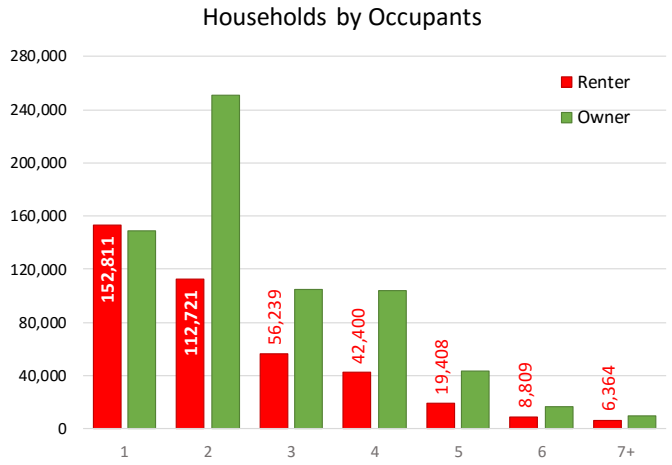
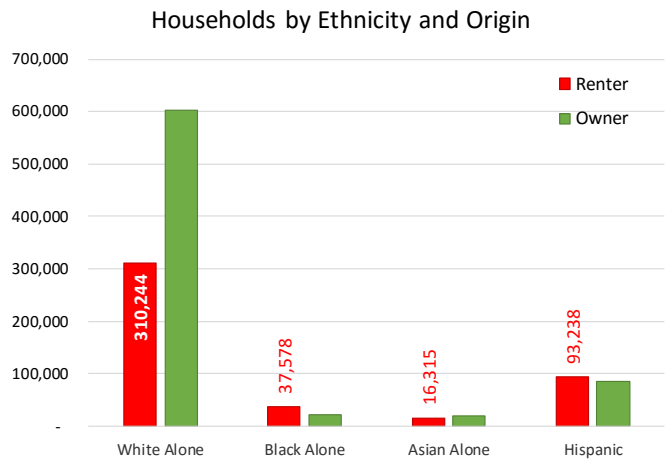


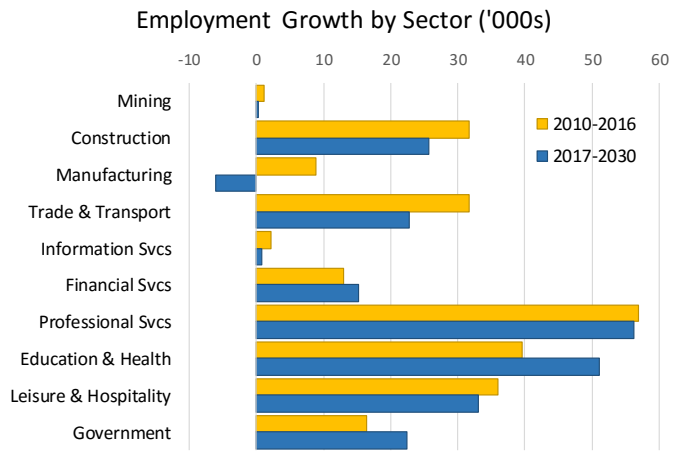
DENVER page 2

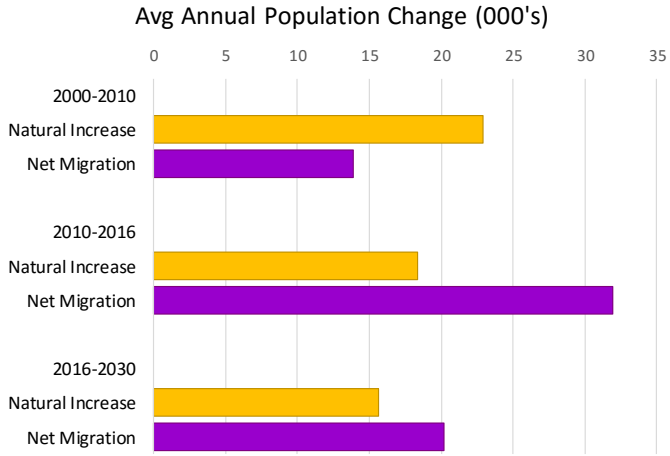












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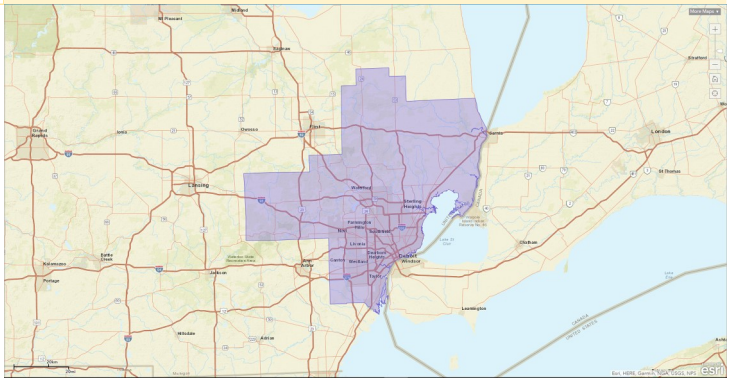
METRO MULTIFAMILY DEMAND OVERVIEW

DETROIT

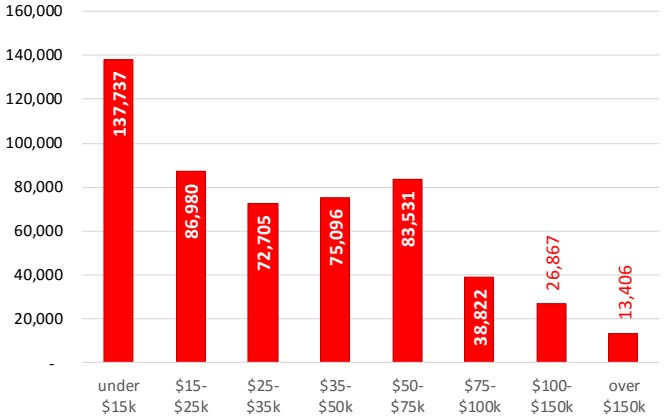
Net in migration is negative and is expected to remain so with only modest natural population growth. City could surprise on the upside if recent manufacturing gains continue. Renter incomes are lower and 43% pay over 35% of income on rent. Rental stock is older and over half seen in STAR units. Multifamily demand ahead is positive but erratic.

Definitions on back

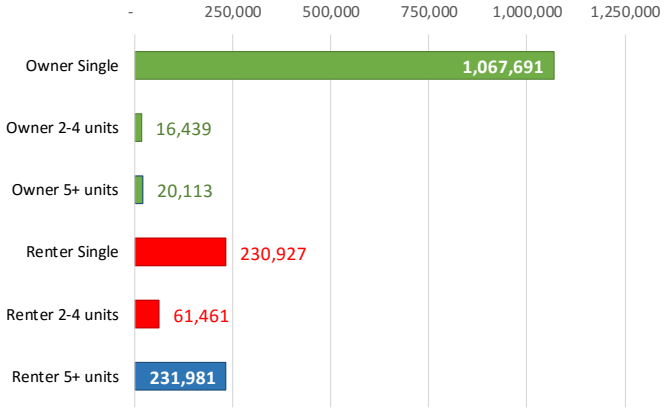
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
41	260	1.2	52%



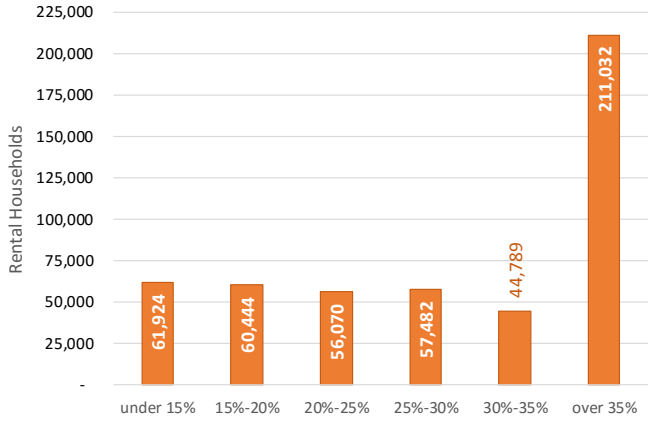
Rental Households by Income



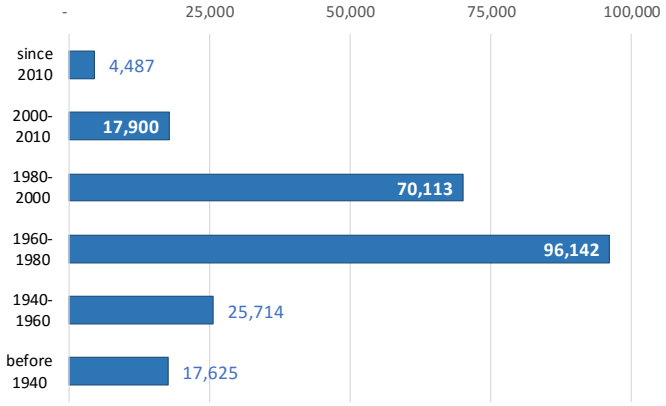
Housing Stock by Tenure & Type



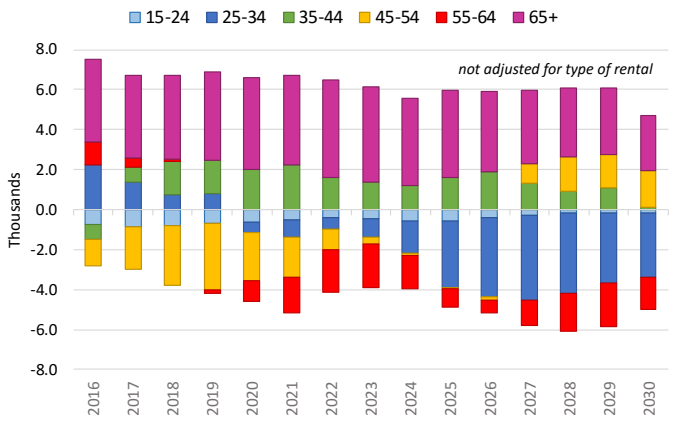
Rent as a Percent of Household Income



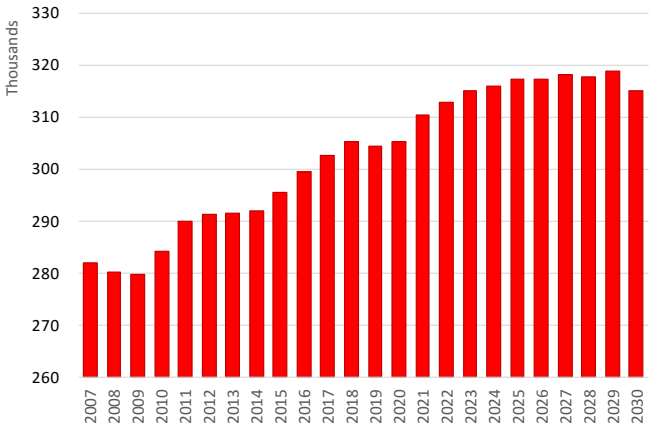
5+ Unit Rental Stock by Year Built



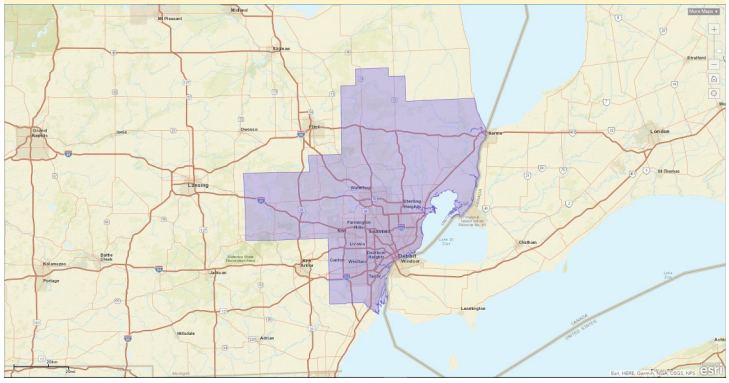
New Rental Households by Age Cohort



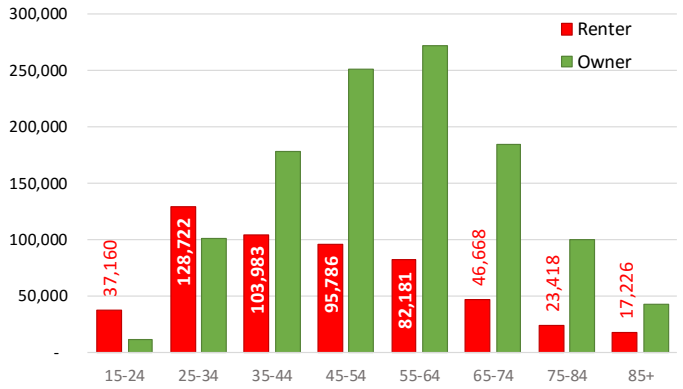
5+ Unit Apartment Demand Forecast



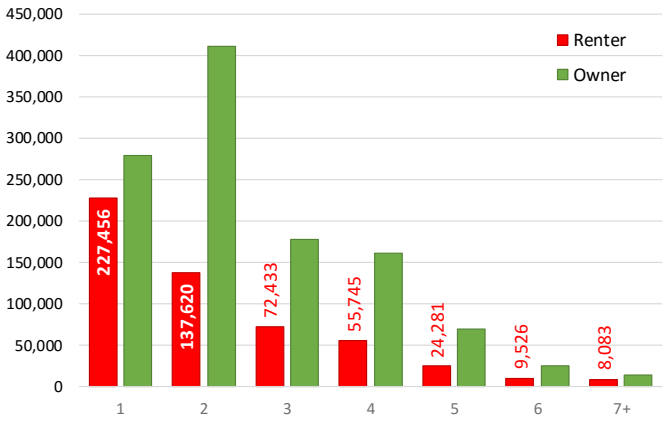
DETROIT page 2



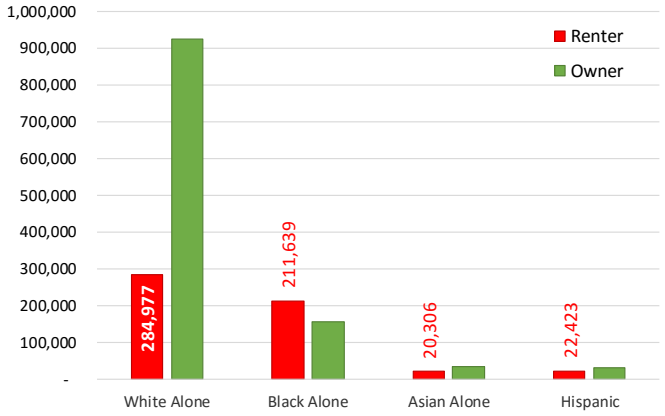
Households by Age Cohort



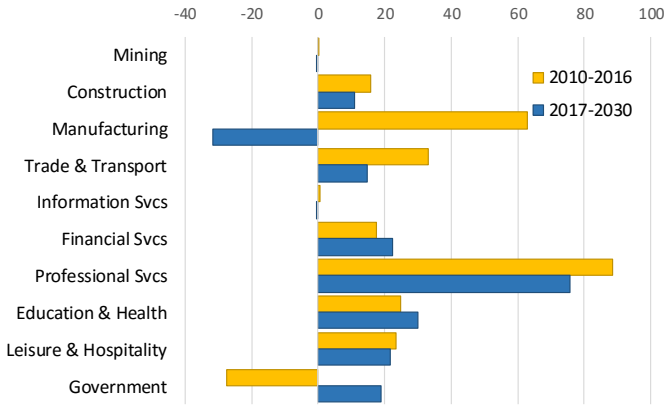
Households by Occupants



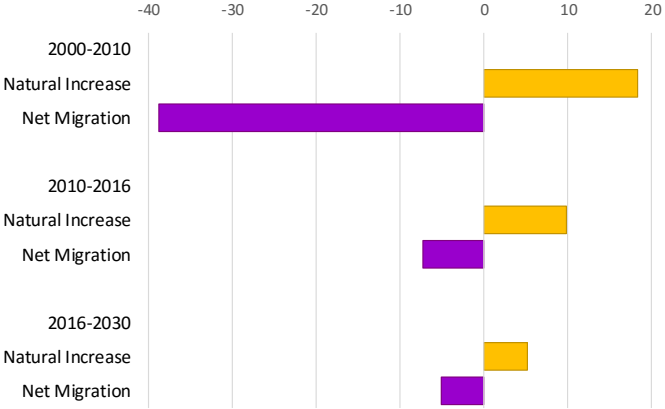
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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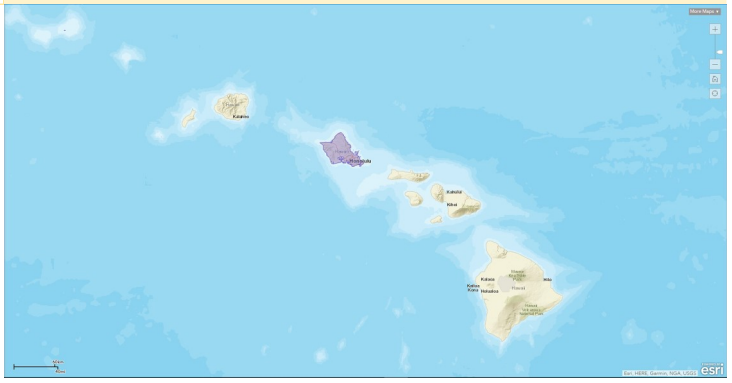
METRO MULTIFAMILY DEMAND OVERVIEW

HONOLULU

Minor net in migration remains an important component of new household growth. Economic prospects are positive in most sectors, albeit dependent upon tourism and the military. Extreme land constraints contribute to overall housing shortages, while affordable housing is both smaller and lower quality. Nearly 60% of multifamily units were built 1960-1980.

Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
35	71	19.5	41%



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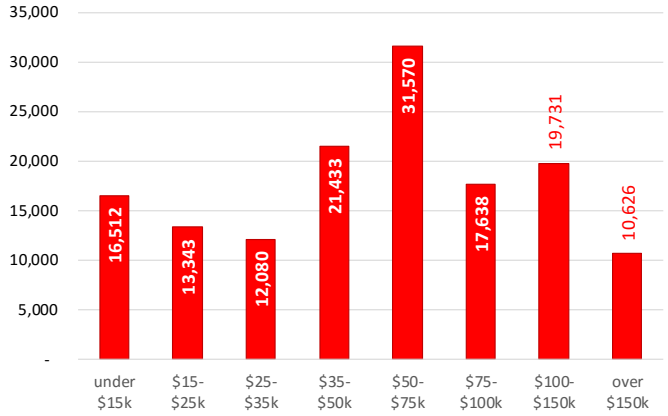

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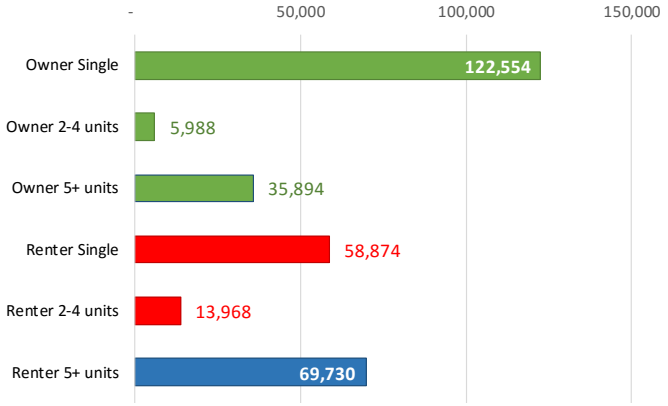
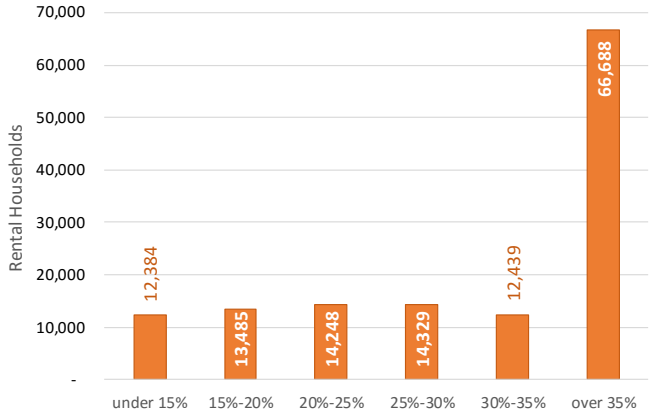
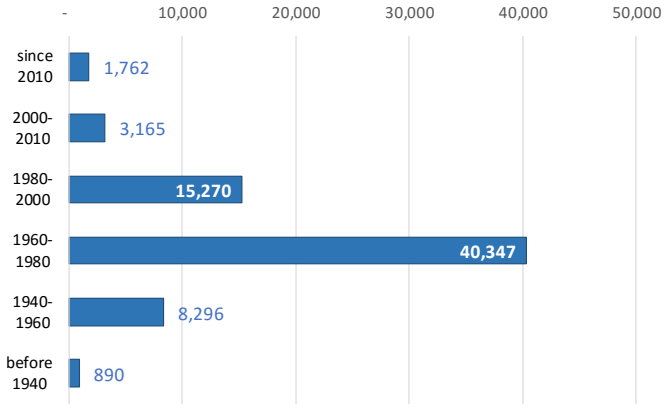


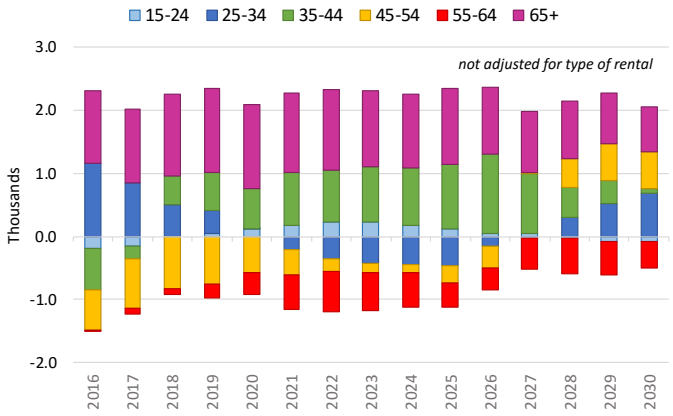
Rent as a Percent of Household Income



5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



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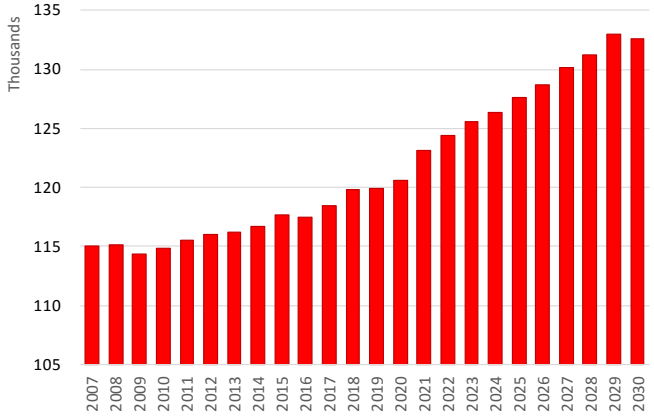
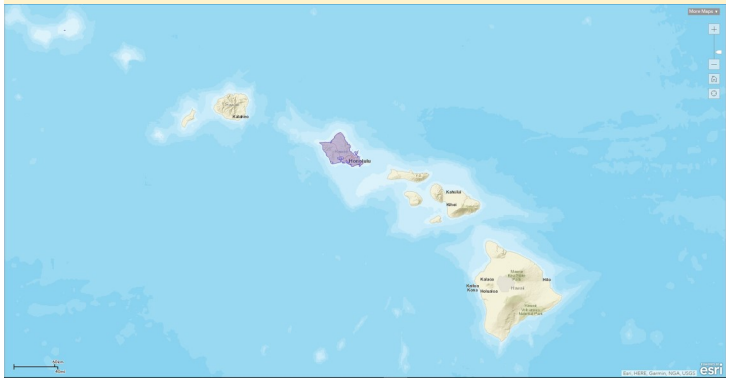


HONOLULU page 2



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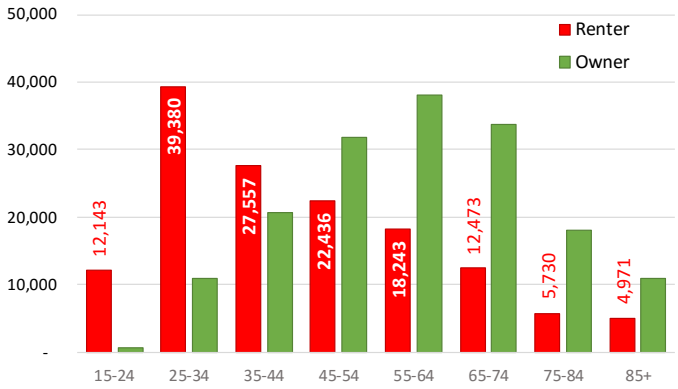

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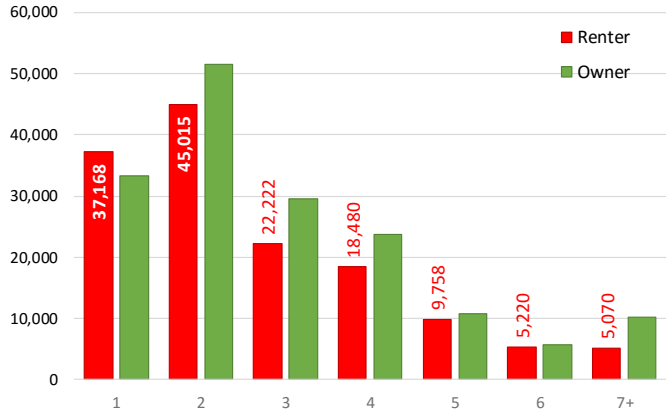

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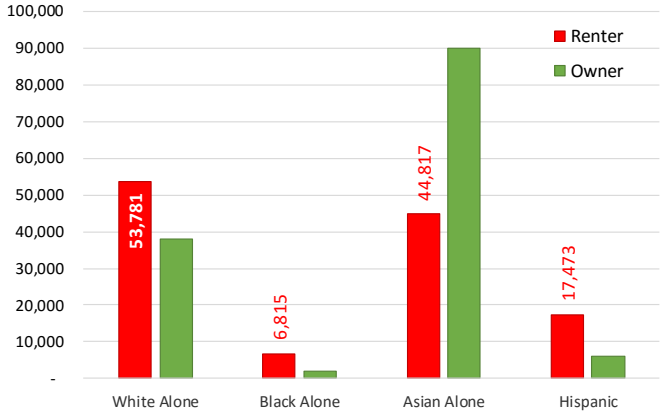

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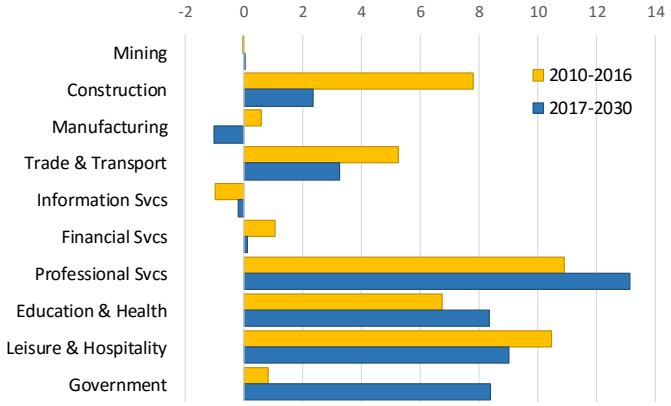

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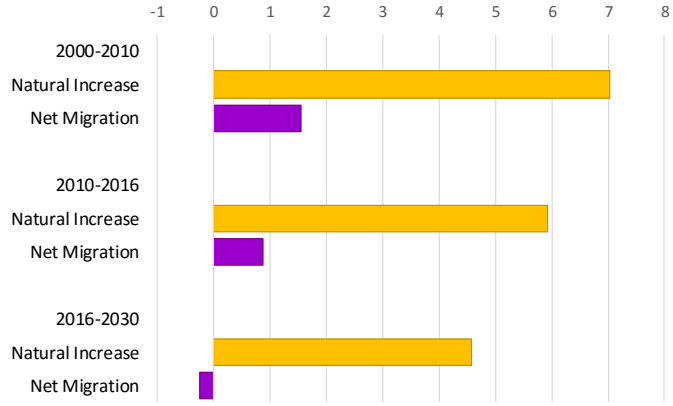

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METRO MULTIFAMILY DEMAND OVERVIEW

HOUSTON

Strong net in migrations and a diverse population drives new multifamily demand ahead. The economy is growing, becoming more diversified and less reliant on oil and gas. New rental households coming from most age cohorts. More new rental supply relative to demand than most metros with a smaller 22% share of multifamily today in STAR units.

Definitions on back

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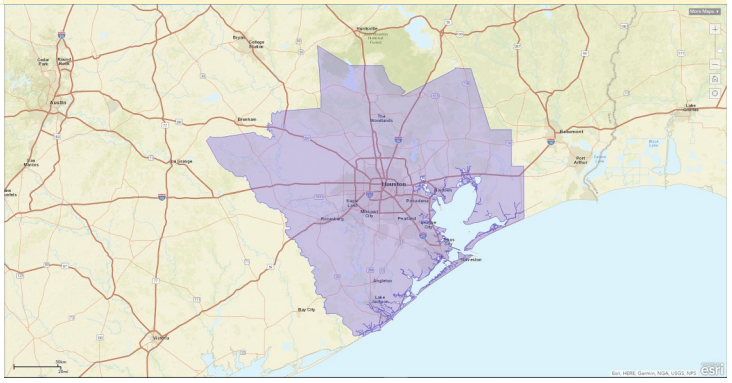
4	181	-2.5	22%



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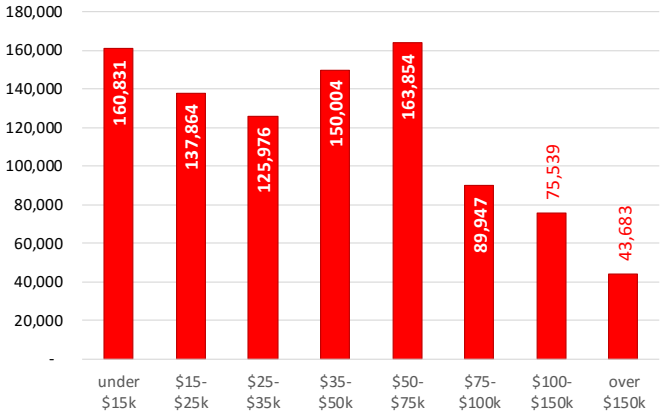

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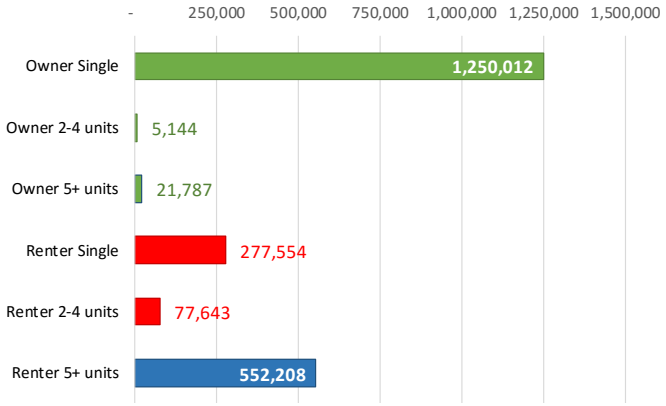
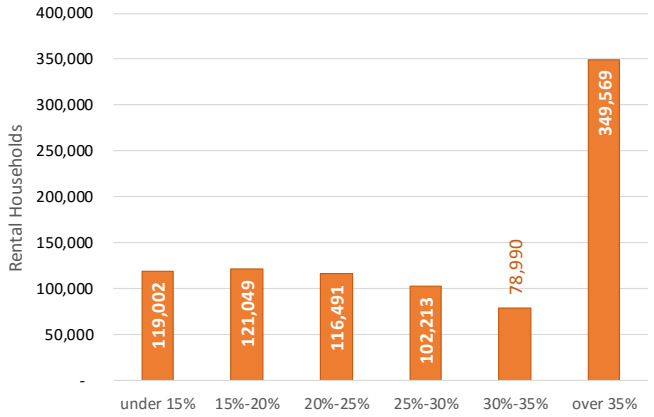
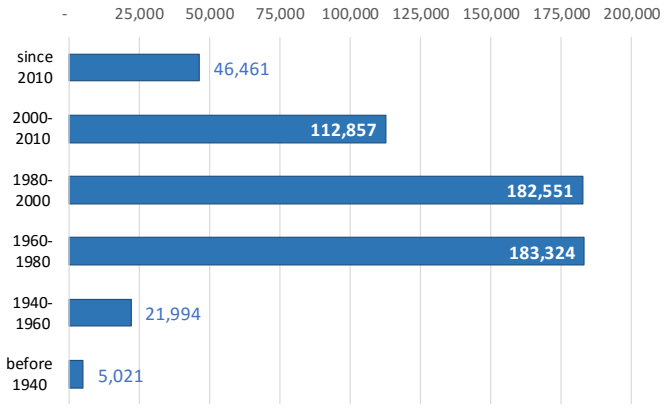


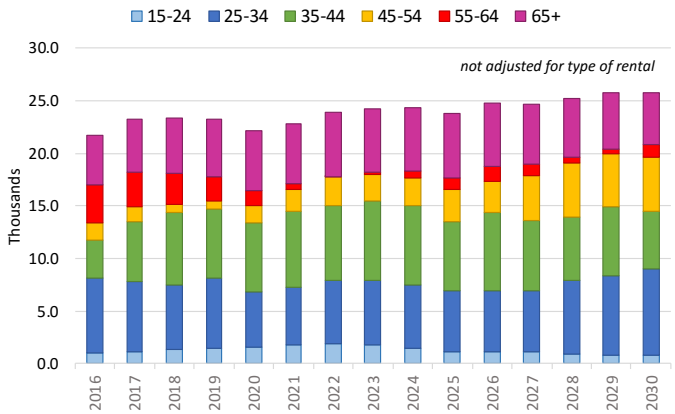
Rent as a Percent of Household Income



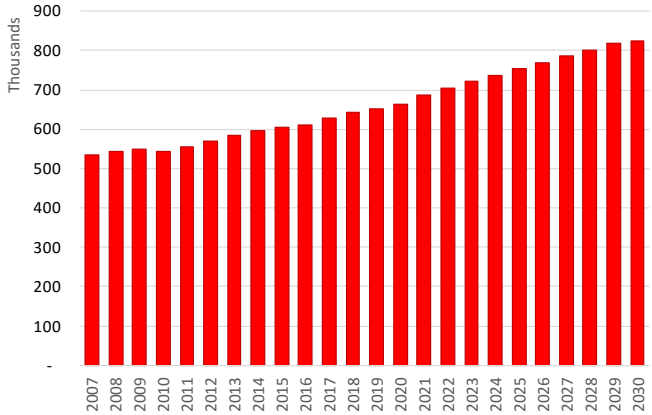
5+ Unit Rental Stock by Year Built



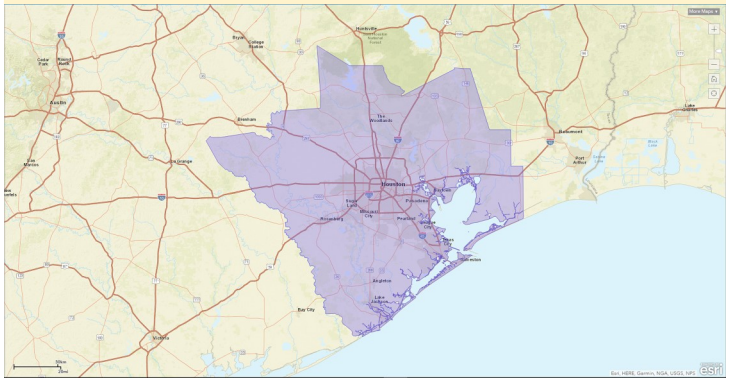
New Rental Households by Age Cohort



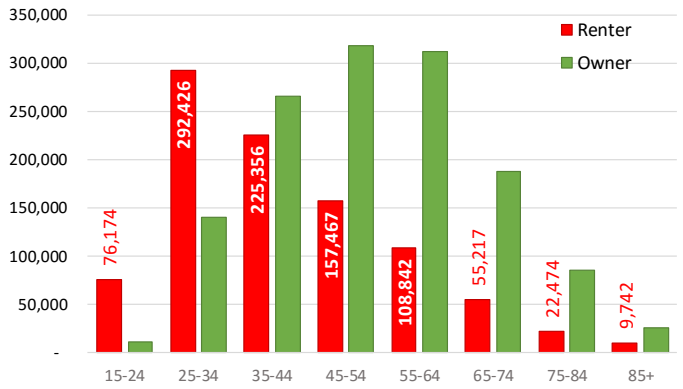
5+ Unit Apartment Demand Forecast



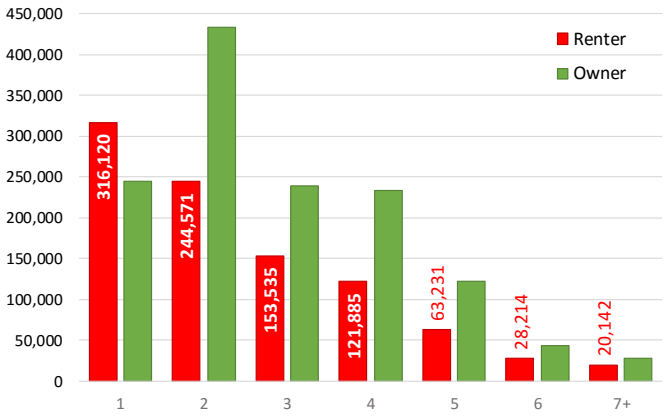
HOUSTON page 2



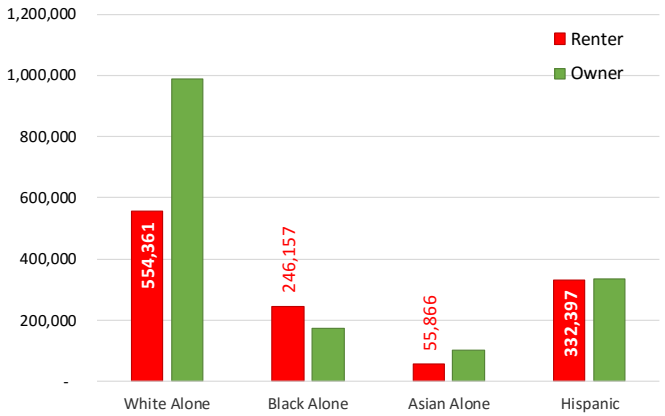
Households by Age Cohort



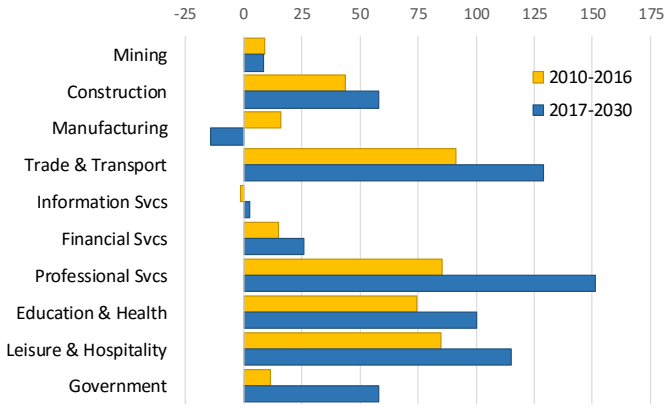
Households by Occupants



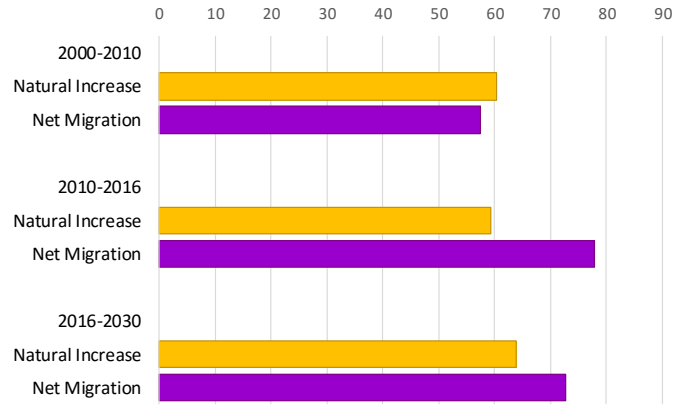
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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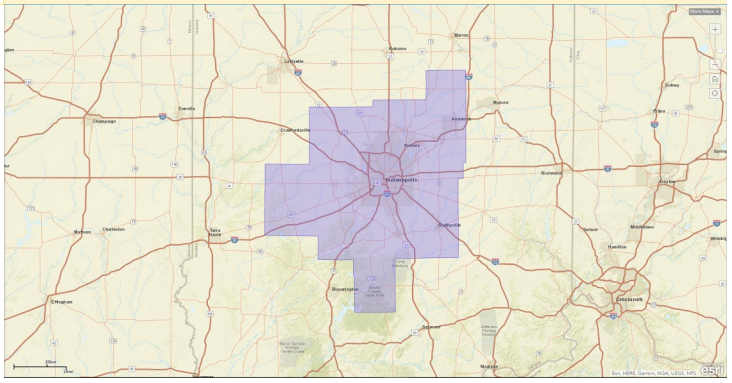
METRO MULTIFAMILY DEMAND OVERVIEW

INDIANAPOLIS

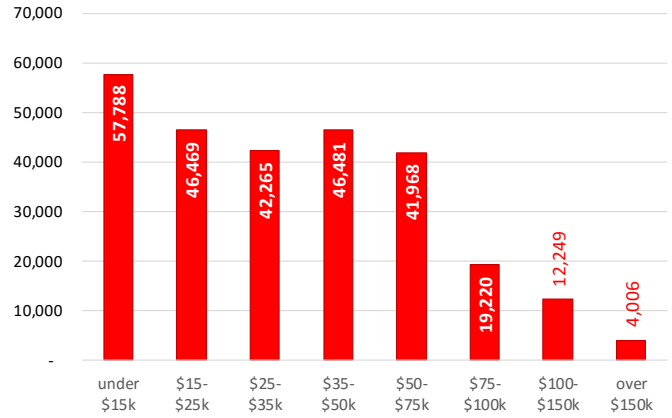
Strong net in migrations will exceed natural population growth. New rental households source from most age cohorts except for the youngest. Their economic prospects are good led by professional services, trade and education. Rental households have good incomes up to $75,000, are older and primarily one or two occupants. Steady multifamily demand ahead.

Definitions on back

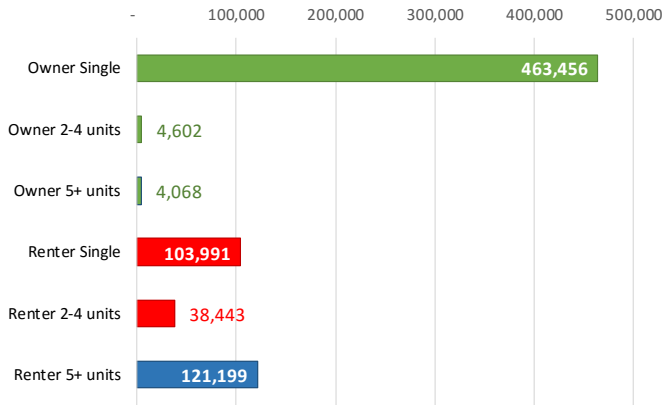
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
30	254	-5.1	25%



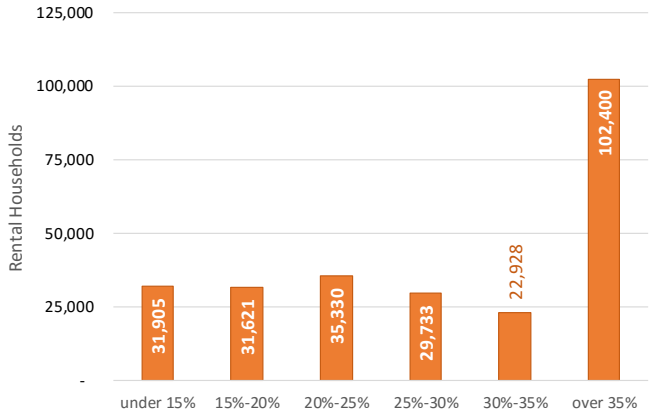
Rental Households by Income



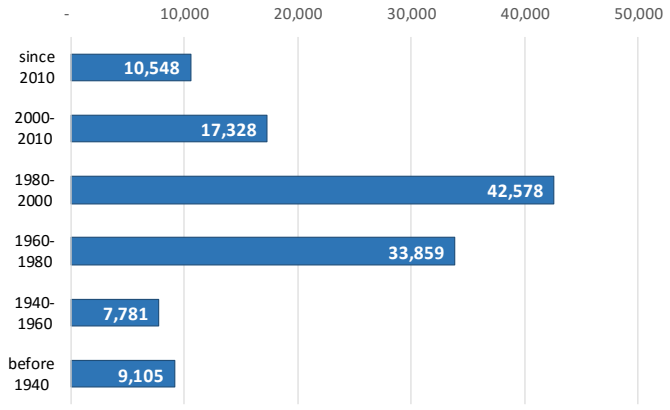
Housing Stock by Tenure & Type



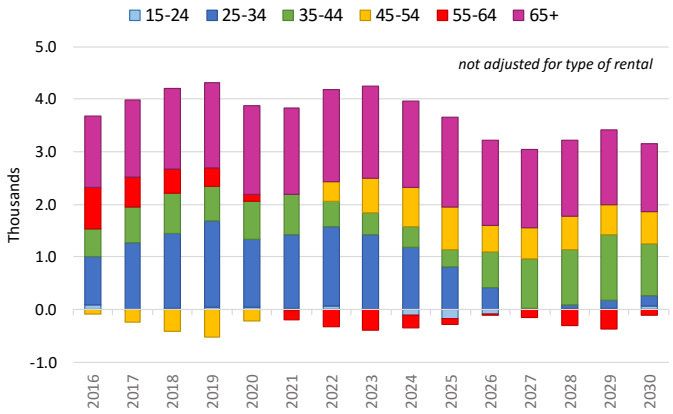
Rent as a Percent of Household Income



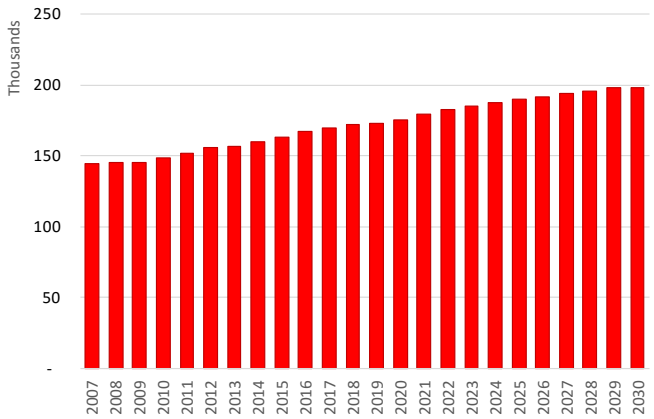
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

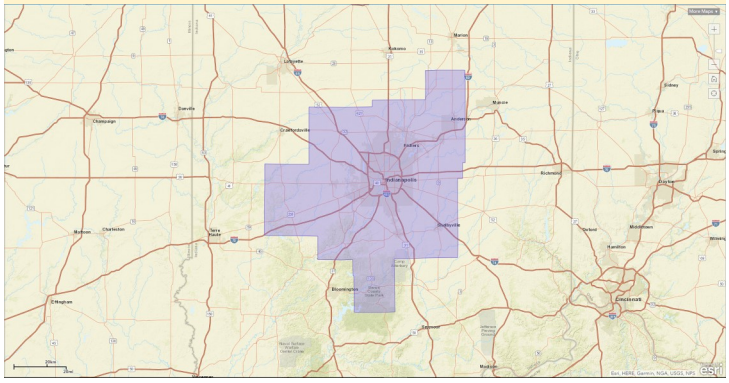
University of San Diego SCHOOL OF BUSINESS

WREA

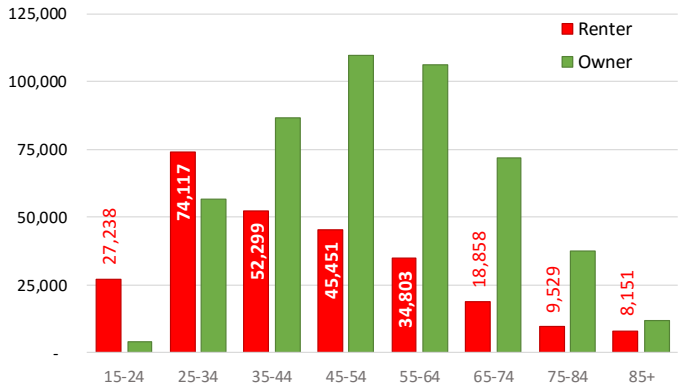
dfm

Version 1

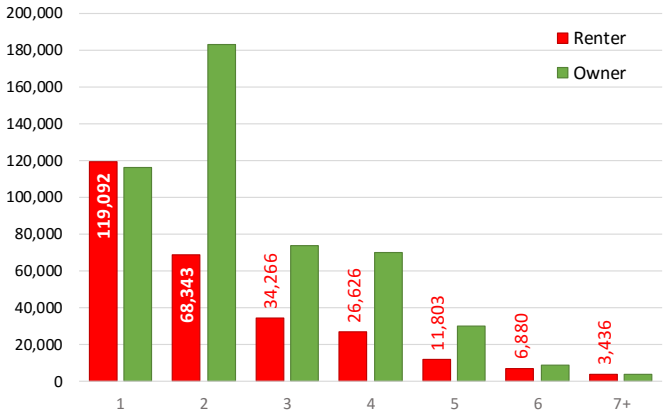
INDIANAPOLIS page 2



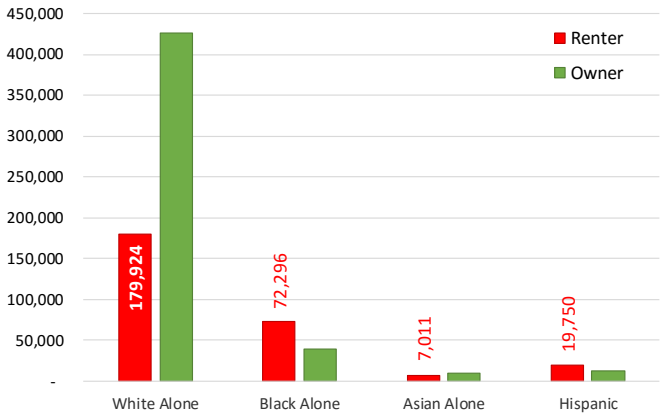
Households by Age Cohort



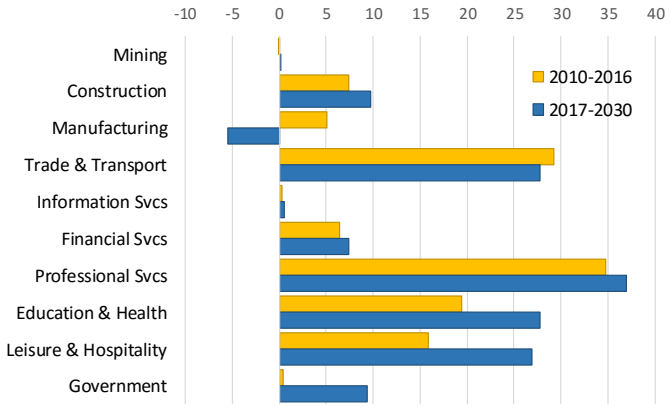
Households by Occupants



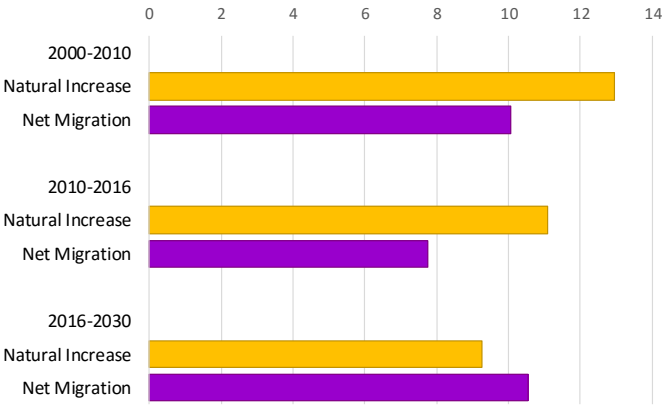
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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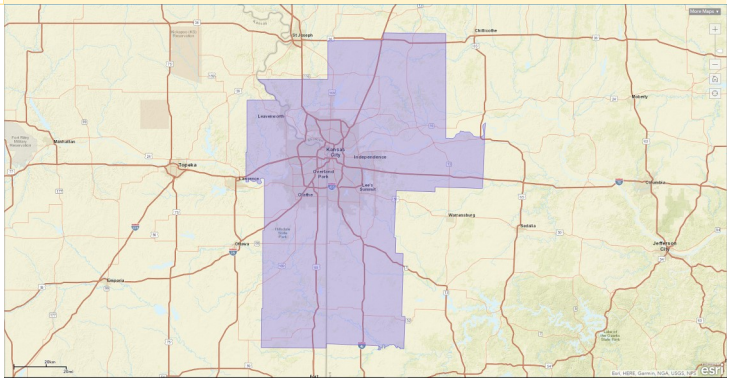
METRO MULTIFAMILY DEMAND OVERVIEW

KANSAS CITY

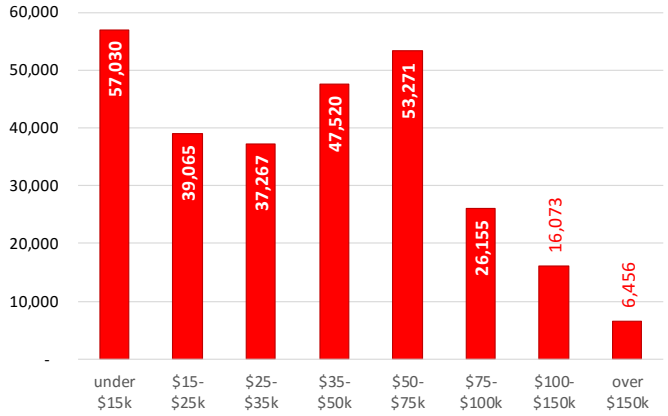
Population growth is slowing with a modest share of net in migrations going negative ahead. New rental households will source from the older cohorts. Good rental incomes and smaller households. Modest economic growth ahead, led by professional services, education and hospitality. Increasing multifamily demand is steady though slight.

Definitions on back

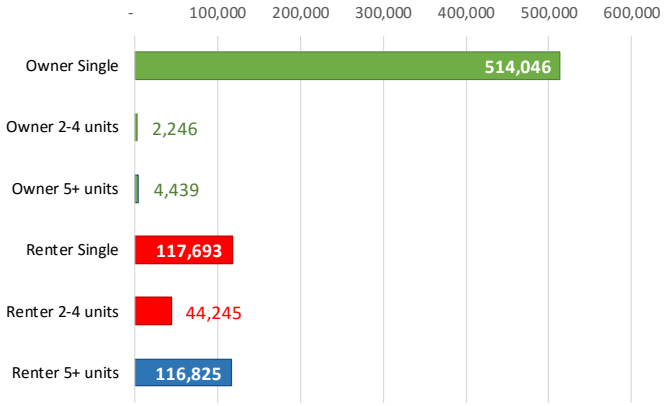
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
42	234	-5.3	35%



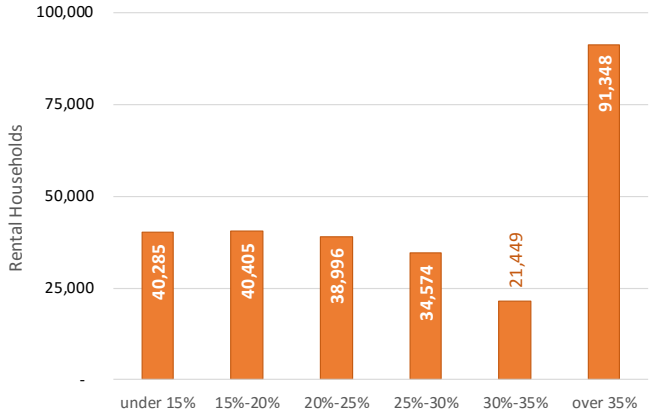
Rental Households by Income



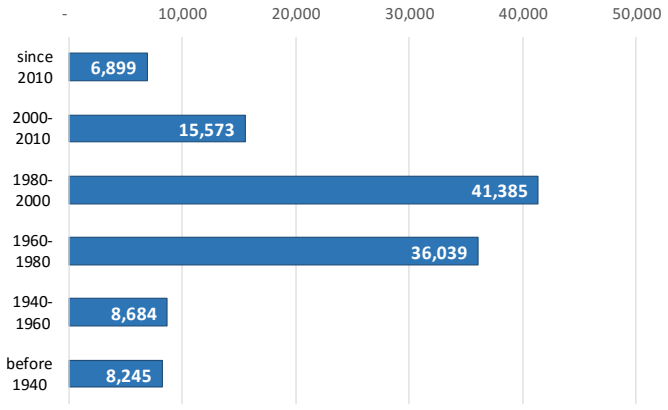
Housing Stock by Tenure & Type



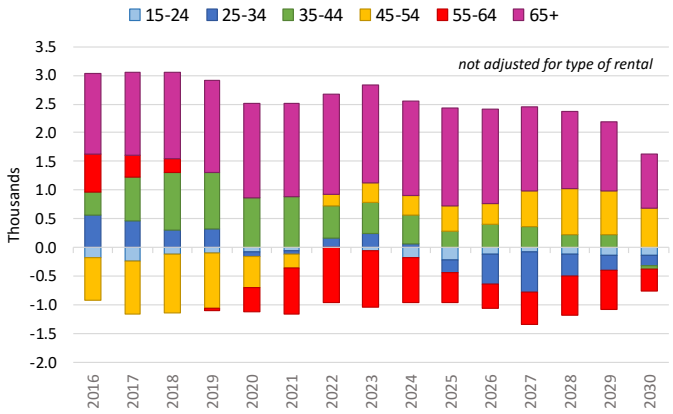
Rent as a Percent of Household Income



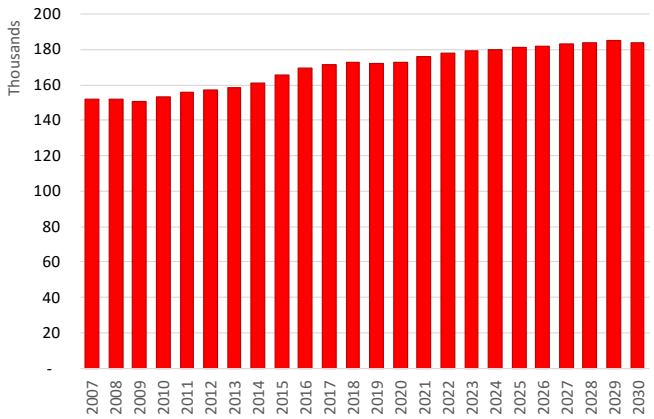
5+ Unit Rental Stock by Year Built



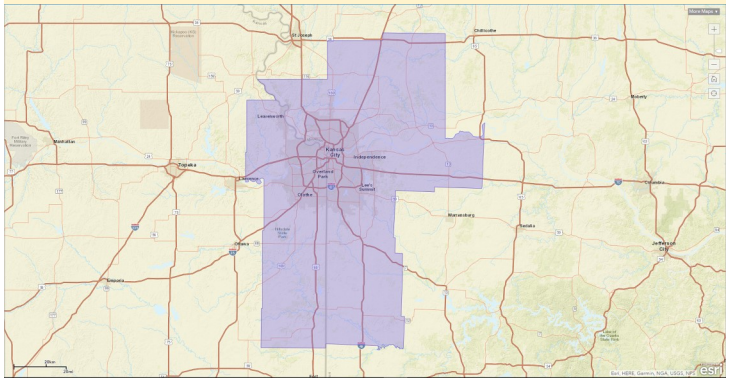
New Rental Households by Age Cohort



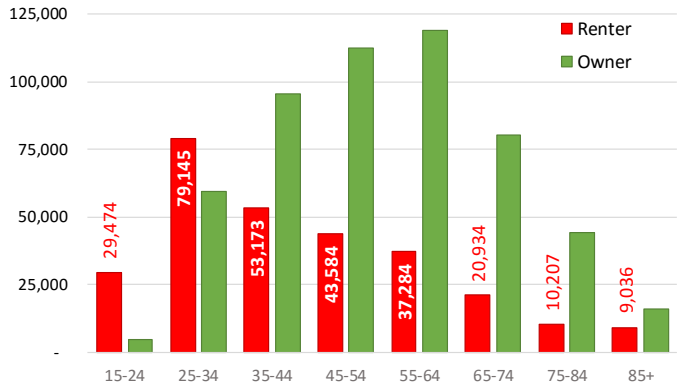
5+ Unit Apartment Demand Forecast



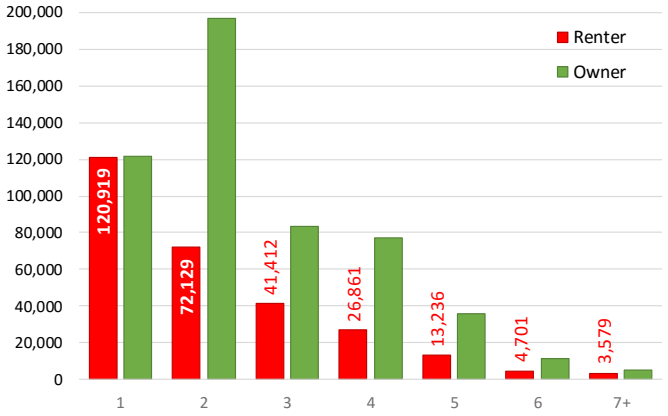
KANSAS CITY page 2



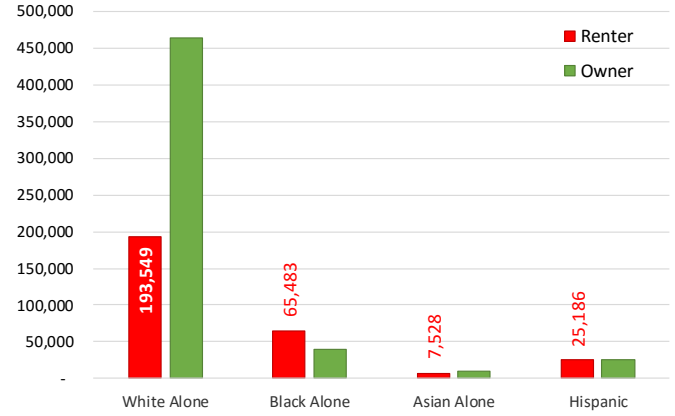
Households by Age Cohort



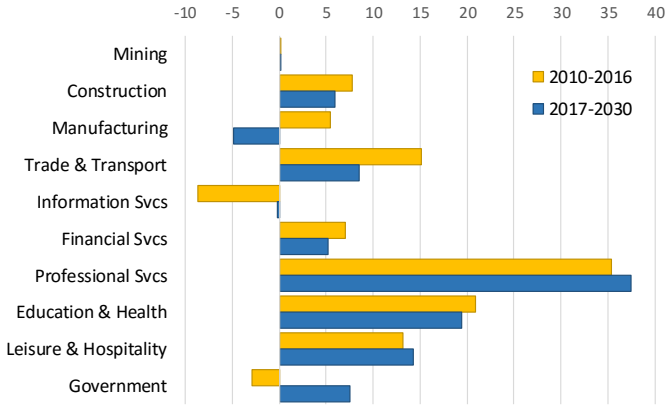
Households by Occupants



Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



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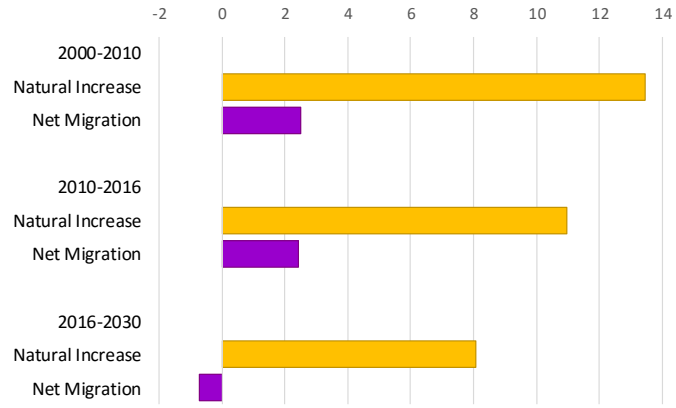

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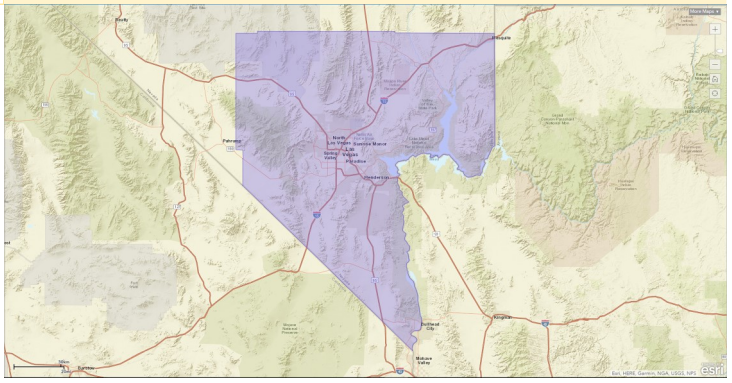
METRO MULTIFAMILY DEMAND OVERVIEW

LAS VEGAS

Net in migrations from all age cohorts dominate the sourcing of new rental households as natural population growth eases ahead. Rental households are smaller with good incomes up to $75,000. Economy is slowly diversifying away from dependency on tourism. Good multifamily demand has been consistent since the downturn and will increase through 2030.

Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
9	146	-3.7	21%



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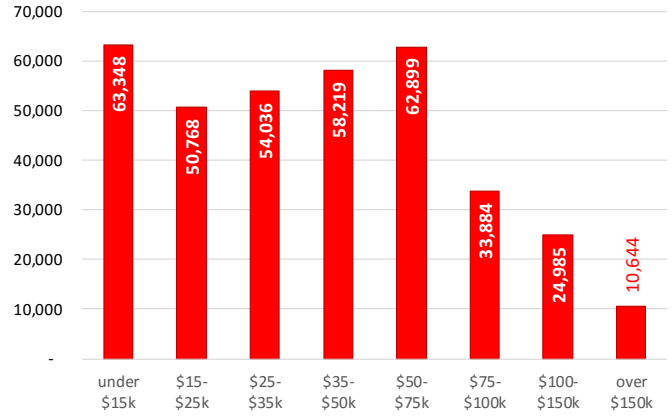

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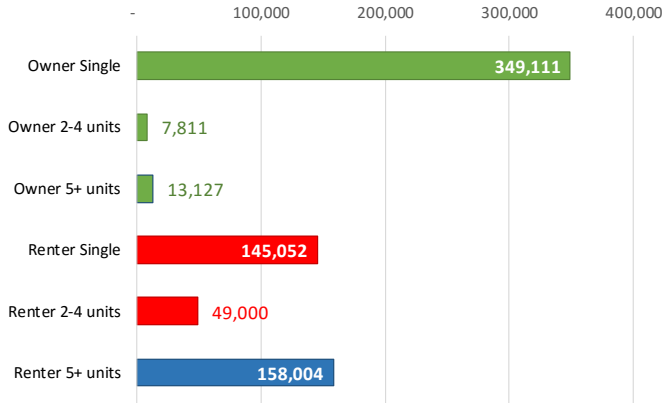
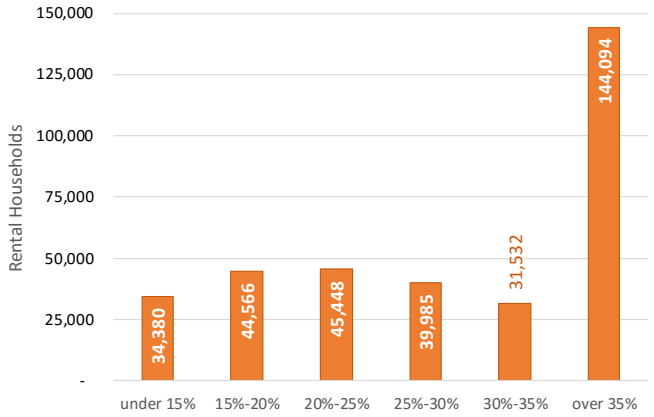
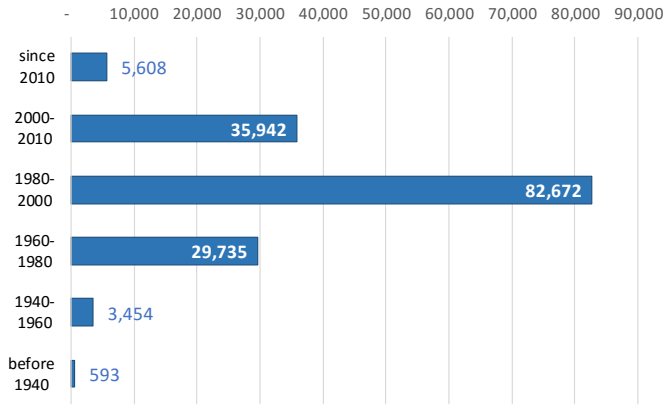


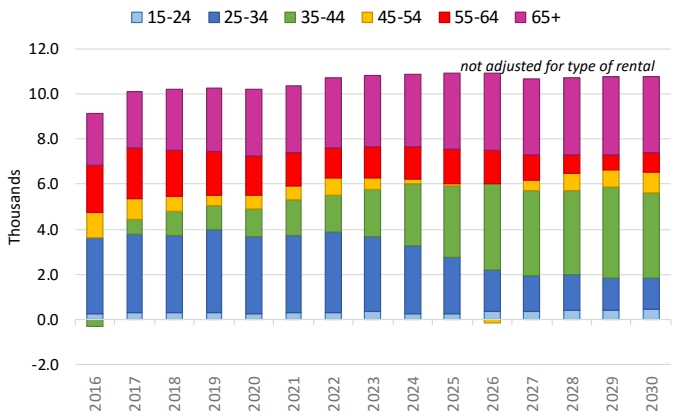
Rent as a Percent of Household Income



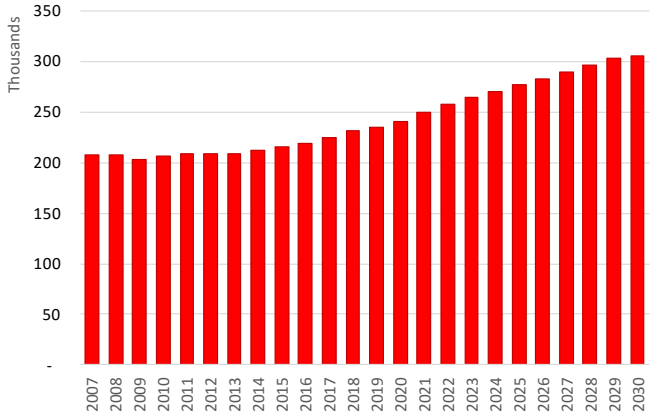
5+ Unit Rental Stock by Year Built



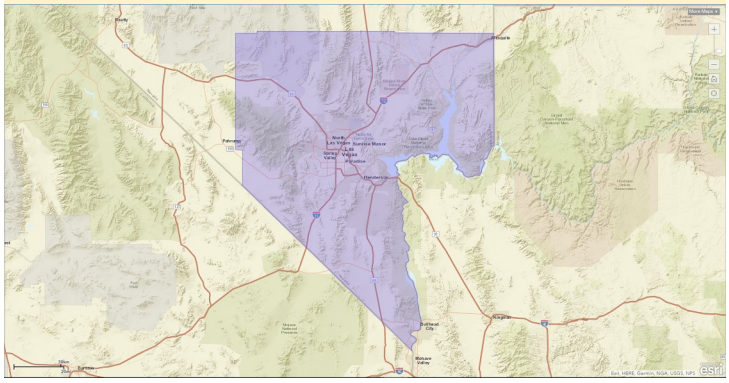
New Rental Households by Age Cohort



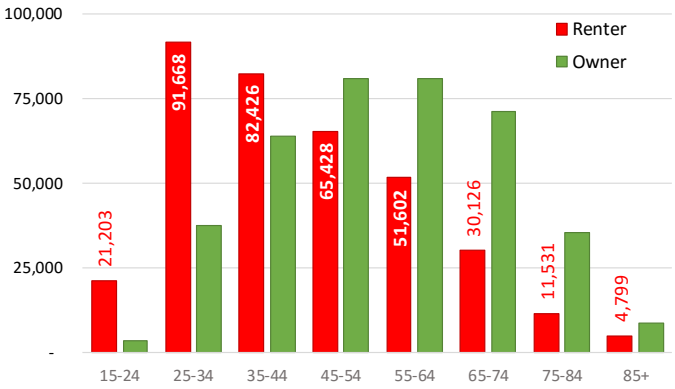
5+ Unit Apartment Demand Forecast



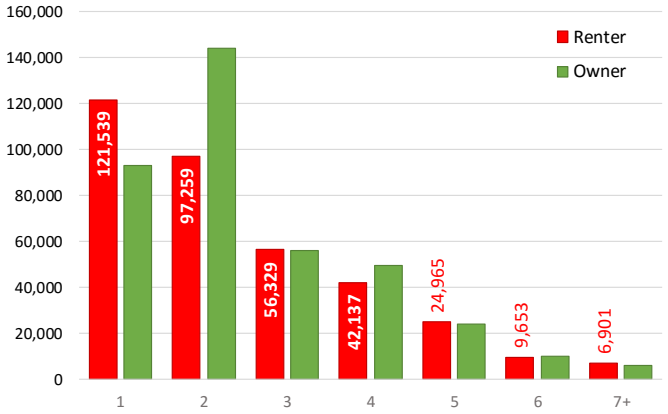
LAS VEGAS page 2



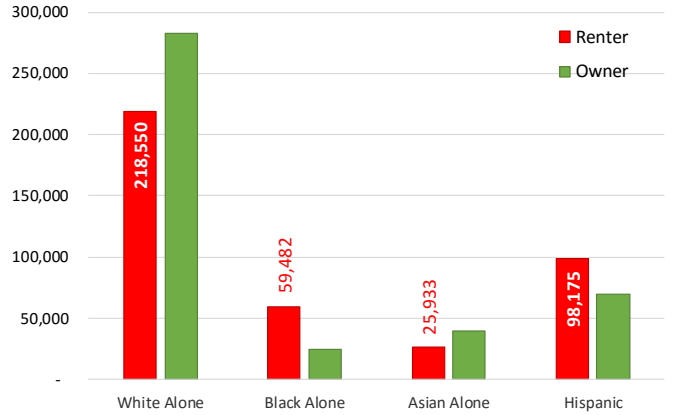
Households by Age Cohort



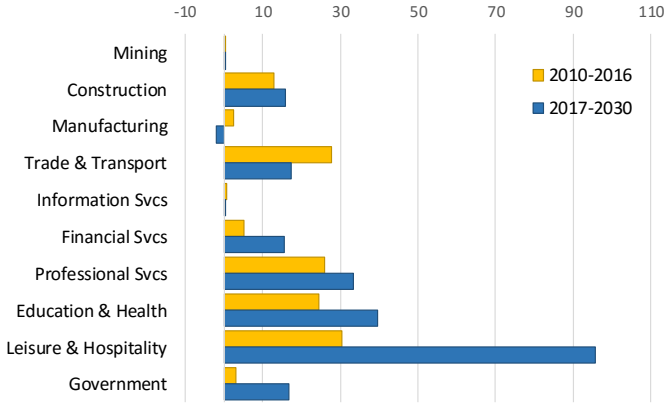
Households by Occupants



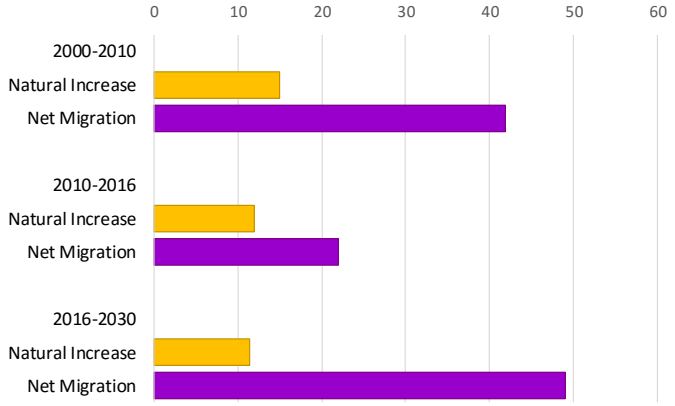
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

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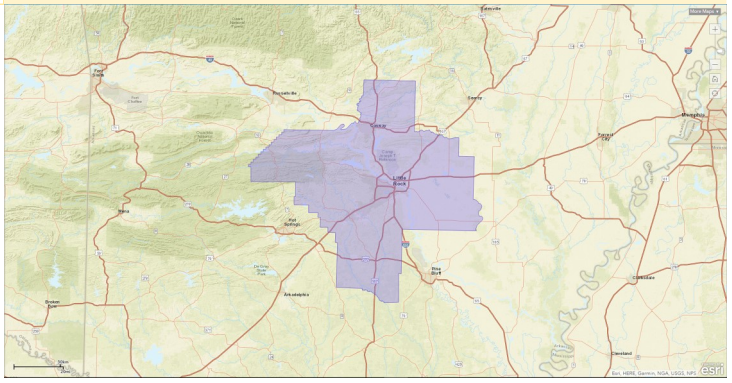
METRO MULTIFAMILY DEMAND OVERVIEW

LITTLE ROCK

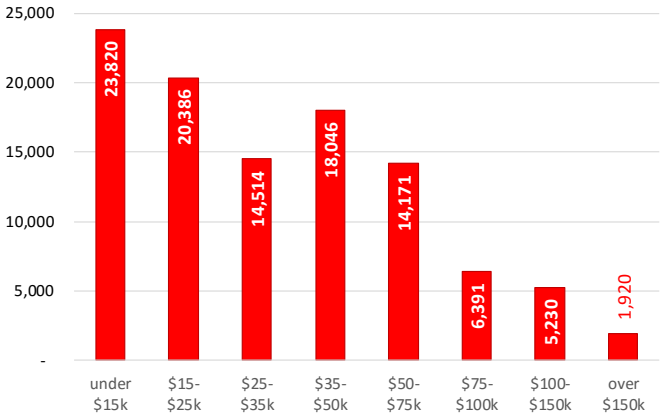
Net in migrations will exceed modest natural population growth. Rental households are fairly diverse in ages, size and incomes. Reasonably good economic prospects led by professional services and education. A third of multifamily rental stock is in affordable STAR units. Annual multifamily demand will remain flat until 2021, then increase slightly through 2030.

Definitions on back

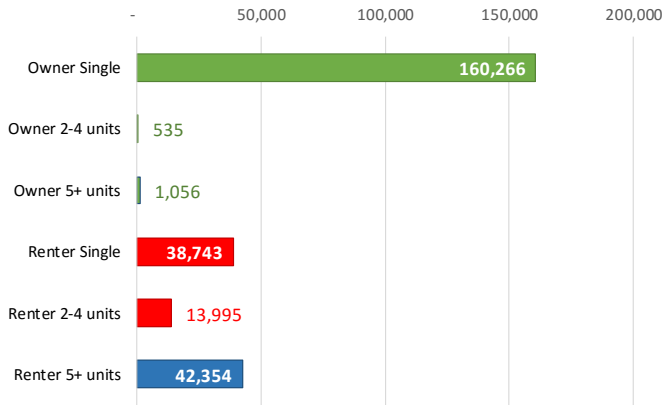
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
43	244	-5.4	33%



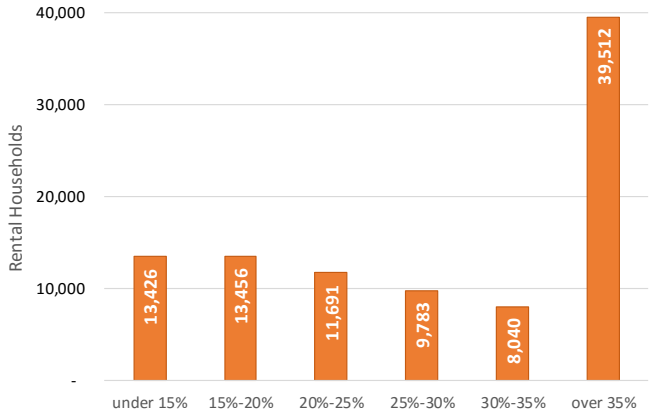
Rental Households by Income



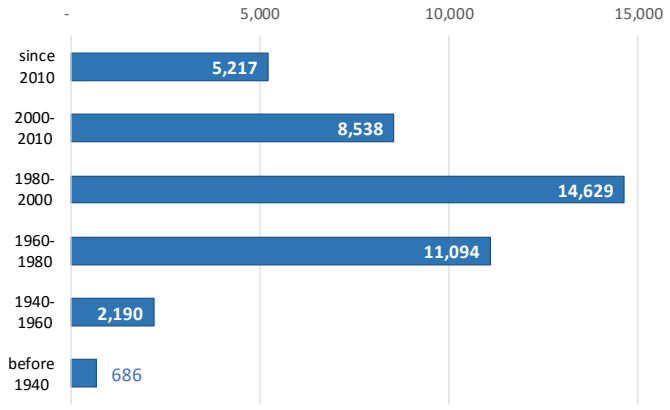
Housing Stock by Tenure & Type



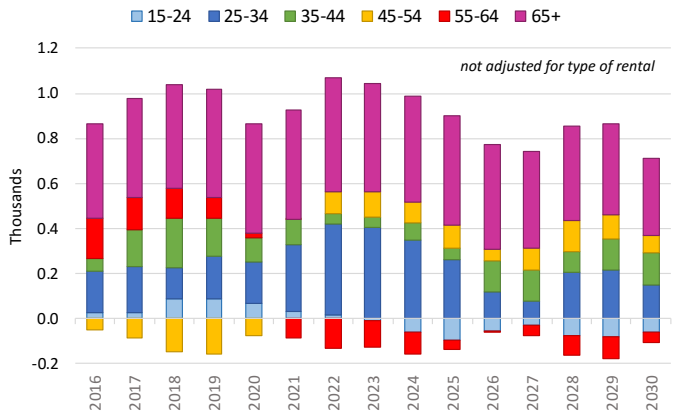
Rent as a Percent of Household Income



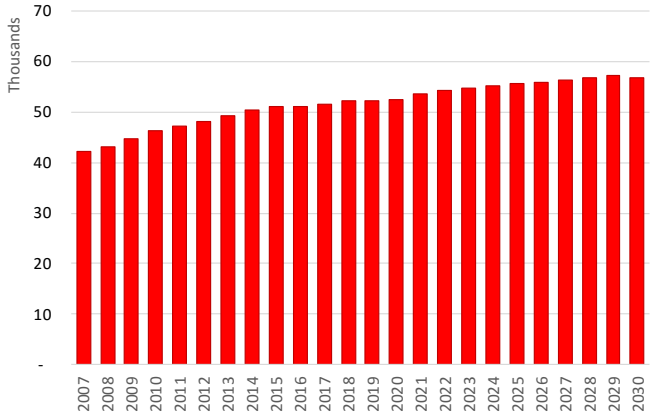
5+ Unit Rental Stock by Year Built



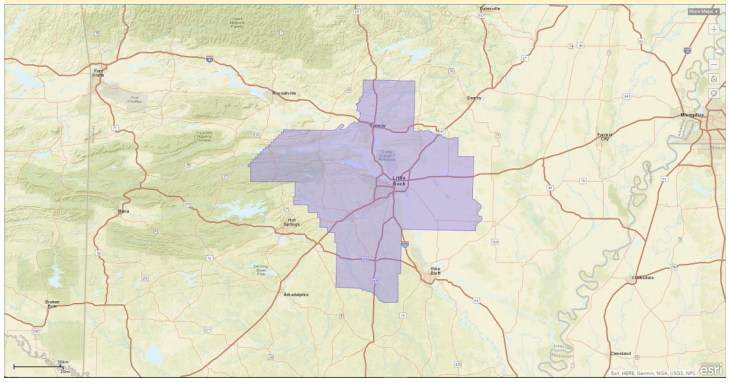
New Rental Households by Age Cohort



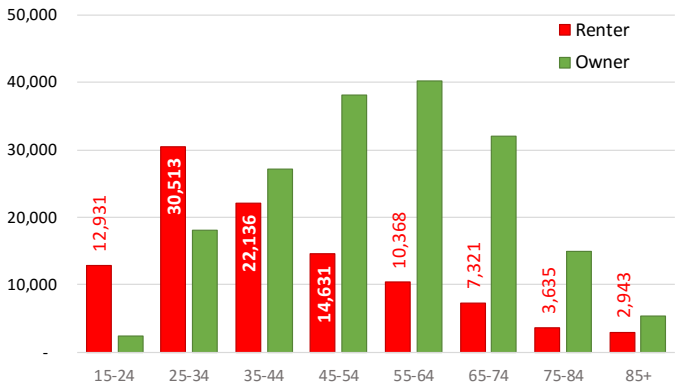
5+ Unit Apartment Demand Forecast



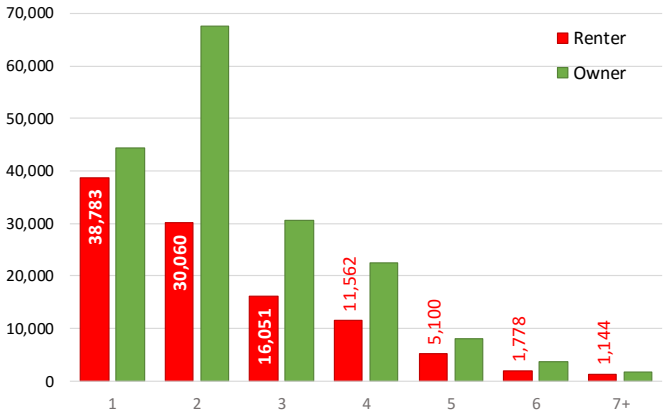
LITTLE ROCK page 2



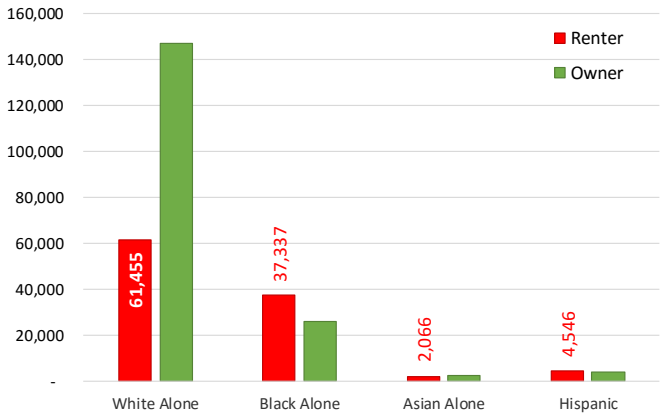
Households by Age Cohort



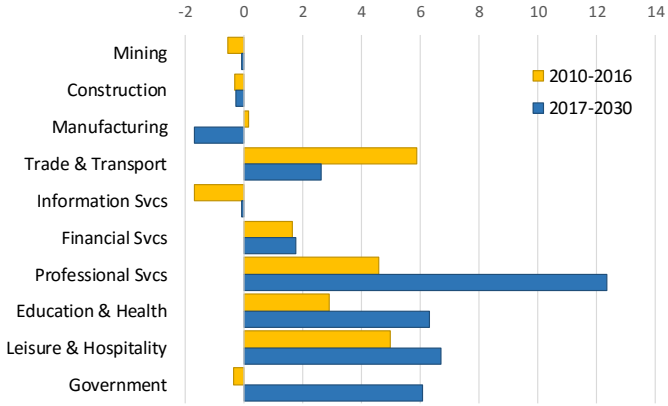
Households by Occupants



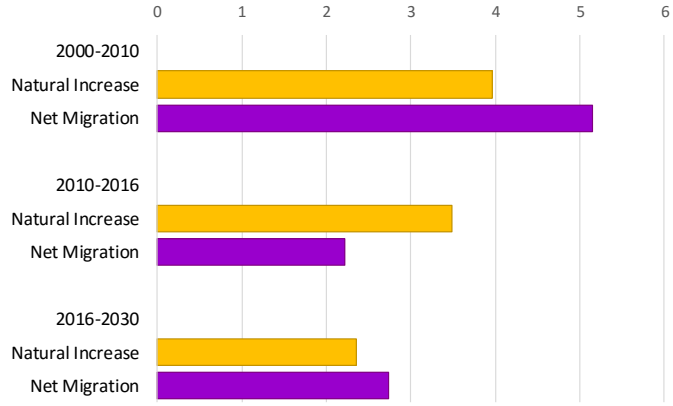
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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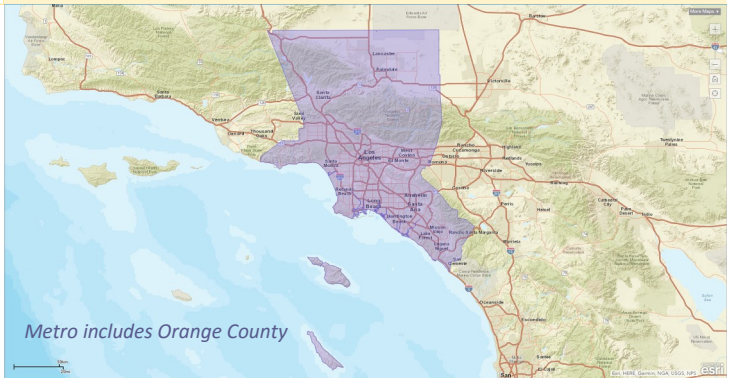
METRO MULTIFAMILY DEMAND OVERVIEW

LOS ANGELES

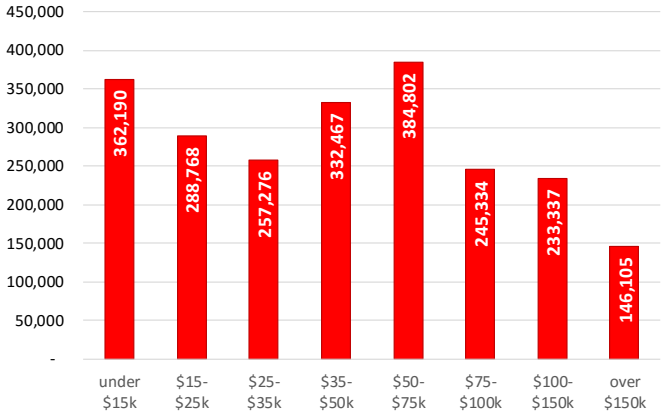
In migrations in are now similar to out migrations with natural change driving household growth. Diverse rental households source from most ages with a range of sizes and incomes. Strong economic prospects in most sectors. Largest share of more affordable STAR units from the 50 metros studied. Steady increases in annual multifamily demand ahead.

Definitions on back

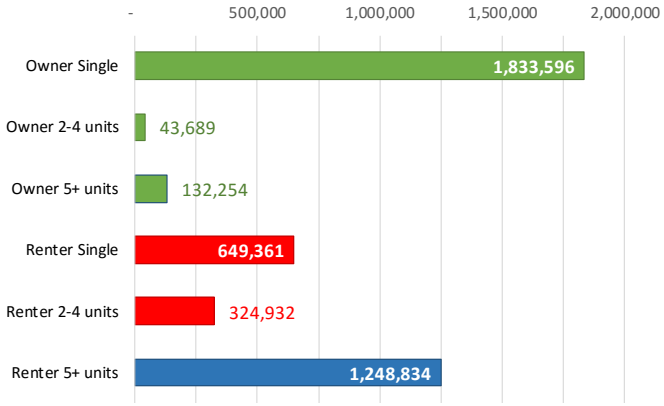
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
17	70	5.3	61%



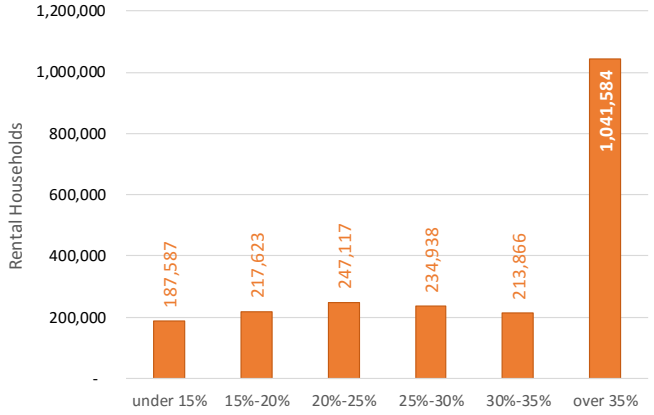
Rental Households by Income



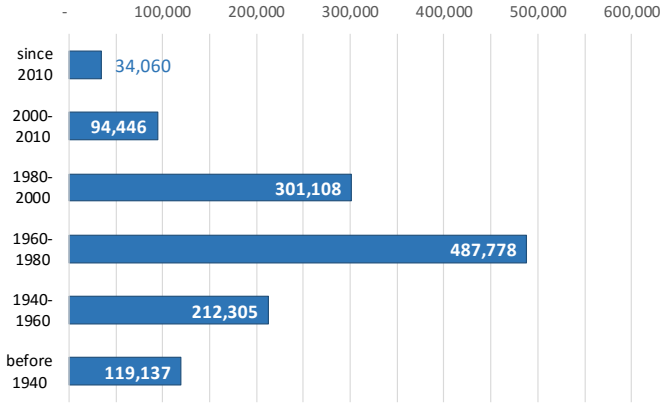
Housing Stock by Tenure & Type



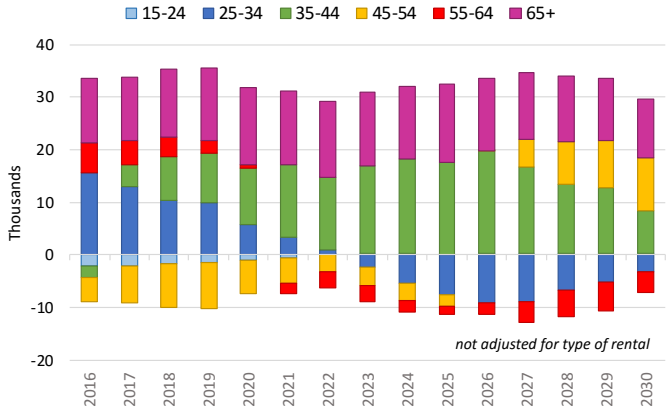
Rent as a Percent of Household Income



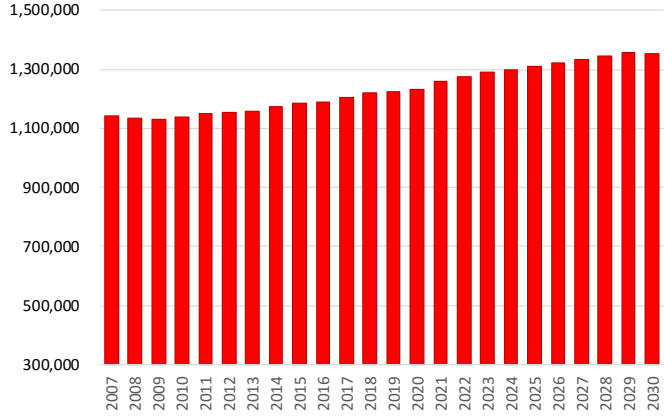
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

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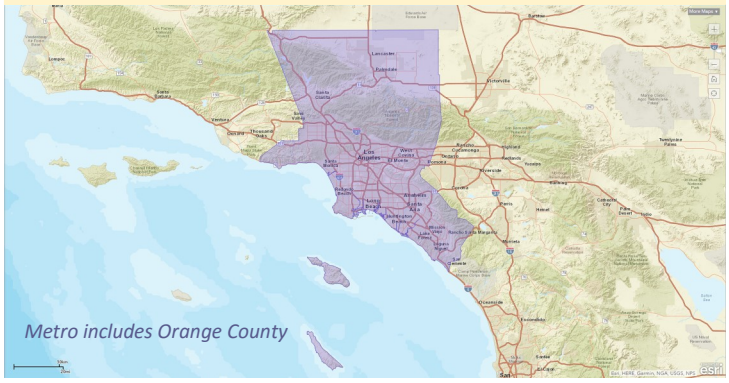
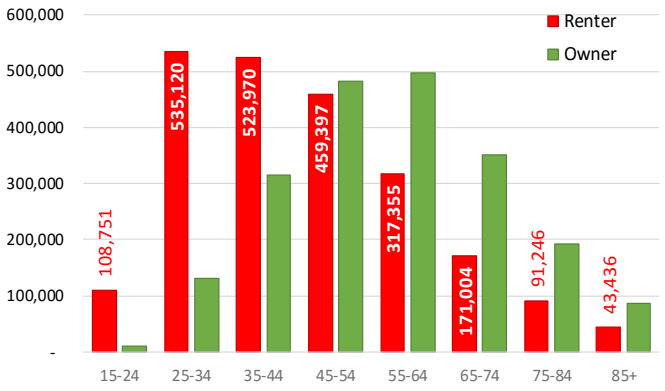
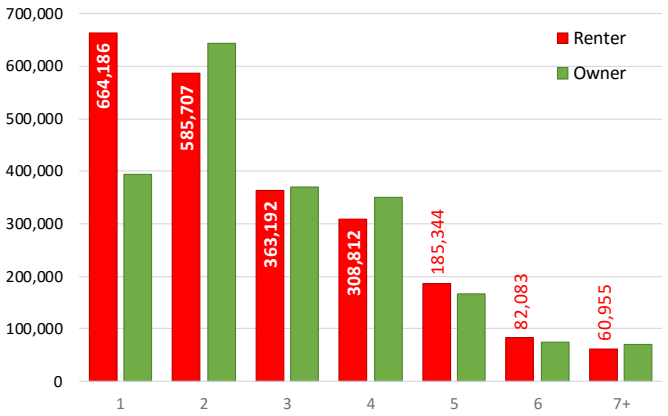
LOS ANGELES page 2



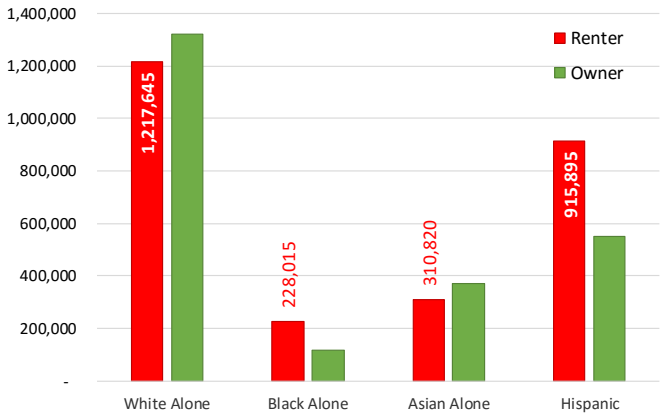
Households by Age Cohort



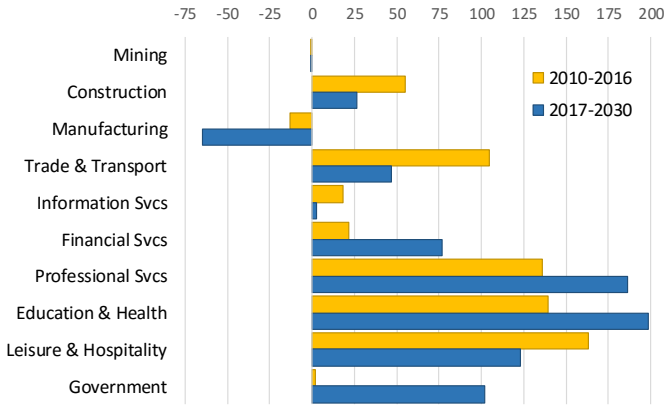
Households by Occupants



Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



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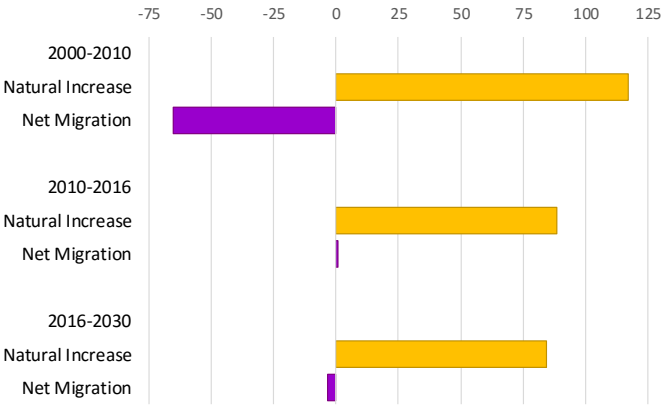

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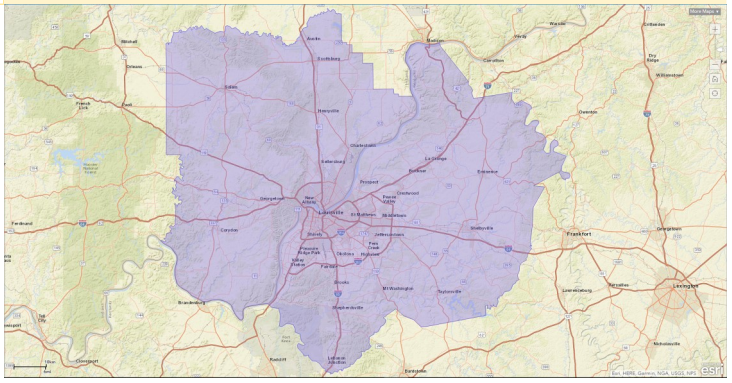
METRO MULTIFAMILY DEMAND OVERVIEW

LOUISVILLE

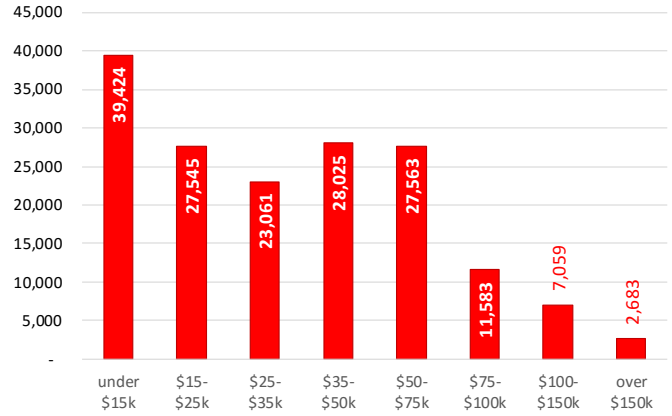
Net in migrations source most of the new rental households ahead as natural population growth wanes. These households will be older, smaller with more modest incomes. Decent economic prospects ahead amid a retreat in manufacturing. Rental housing stock is older with 42% seen in affordable STAR units. Multifamily demand steadily increases to 2030.

Definitions on back

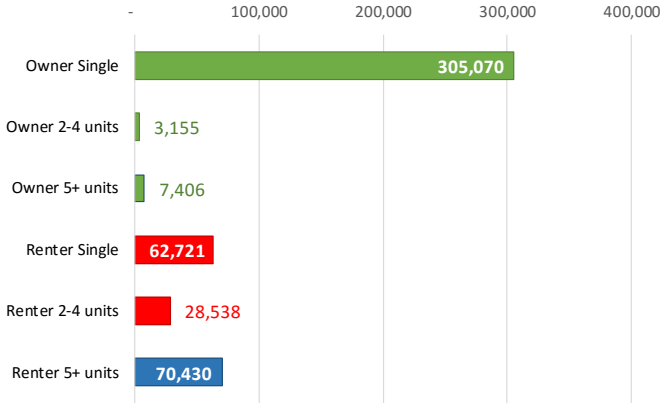
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
44	228	-2.8	42%



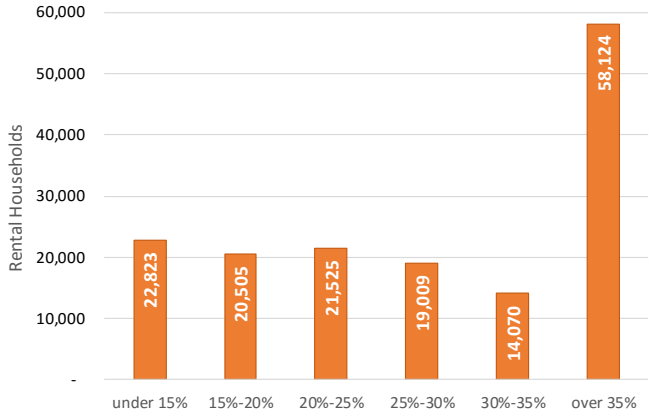
Rental Households by Income



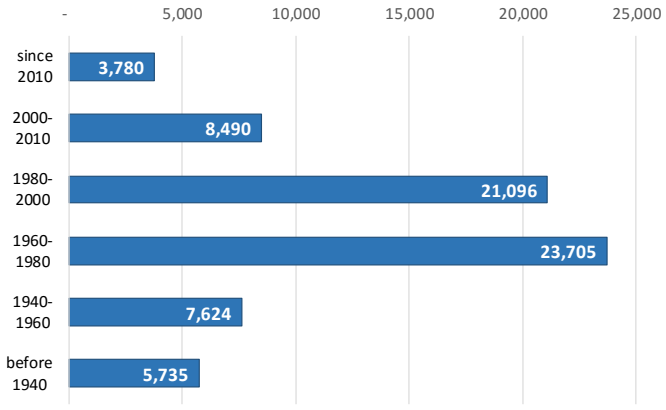
Housing Stock by Tenure & Type



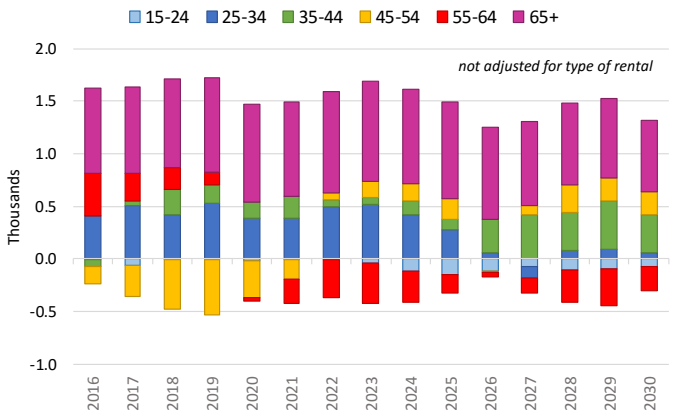
Rent as a Percent of Household Income



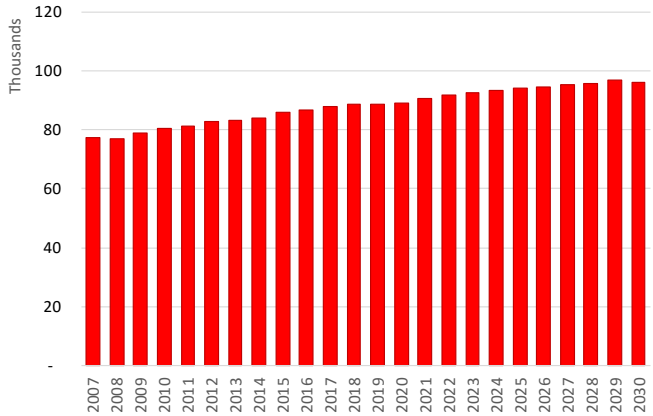
5+ Unit Rental Stock by Year Built



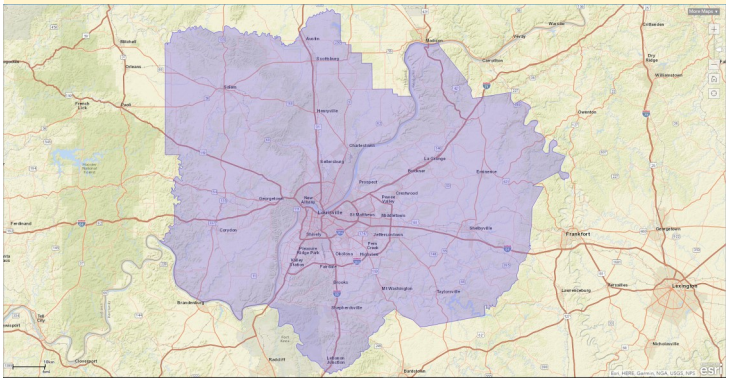
New Rental Households by Age Cohort



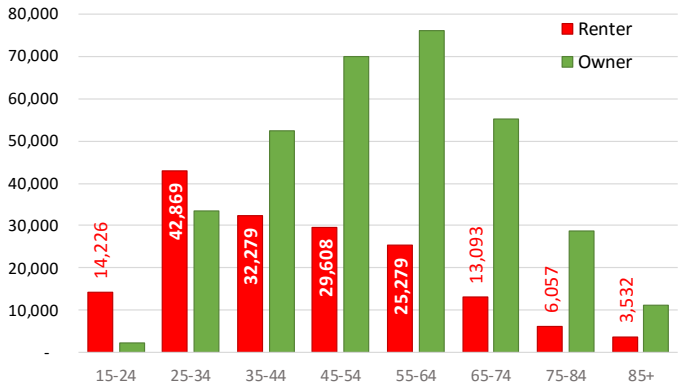
5+ Unit Apartment Demand Forecast



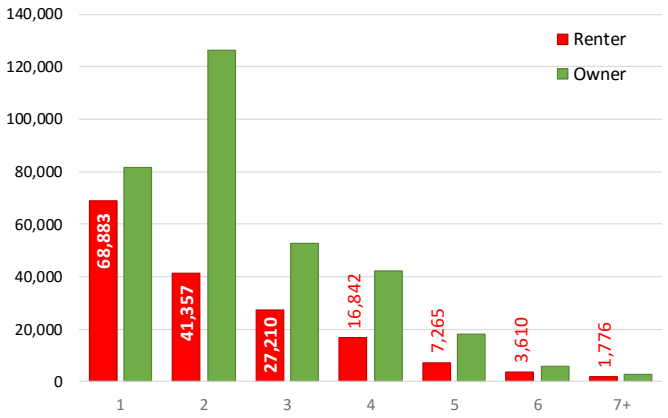
LOUISVILLE page 2



Households by Age Cohort



Households by Occupants



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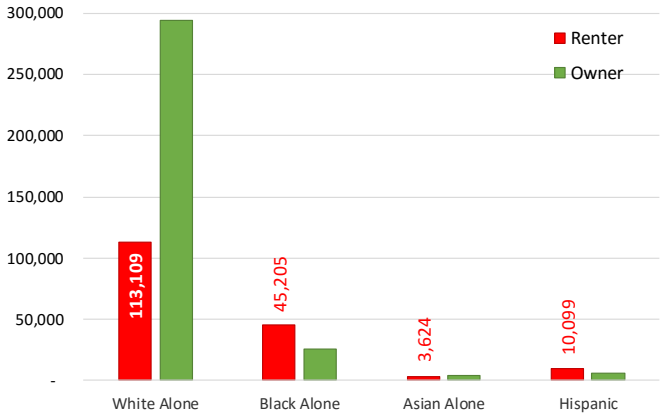

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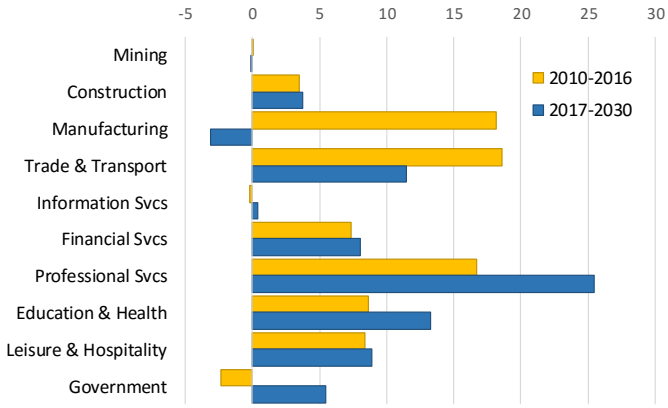

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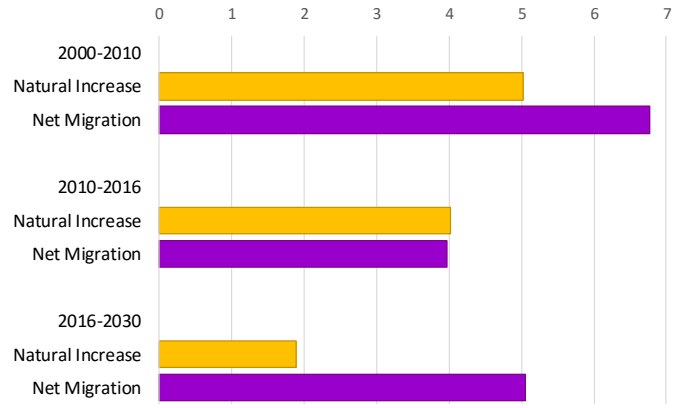

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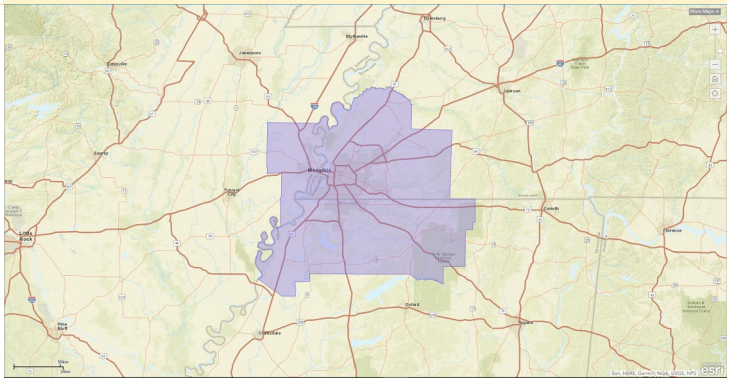
METRO MULTIFAMILY DEMAND OVERVIEW

MEMPHIS

Net out migrations from Memphis will reverse, though natural population growth continues to shrink. New rental households will be older with more modest incomes. Economic growth is positive but weaker than most other metros. Slightly increasing multifamily demand through 2030.



Definitions on back

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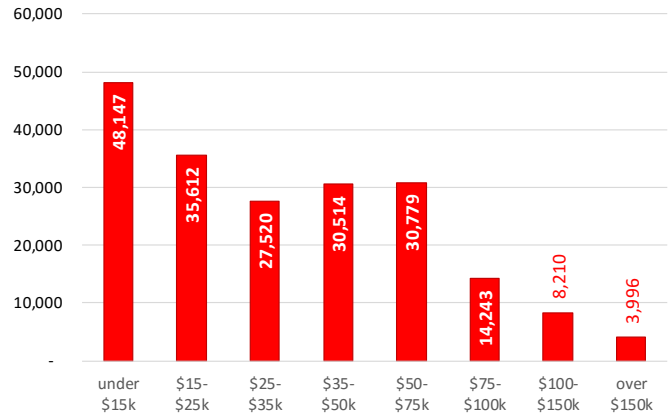
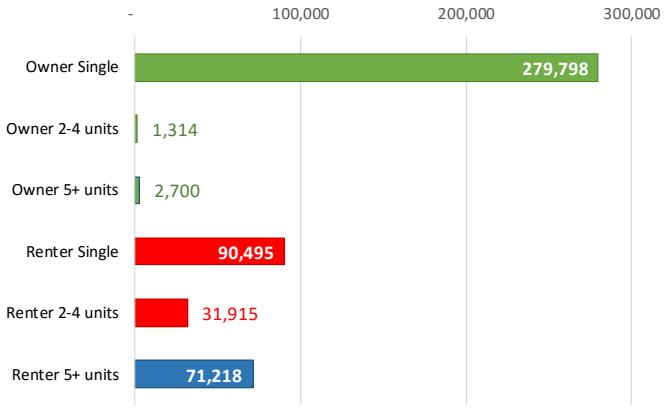
40	222	8.7	38%

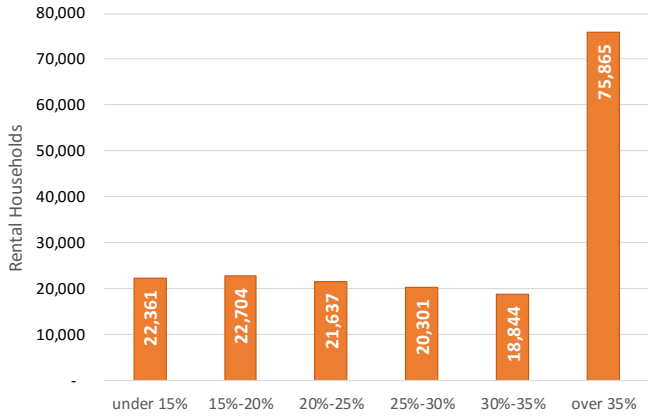
Rental Households by Income



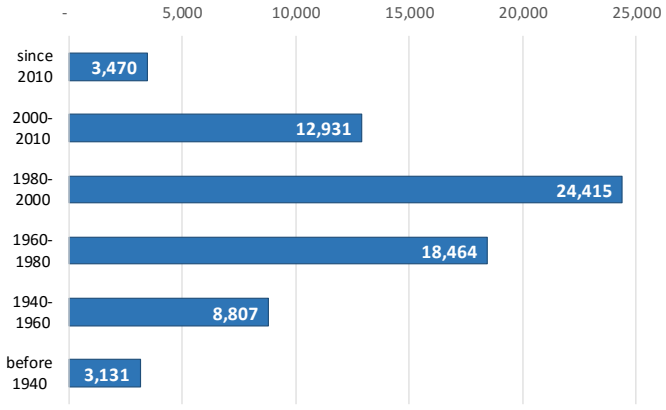
Housing Stock by Tenure & Type



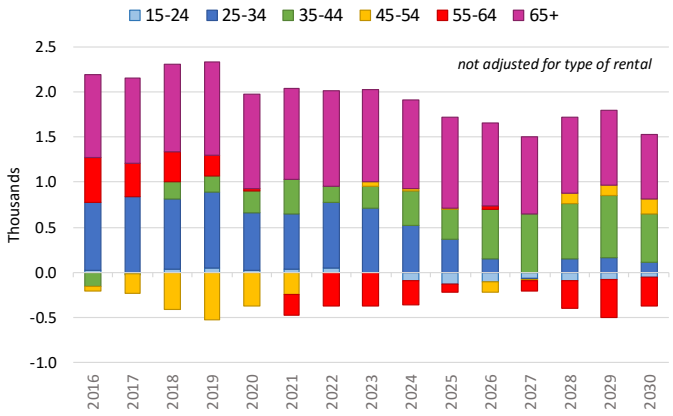
Rent as a Percent of Household Income



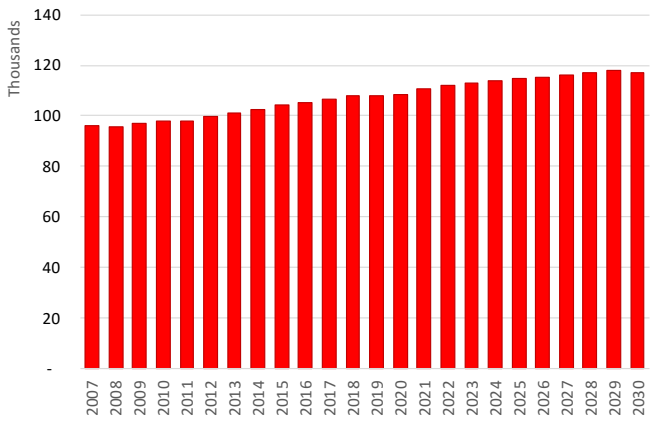
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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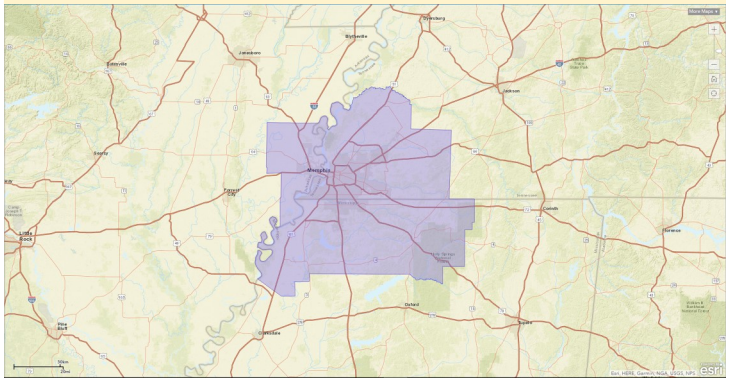
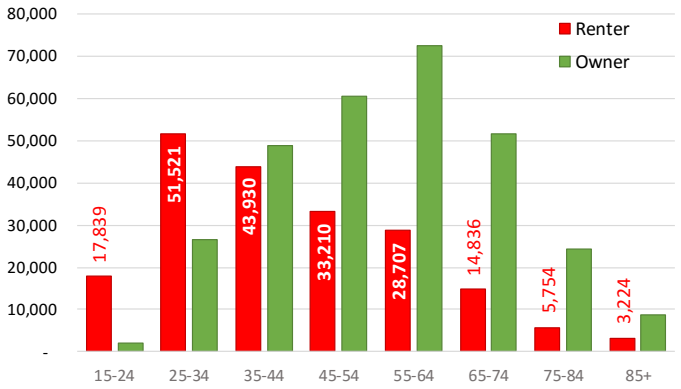
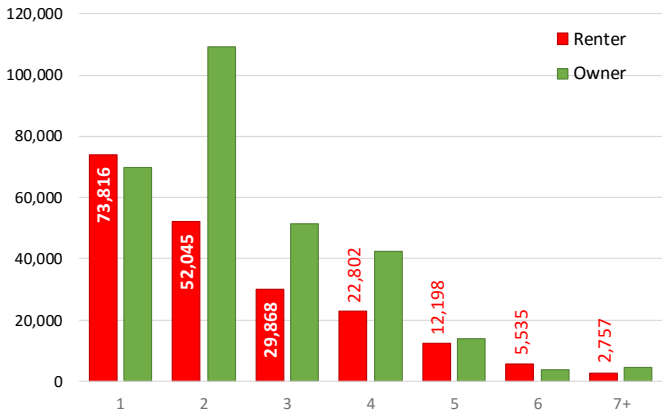


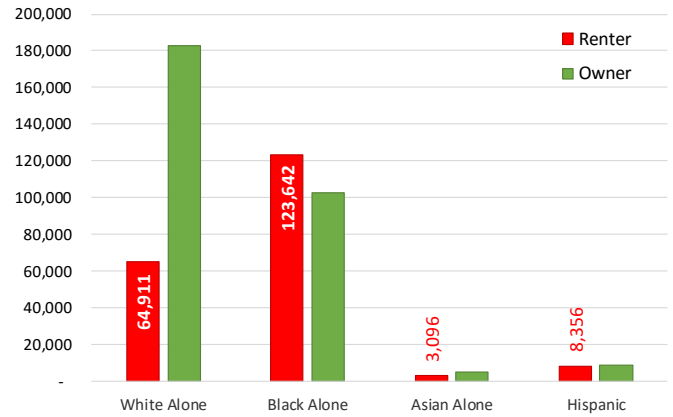
Households by Age Cohort



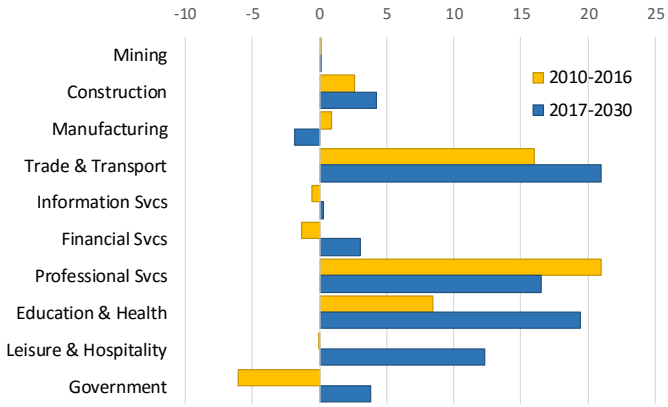
Households by Occupants



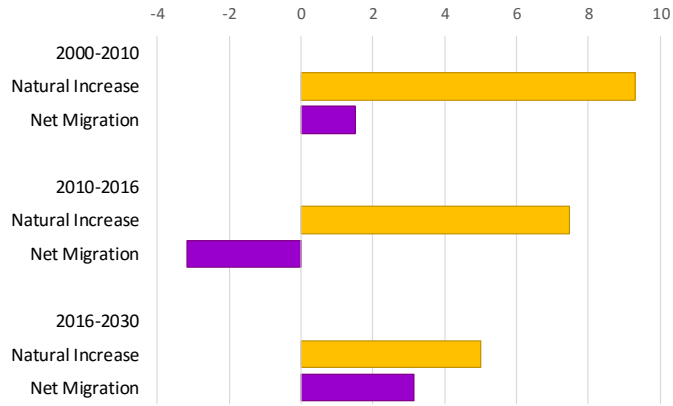
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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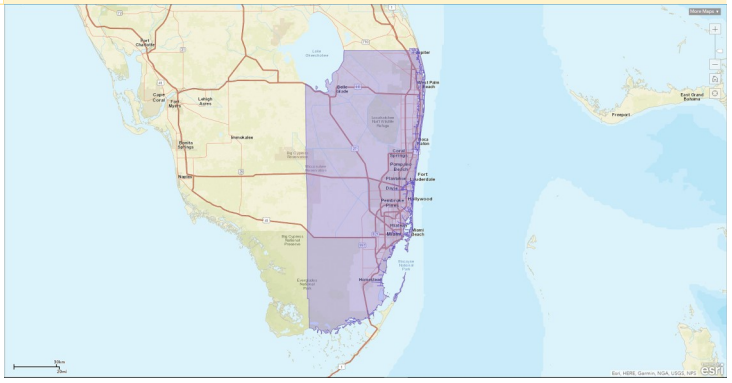
METRO MULTIFAMILY DEMAND OVERVIEW

MIAMI

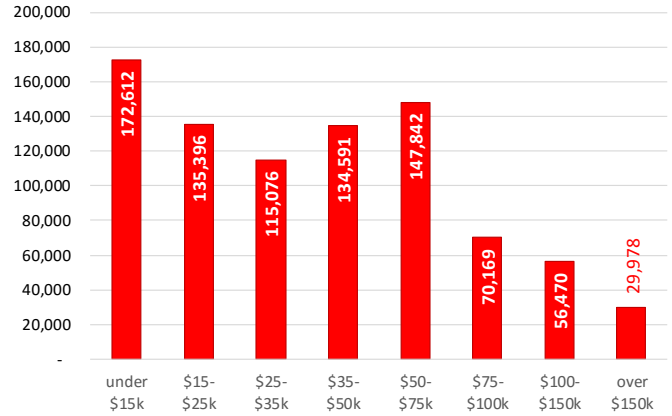
Even with natural population growth in the last decade, net in migrations are three times stronger and soon to be five. New rental households will be smaller from most age cohorts. With strong incomes up to $75,000, most renters still pay over 35% of income on rent. Good economic growth ahead led by professional services and hospitality.

Definitions on back

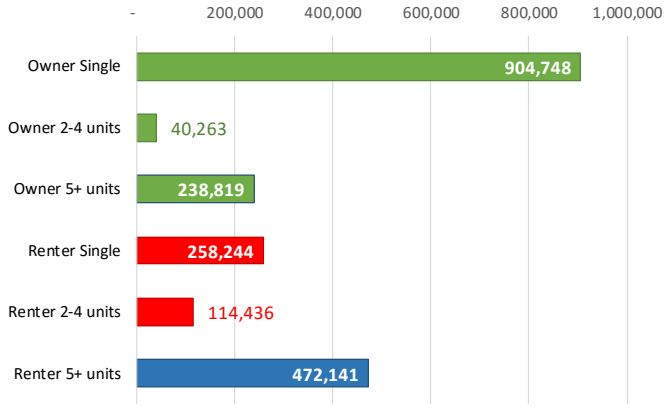
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
3	105	9.3	37%



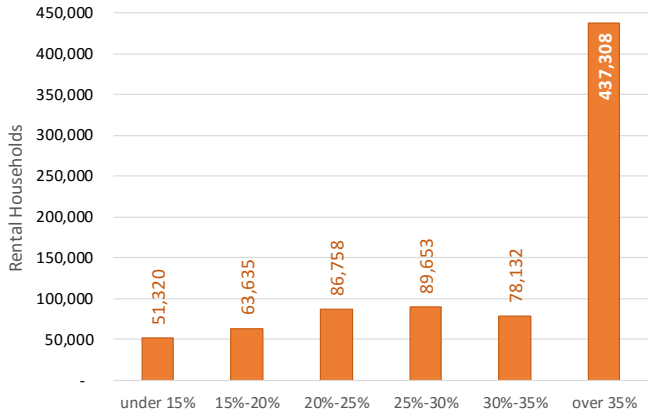
Rental Households by Income



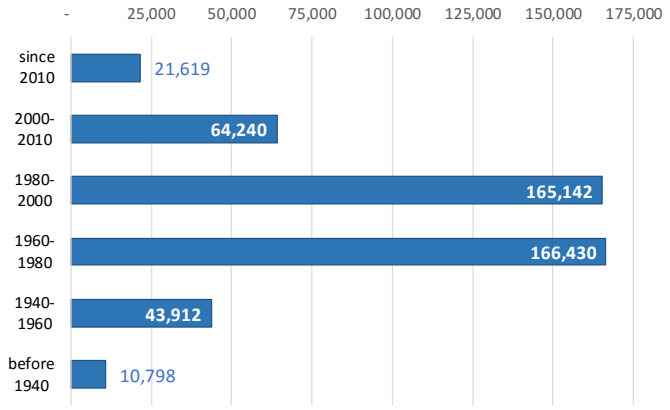
Housing Stock by Tenure & Type



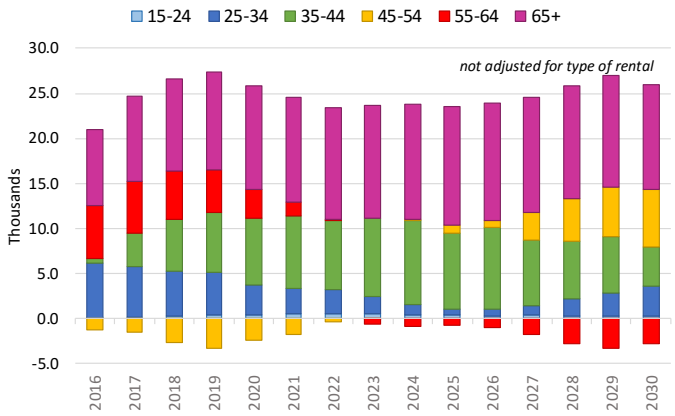
Rent as a Percent of Household Income



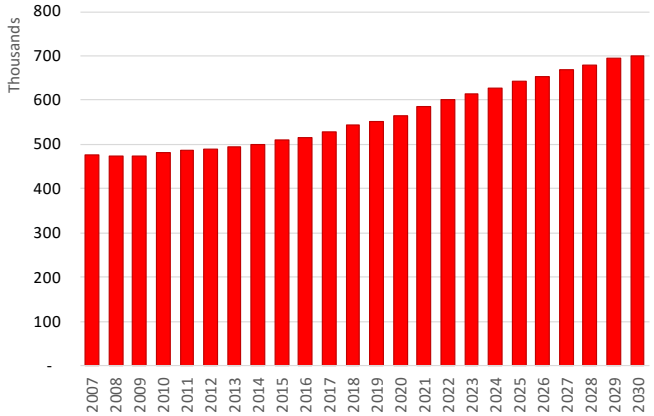
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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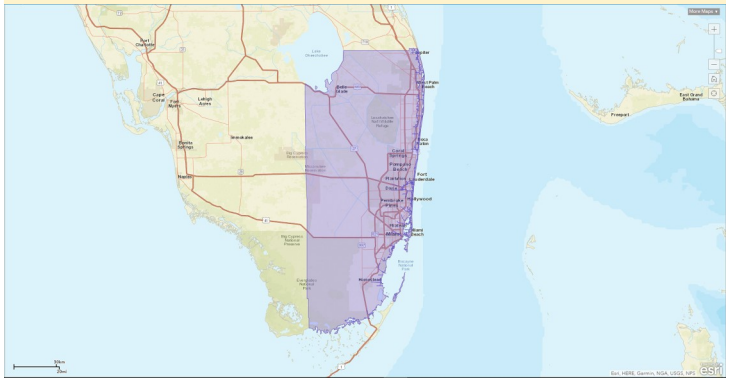
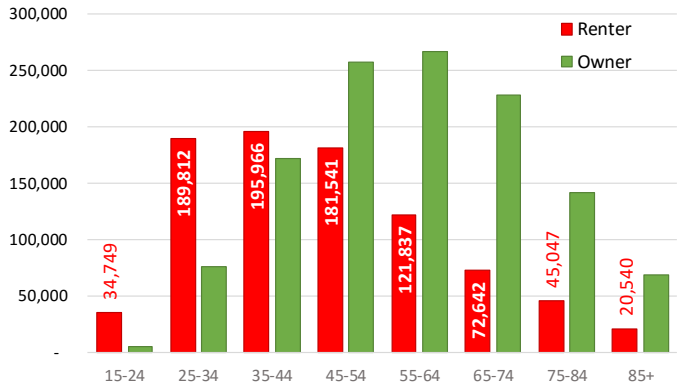
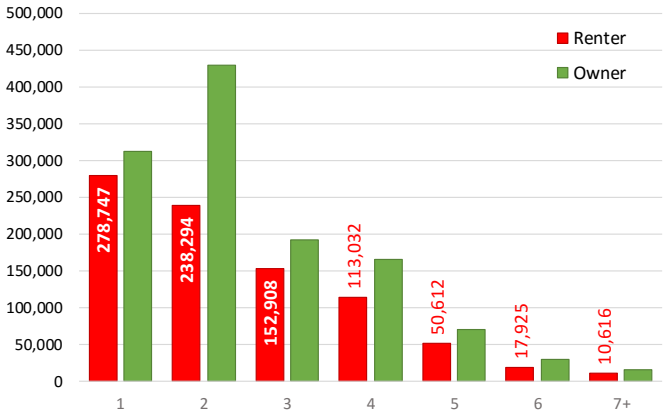


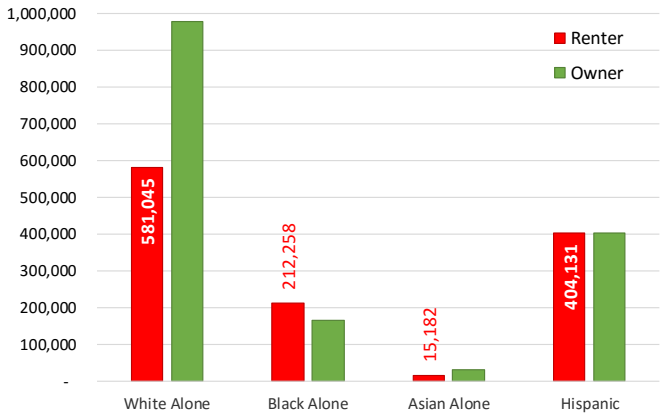
Households by Age Cohort



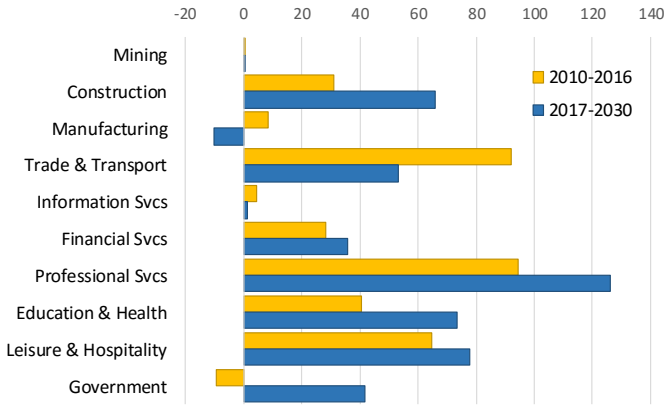
Households by Occupants



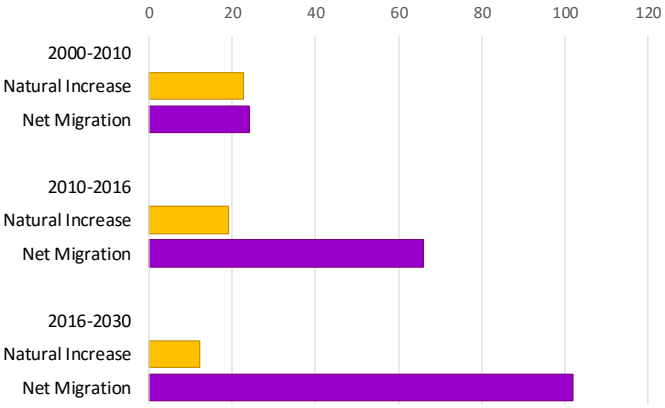
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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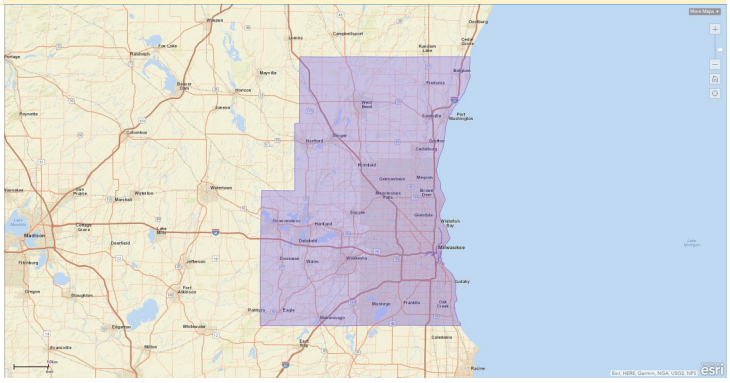
METRO MULTIFAMILY DEMAND OVERVIEW

MILWAUKEE

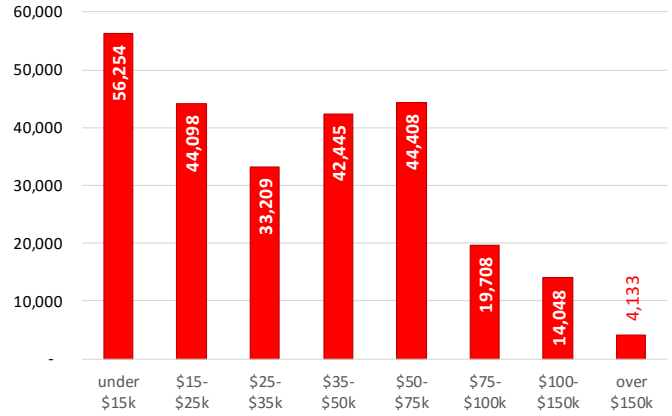
Growth continues to come solely from natural population growth which is slowing. New rental household growth relies upon householders over 35. Economic growth is positive but sluggish. Rental stock is older and over 40% seen in more affordable STAR units. Multifamily demand is flat for two years, then increases through 2029.

Definitions on back

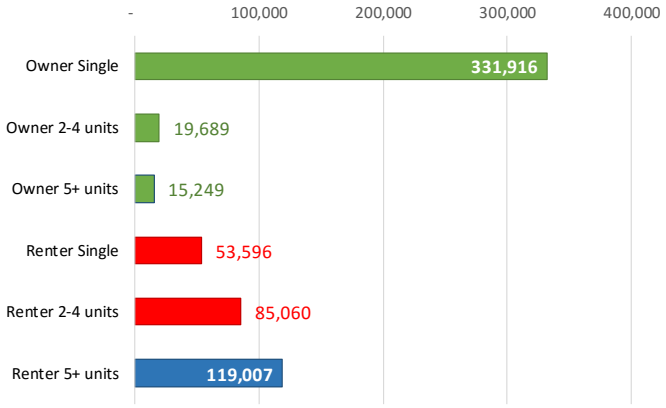
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
49	181	4.7	43%



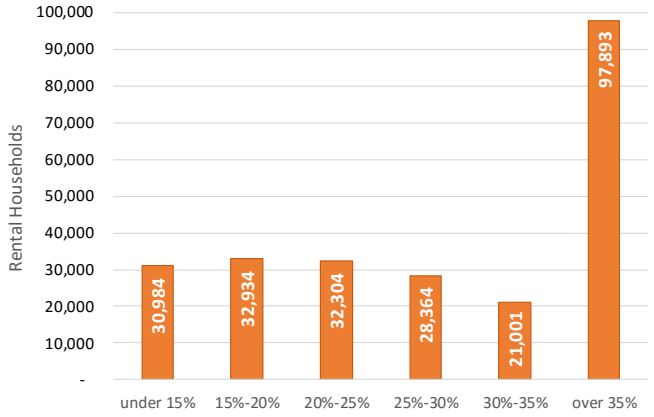
Rental Households by Income



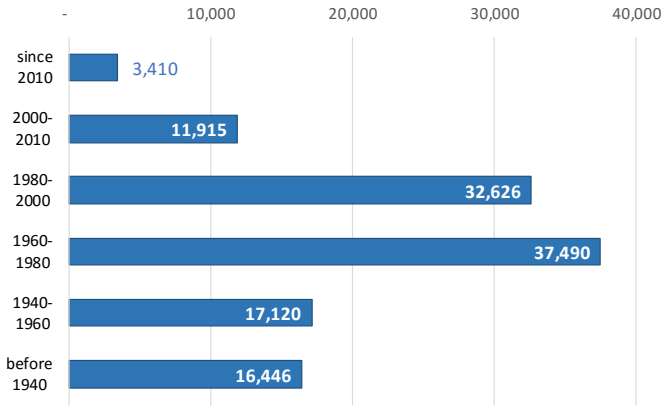
Housing Stock by Tenure & Type



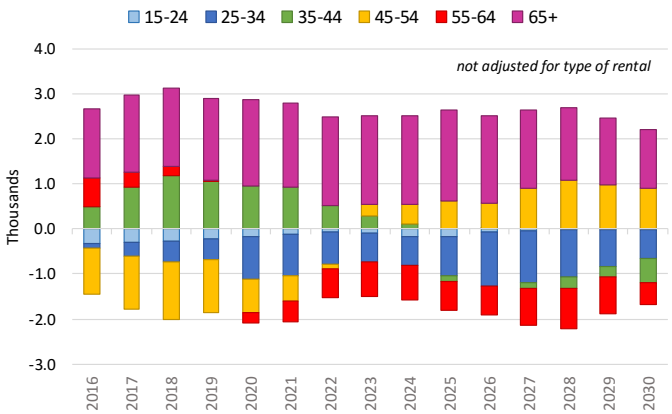
Rent as a Percent of Household Income



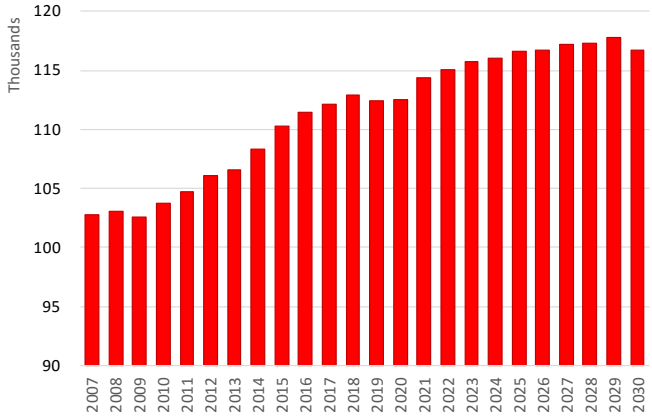
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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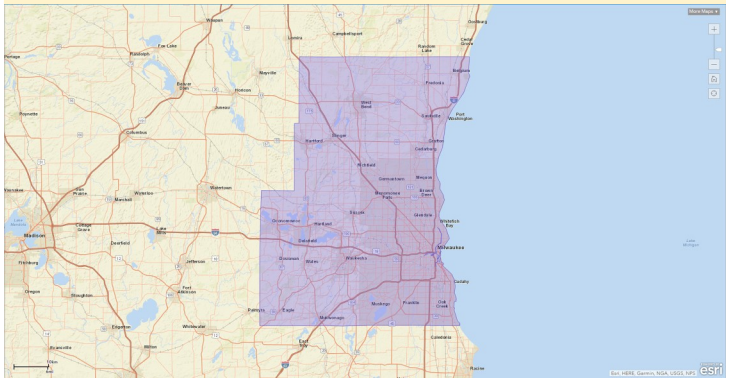
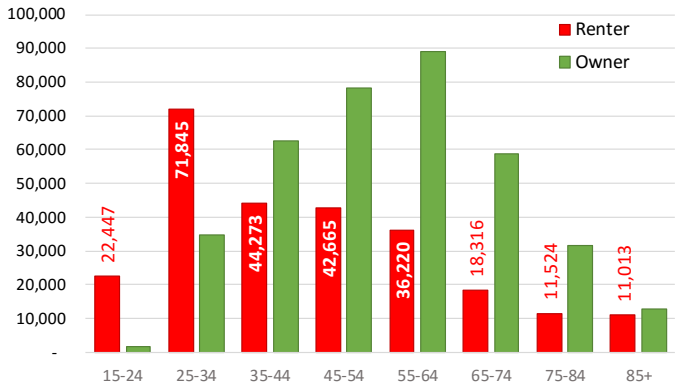
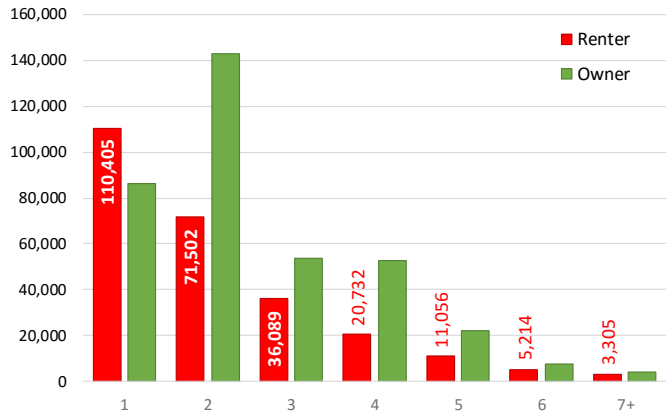


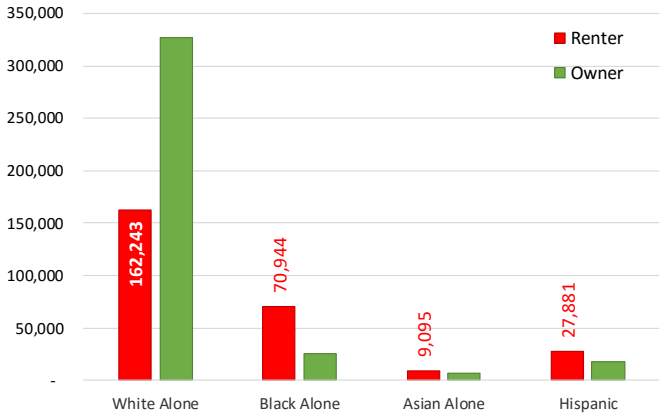
Households by Age Cohort



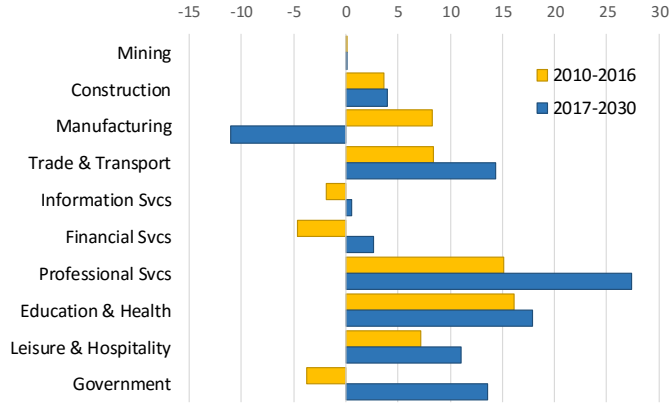
Households by Occupants



Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



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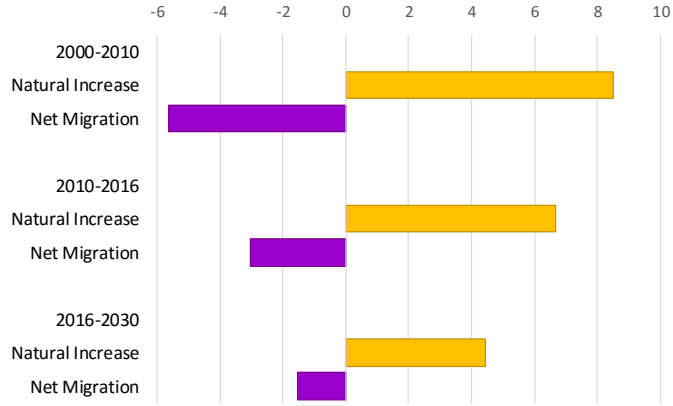

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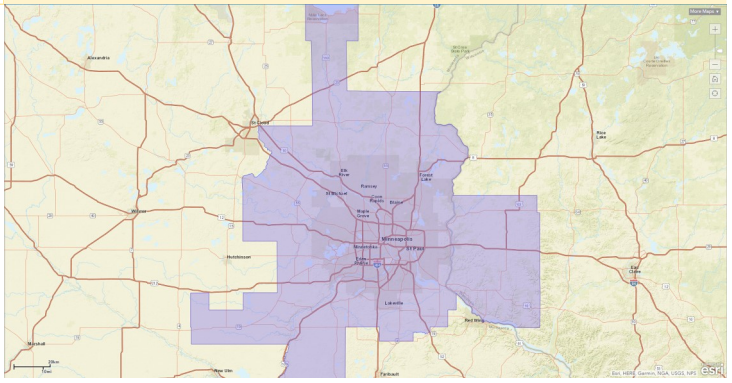
METRO MULTIFAMILY DEMAND OVERVIEW

MINNEAPOLIS

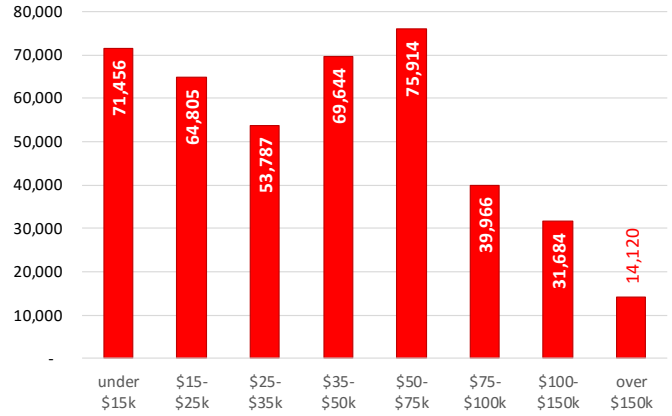
Net in migrations are a modest but growing portion of new renter household growth, relying ahead on renters over 35. Renter incomes are strong up to $75,000. Economic prospects are solid with steady growth. Rental stock is older with 44% seen in more affordable STAR units. Demand is expected to steadily rise.



Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
15	211	3.3	44%

Rental Households by Income



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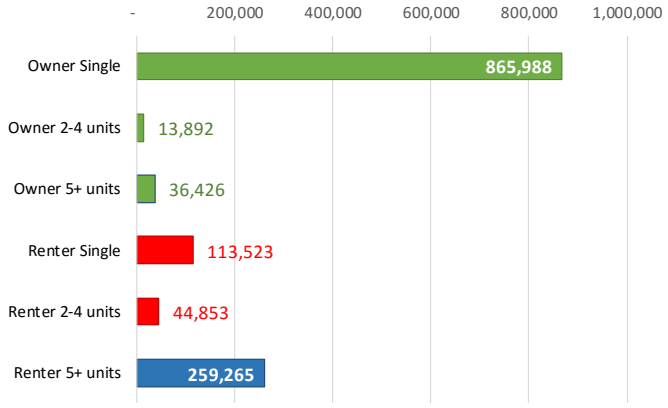
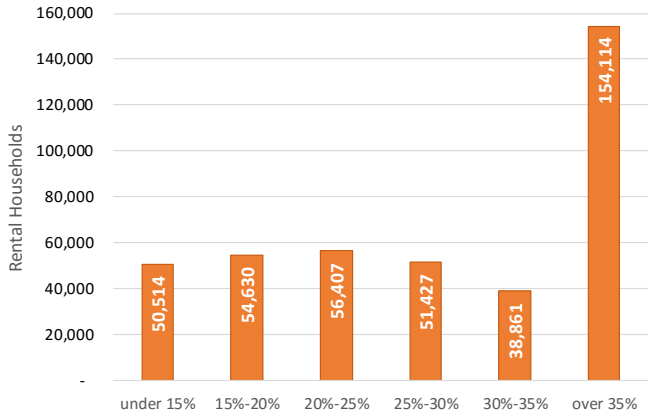
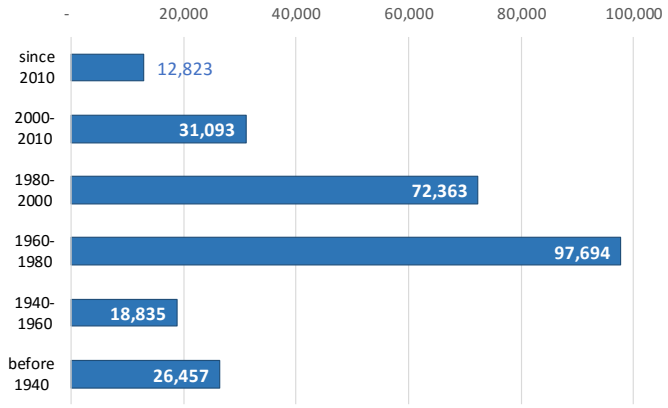


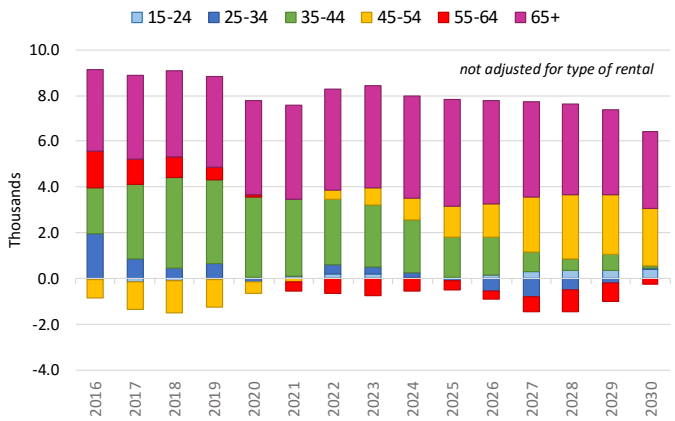
Rent as a Percent of Household Income



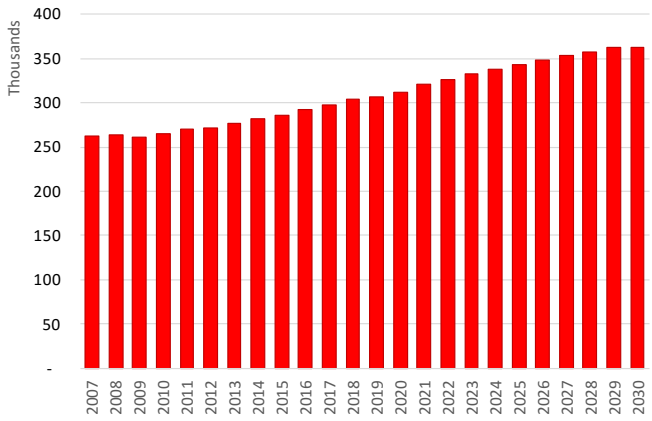
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

University of San Diego SCHOOL OF BUSINESS

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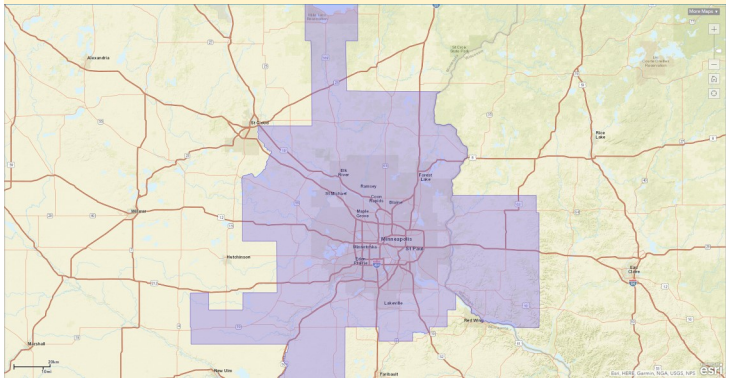
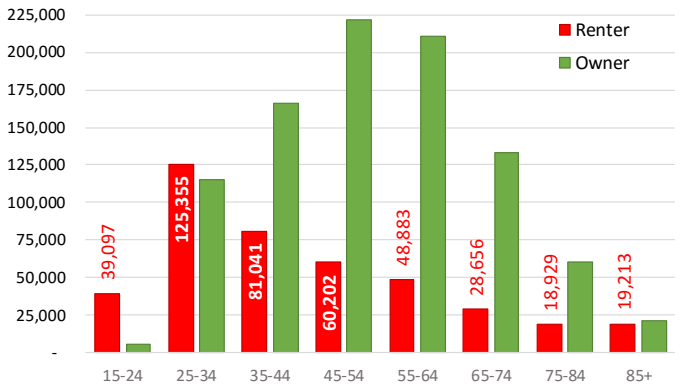
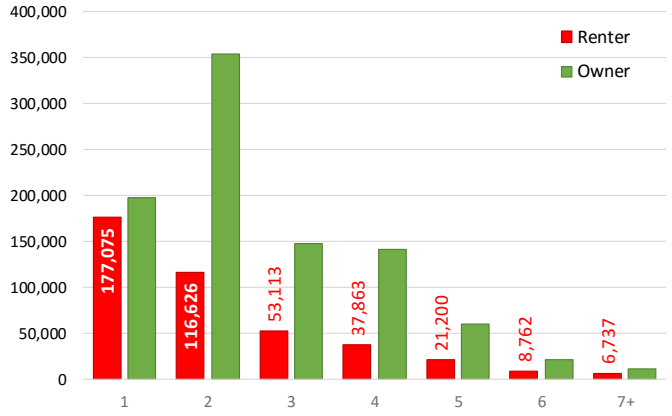


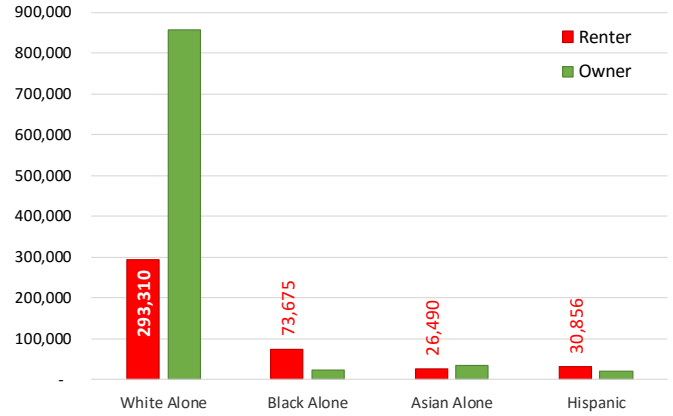
Households by Age Cohort



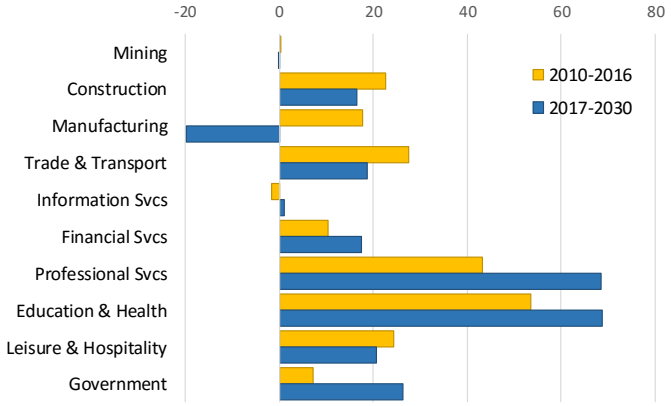
Households by Occupants



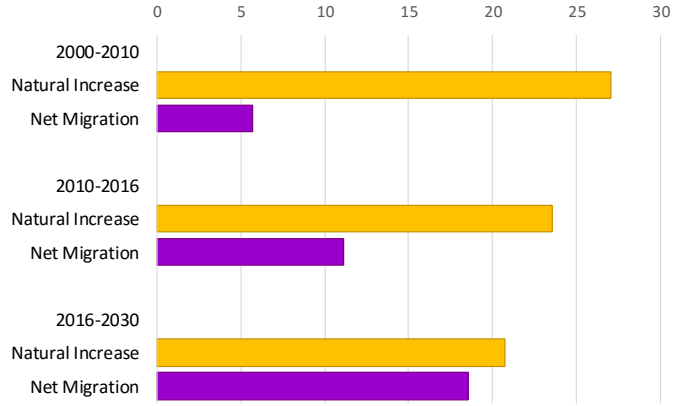
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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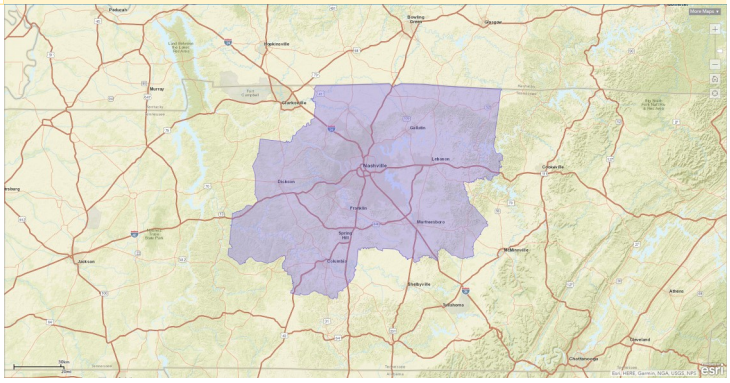
METRO MULTIFAMILY DEMAND OVERVIEW

NASHVILLE

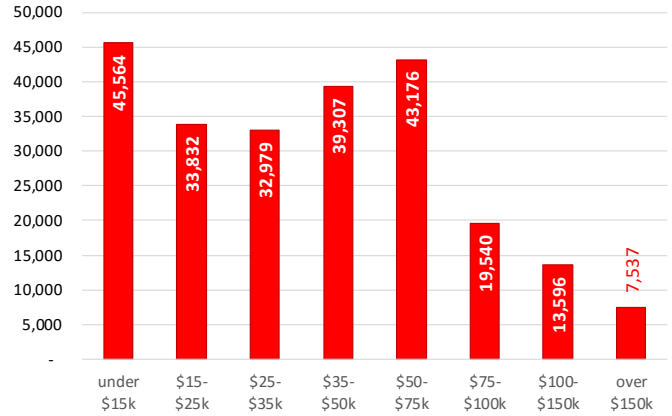
Net in migrations remain stronger than natural population growth for new rental households sourced from all age cohorts. Current rental households are smaller with a wider range of incomes. Economic prospects are strong led by professional services and education. The indices below portend a good supply response to a steadily increasing annual multifamily demand.

Definitions on back

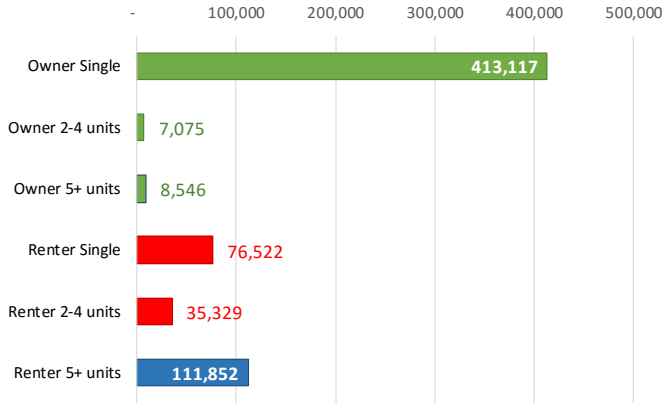
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
24	175	-2.4	30%



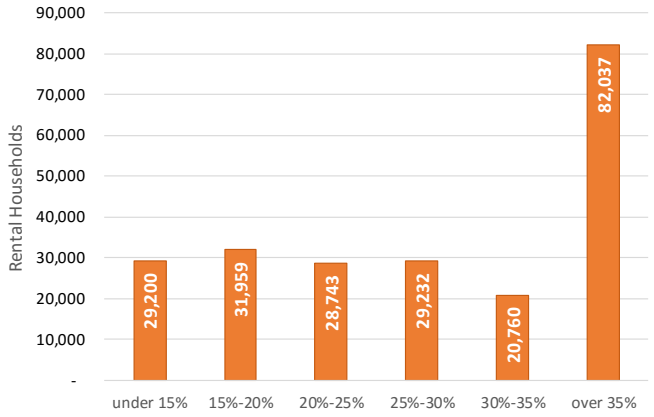
Rental Households by Income



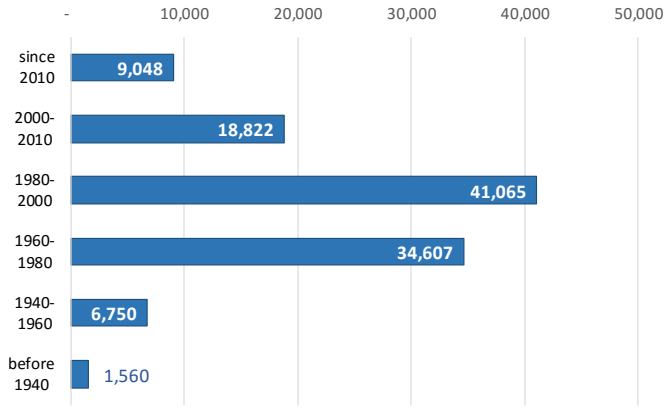
Housing Stock by Tenure & Type



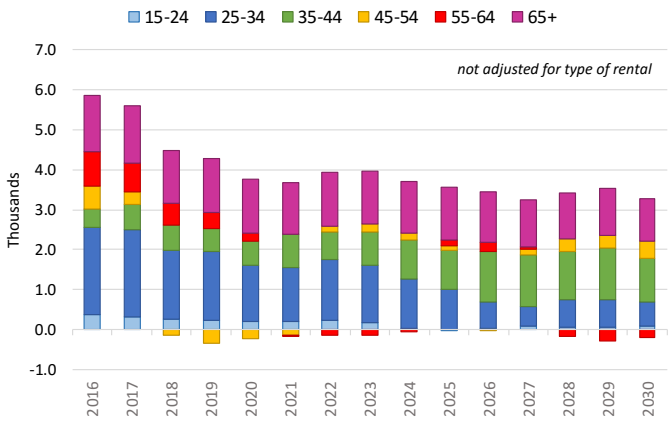
Rent as a Percent of Household Income



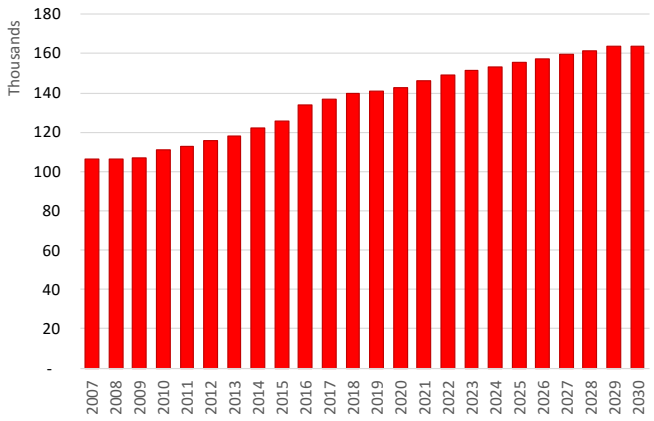
5+ Unit Rental Stock by Year Built



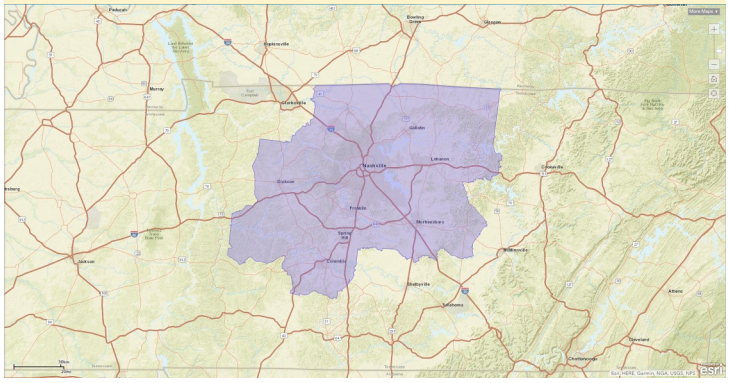
New Rental Households by Age Cohort



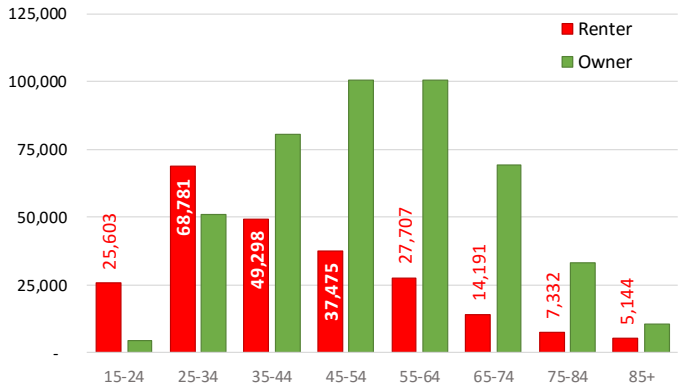
5+ Unit Apartment Demand Forecast



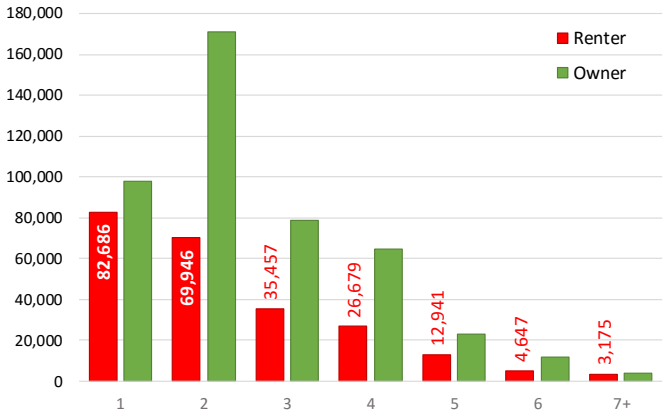
NASHVILLE page 2



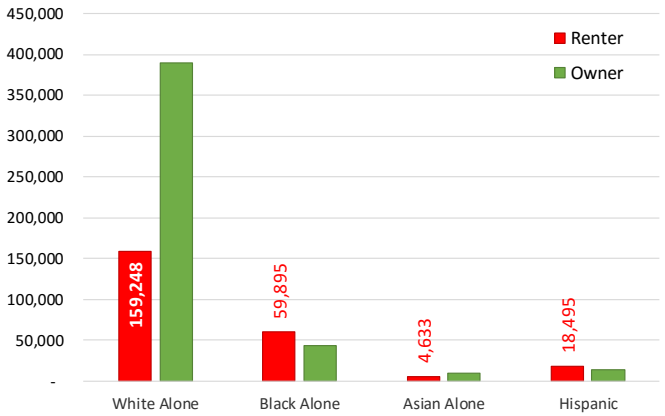
Households by Age Cohort



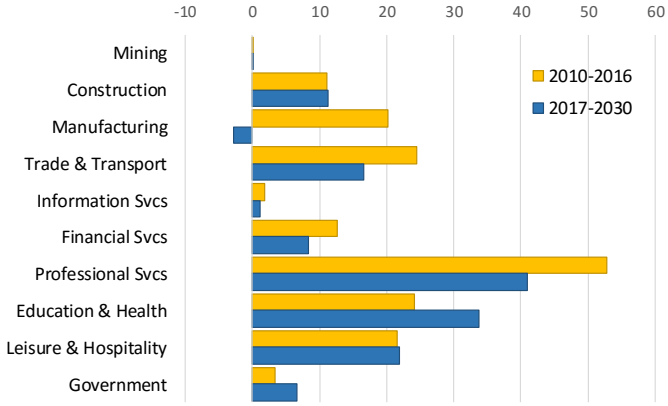
Households by Occupants



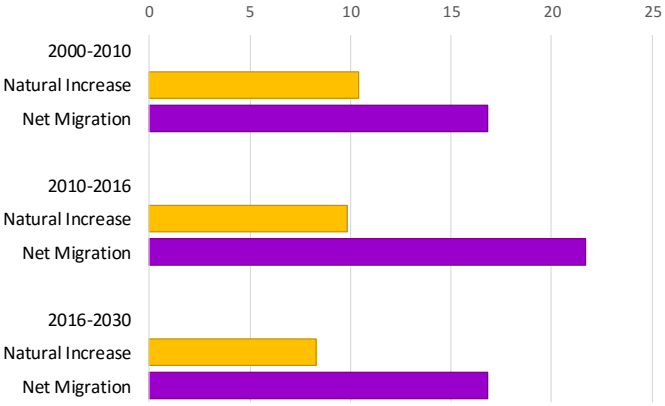
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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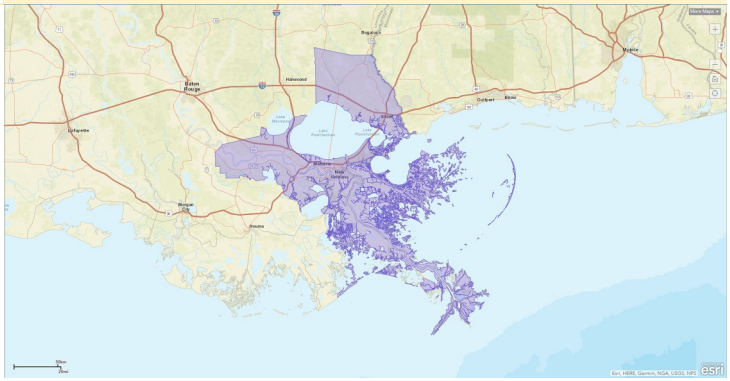
METRO MULTIFAMILY DEMAND OVERVIEW

NEW ORLEANS

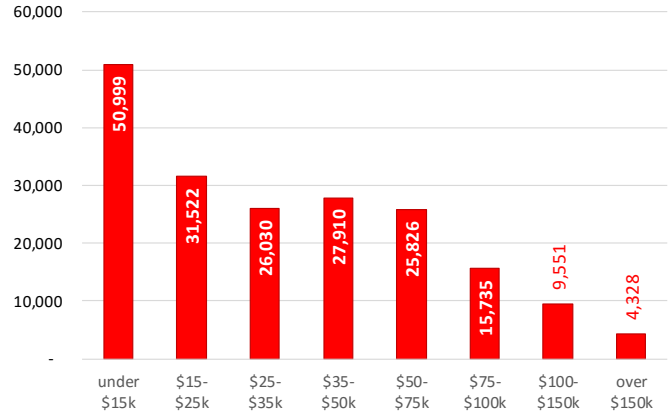
Historic out migrations have halted and new net in migrations slightly exceed mild natural population growth. New rental households will source mostly from 35+ age cohorts but with lower incomes. Nearly half of renters pay more than 35% of income for rent. Future economic prospects are positive, led by trade. Multifamily demand slowly increases.

Definitions on back

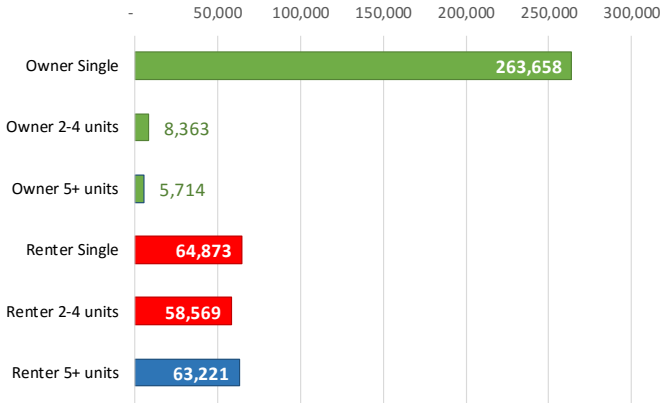
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
46	180	-6.0	41%



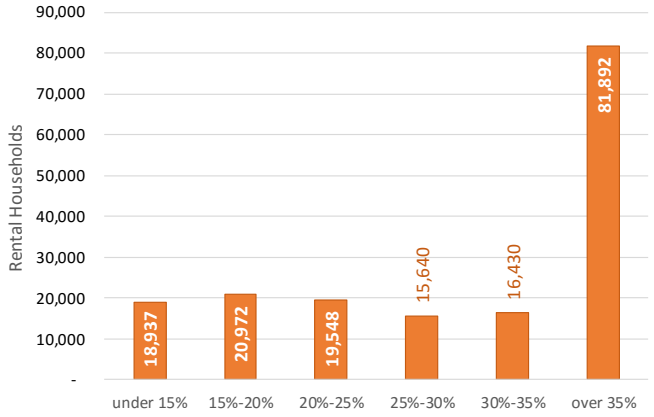
Rental Households by Income



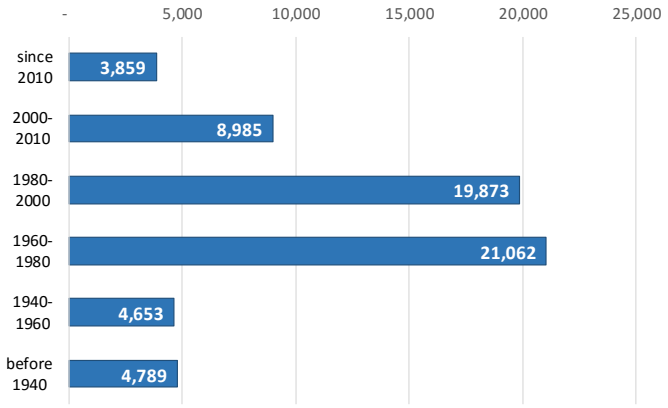
Housing Stock by Tenure & Type



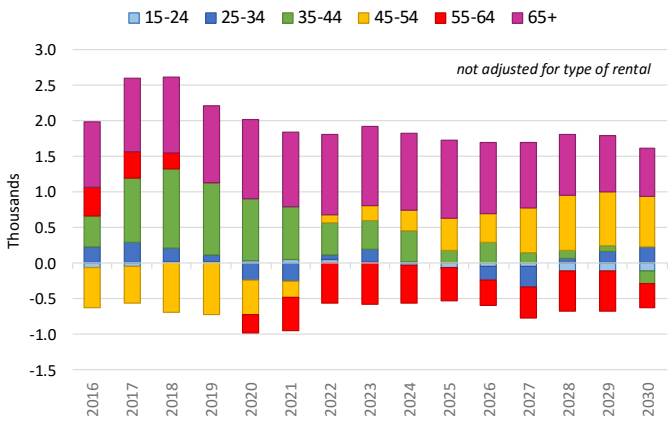
Rent as a Percent of Household Income



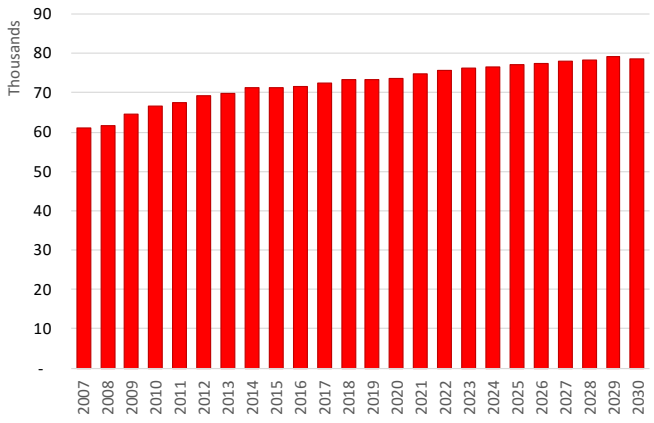
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

University of San Diego SCHOOL OF BUSINESS

WREA

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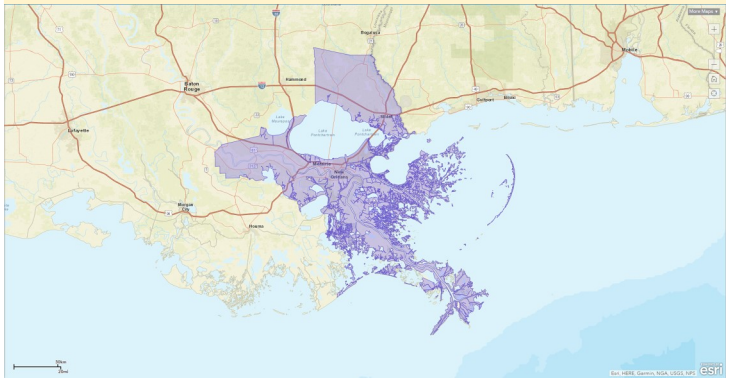
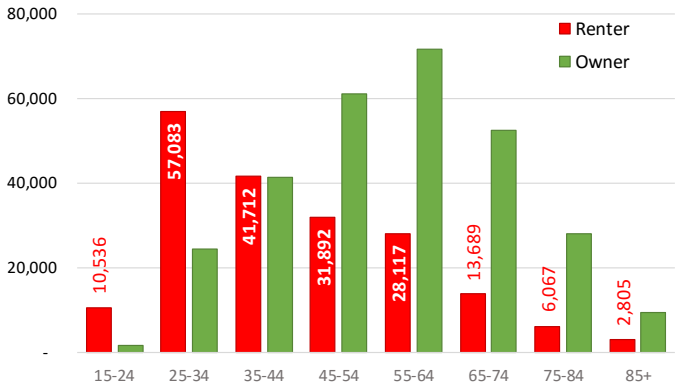
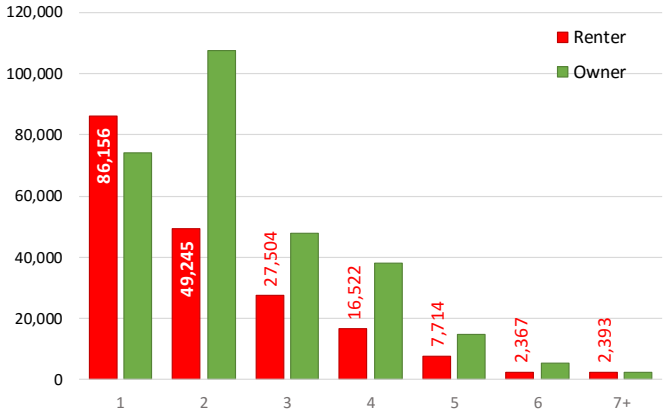
NEW ORLEANS page 2



Households by Age Cohort



Households by Occupants



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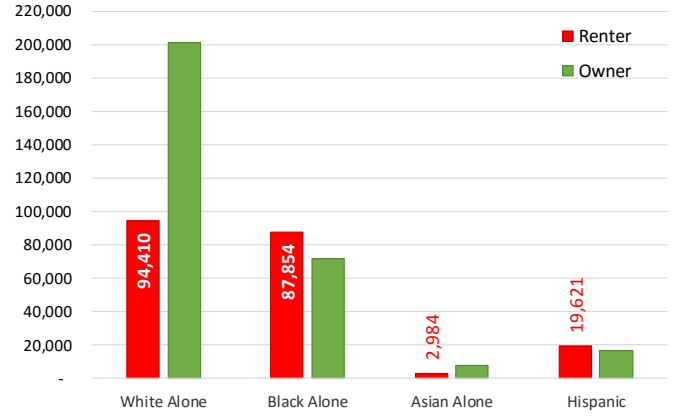
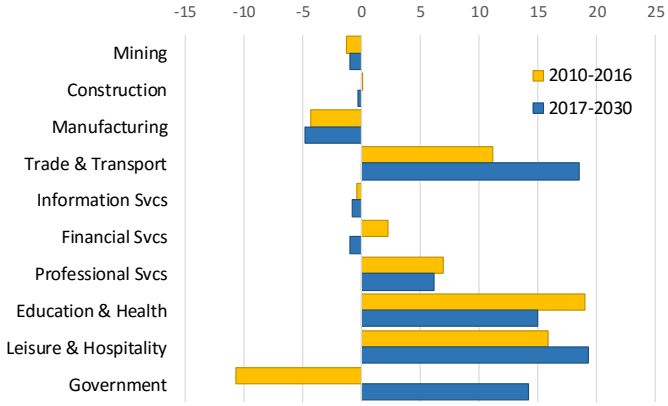


Employment Growth by Sector ('000s)



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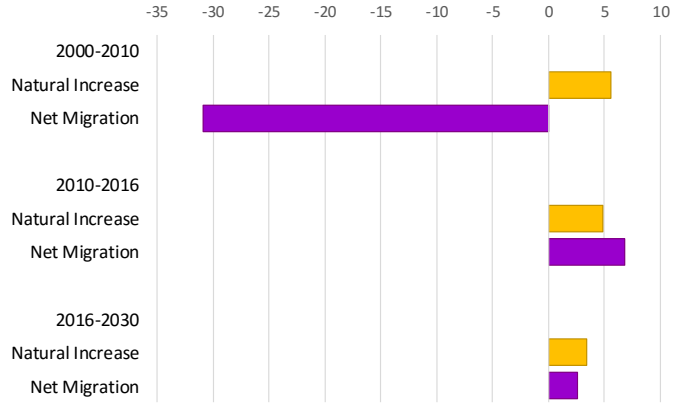

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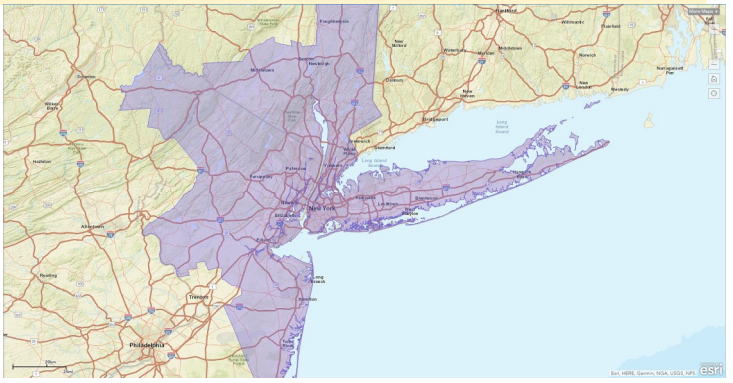
METRO MULTIFAMILY DEMAND OVERVIEW

NEW YORK

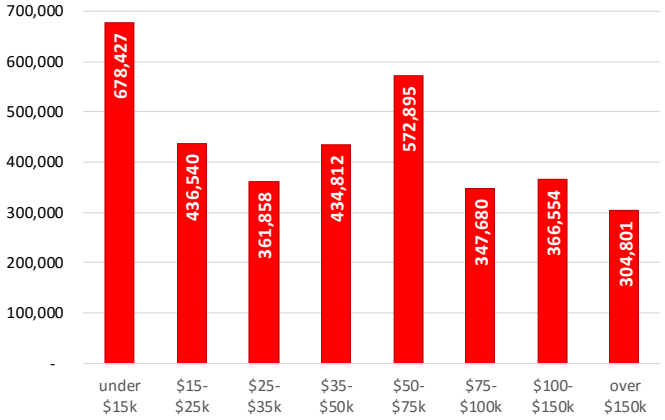
Out migrations have slowed, but will drag on the significant natural population growth that fuels new rental households. These today are smaller across a range of ages and good incomes, though nearly half pay over 35% of income on rent. Economic prospects are strong. Rental stock is older and nearly half seen in STAR units. Demand ahead is consistently strong.

Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
16	122	6.0	48%



Rental Households by Income



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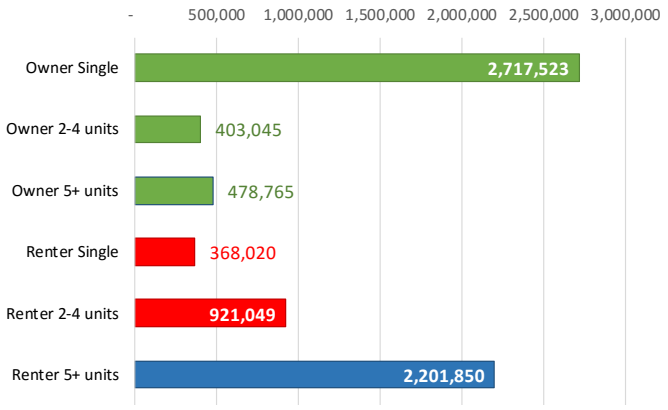
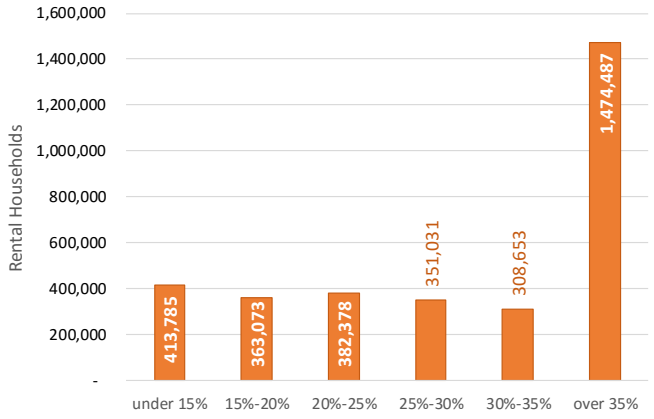
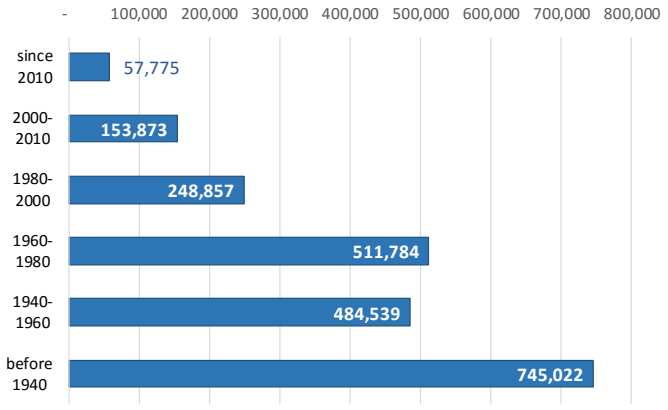


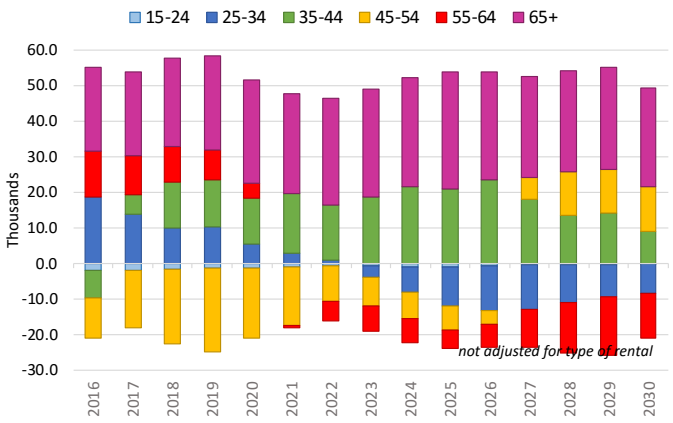
Rent as a Percent of Household Income



5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



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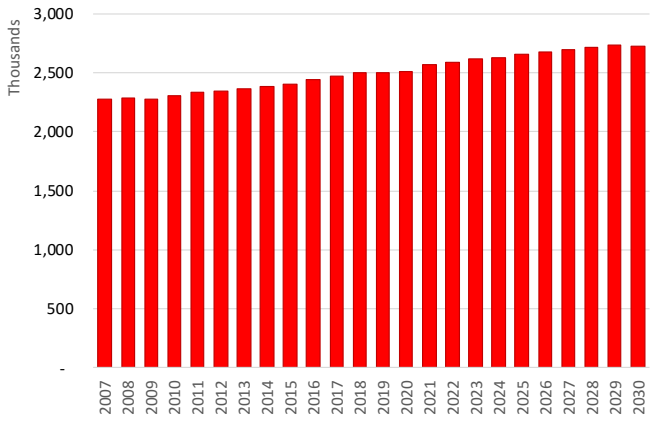

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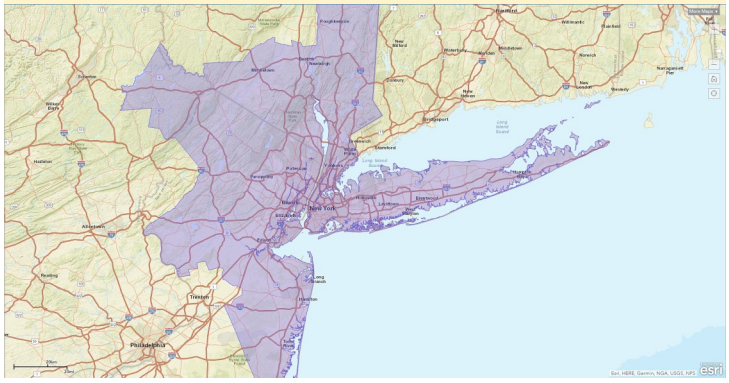

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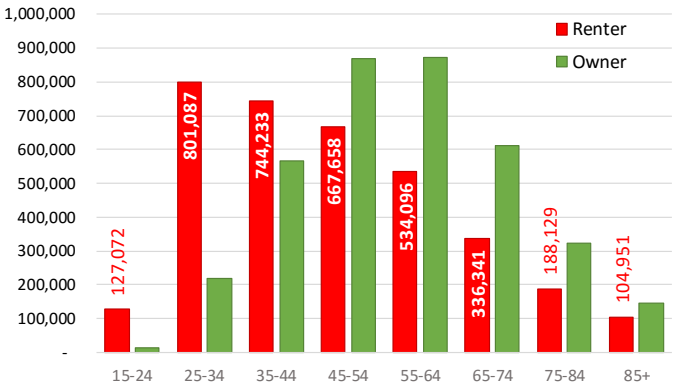
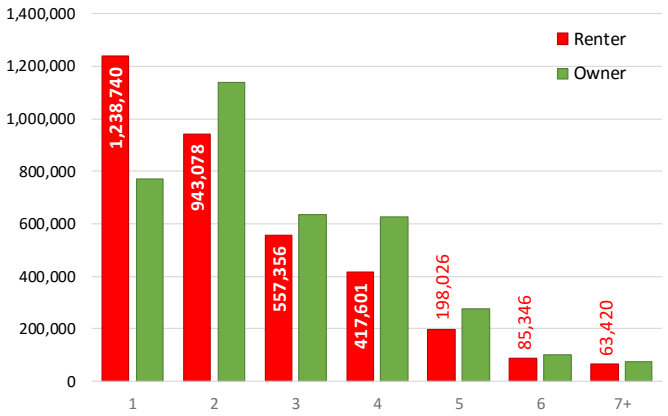


Households by Occupants



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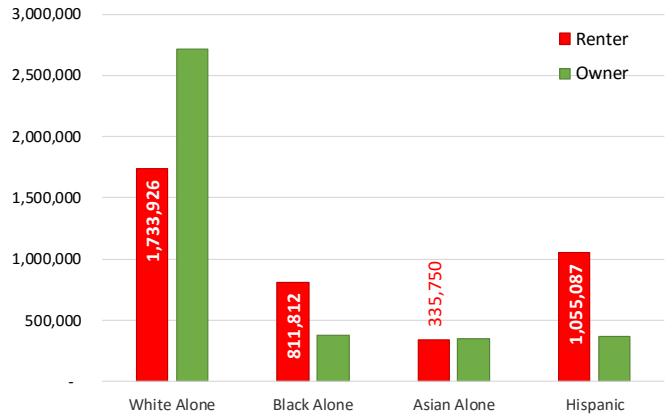

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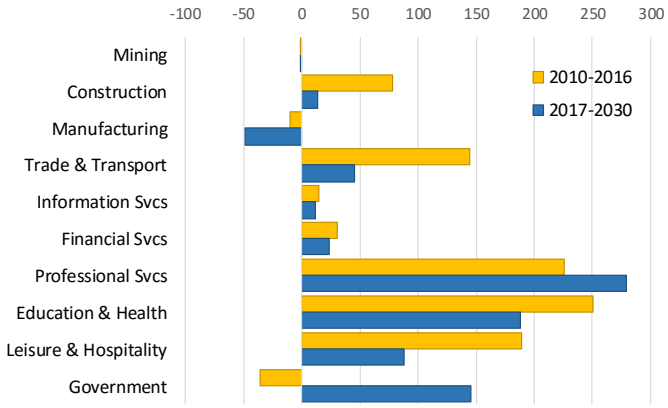

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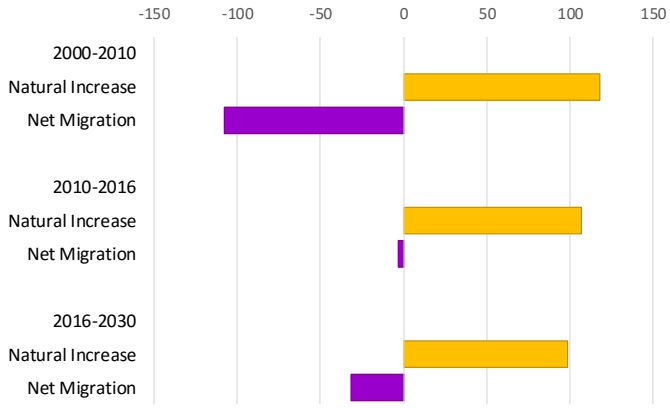

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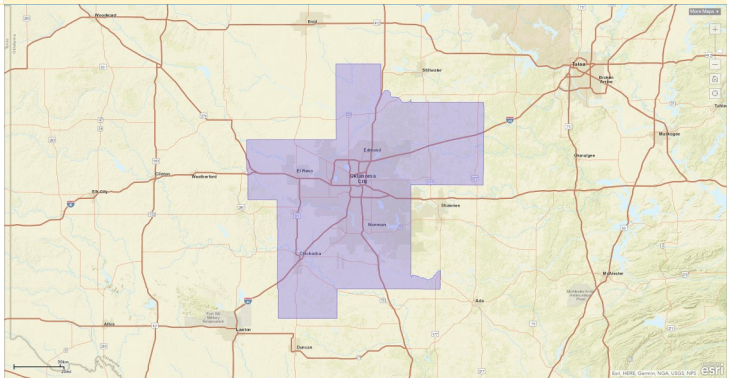
METRO MULTIFAMILY DEMAND OVERVIEW

OKLAHOMA CITY

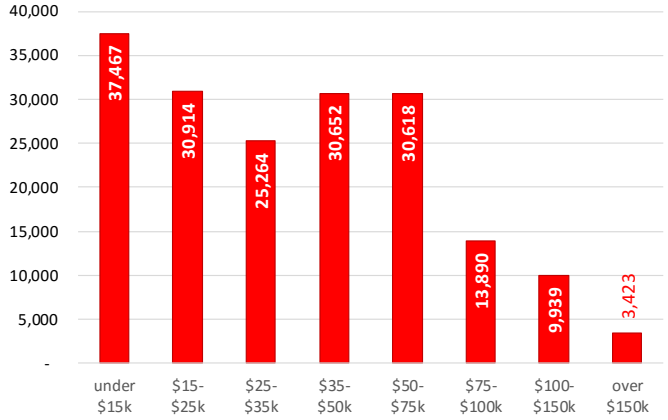
Net in migrations have exceeded modest natural population growth and will subside. New rental households are smaller with good incomes, sourcing from the youngest and oldest cohorts. Economic prospects are good and from all sectors except manufacturing. Rental stock is older with 44% in more affordable STAR units. Demand ahead steadily grows to 2030.

Definitions on back

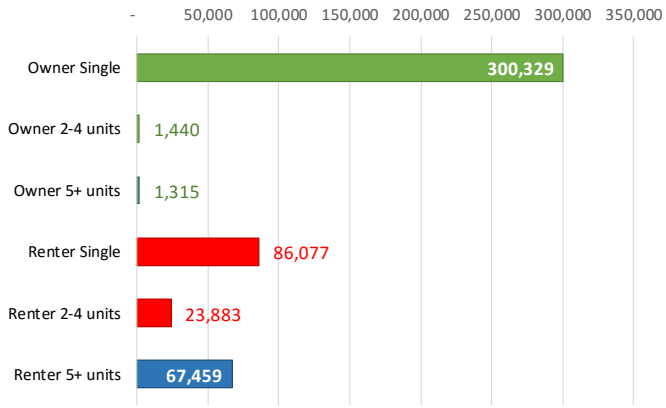
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
37	235	-2.5	44%



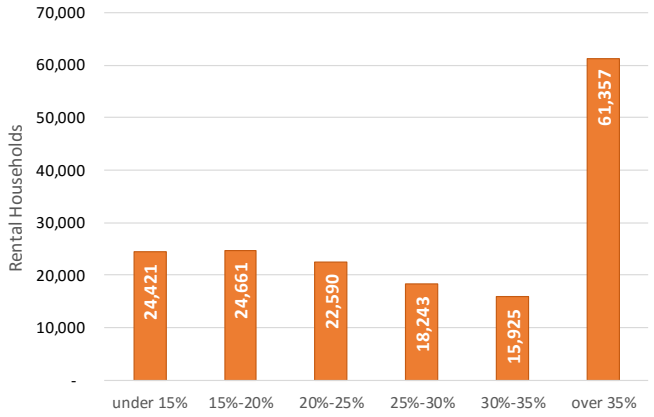
Rental Households by Income



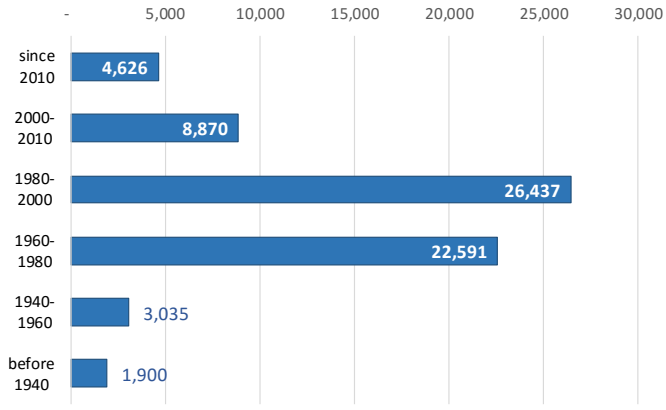
Housing Stock by Tenure & Type



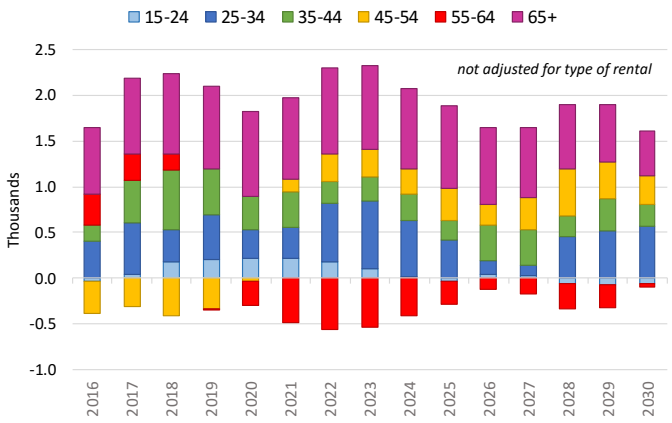
Rent as a Percent of Household Income



5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



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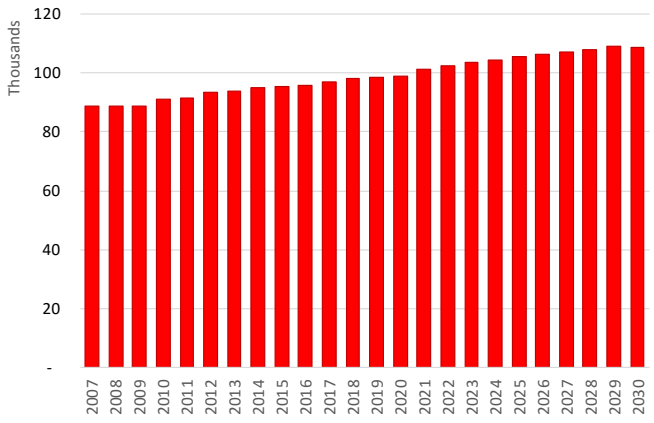
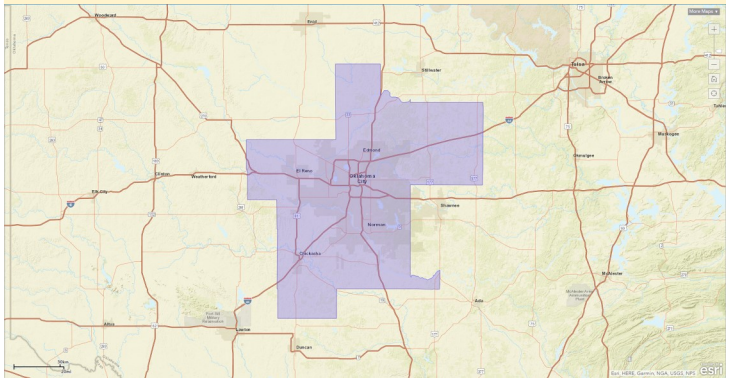
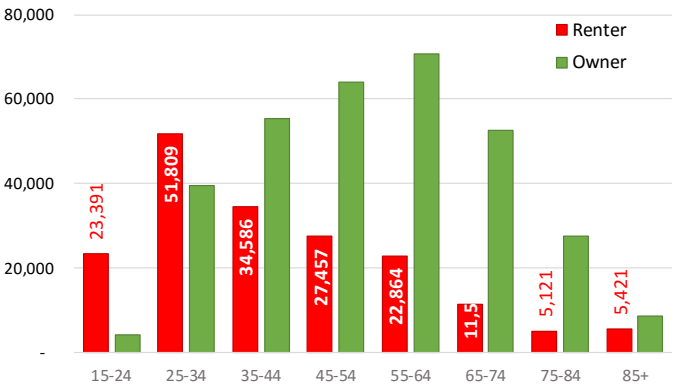


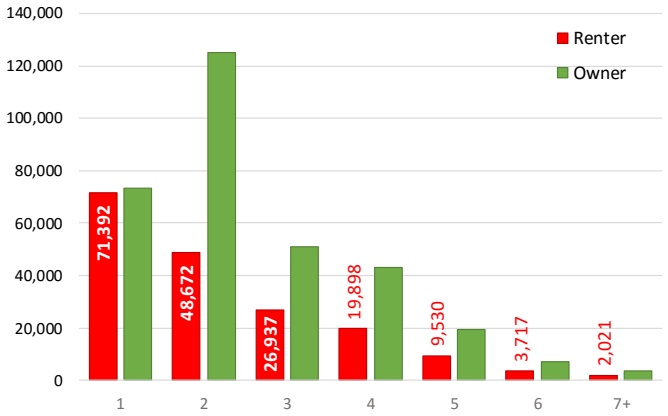
OKLAHOMA CITY page 2



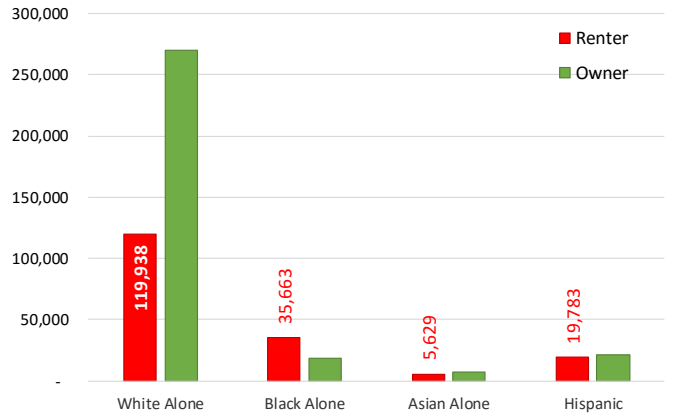
Households by Age Cohort



Households by Occupants

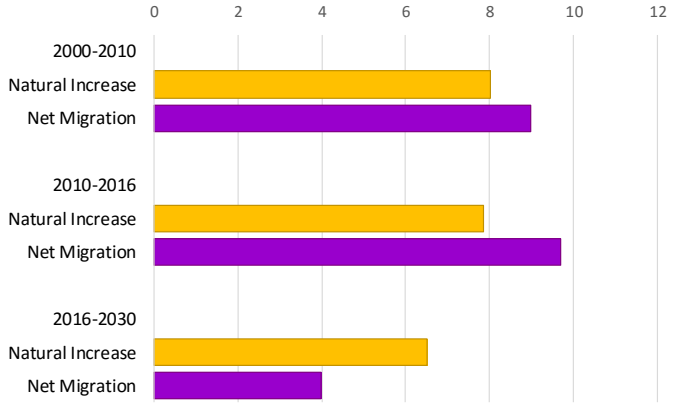


Households by Ethnicity and Origin



Employment Growth by Sector ('000s)

Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

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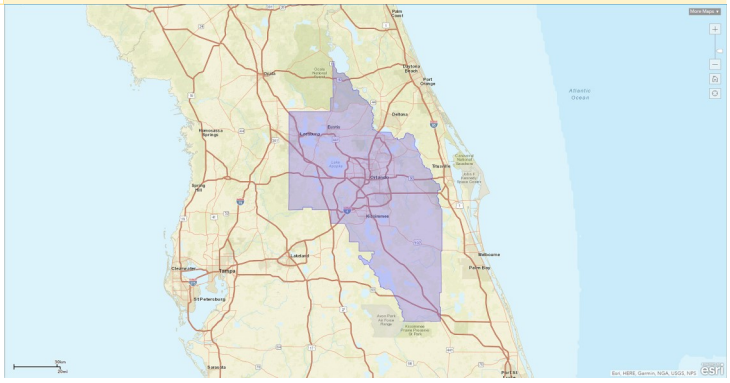
METRO MULTIFAMILY DEMAND OVERVIEW

ORLANDO

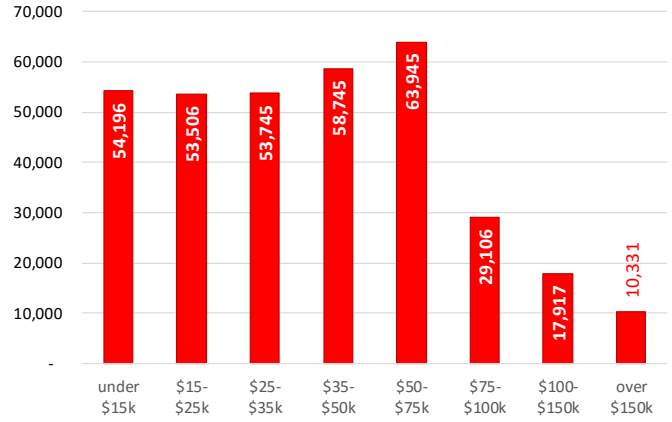
Net in migrations fuel renter household growth, soon over 6 times the natural population growth. Renter households have strong incomes and a wide range of ages. Though rental stock is similar in age to other metros, the small 18% share of STAR units portends affordability issues. Strong economic prospects and annual increases in multifamily demand ahead.

Definitions on back

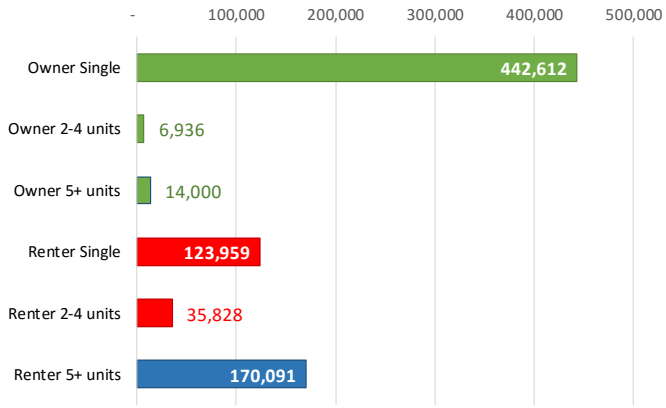
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
2	149	3.5	18%



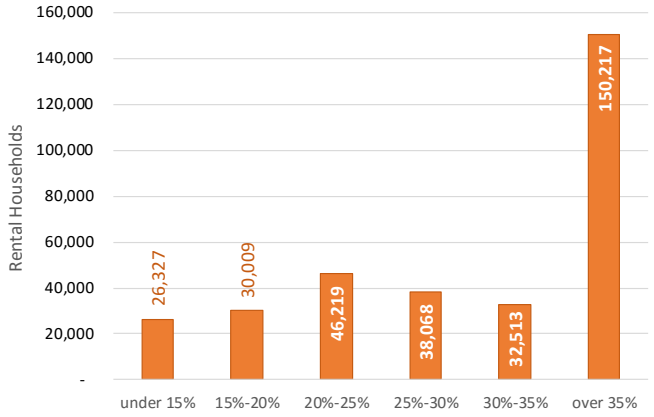
Rental Households by Income



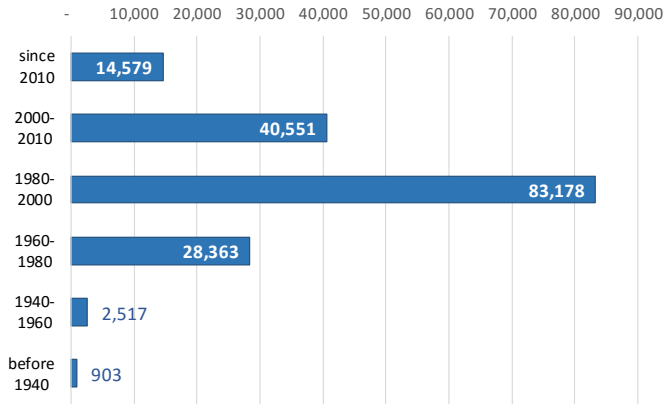
Housing Stock by Tenure & Type



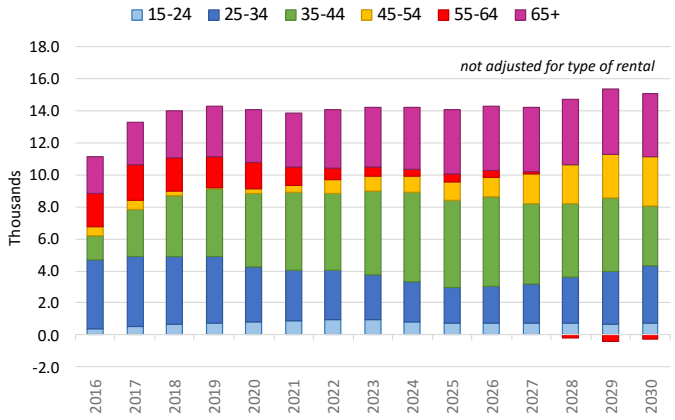
Rent as a Percent of Household Income



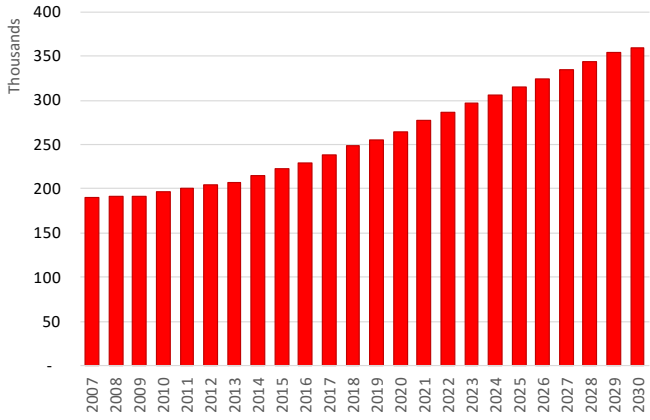
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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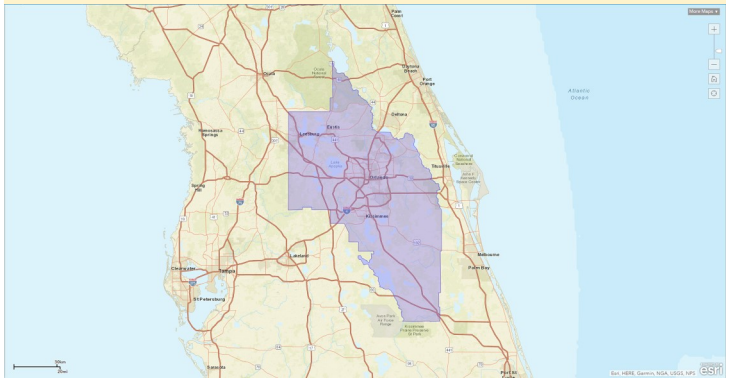
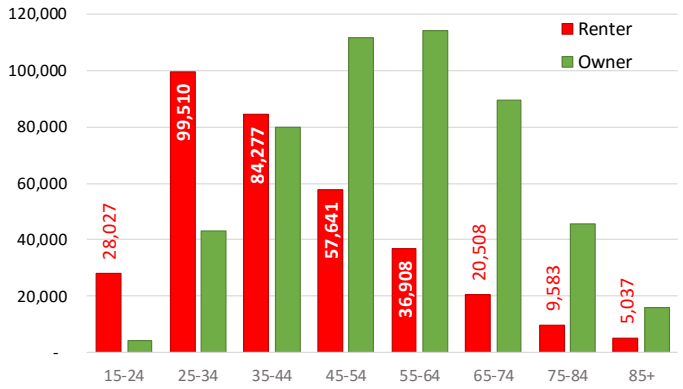
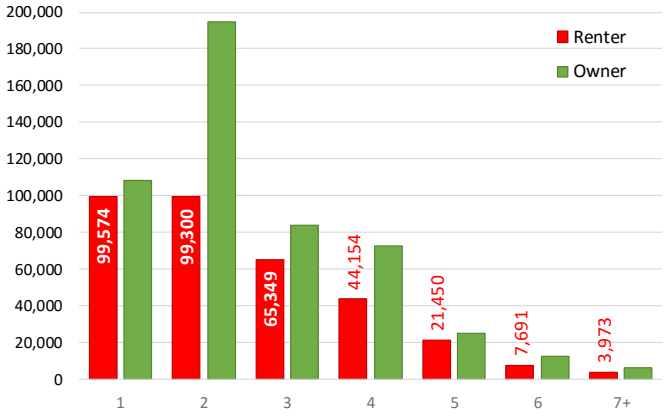
ORLANDO page 2



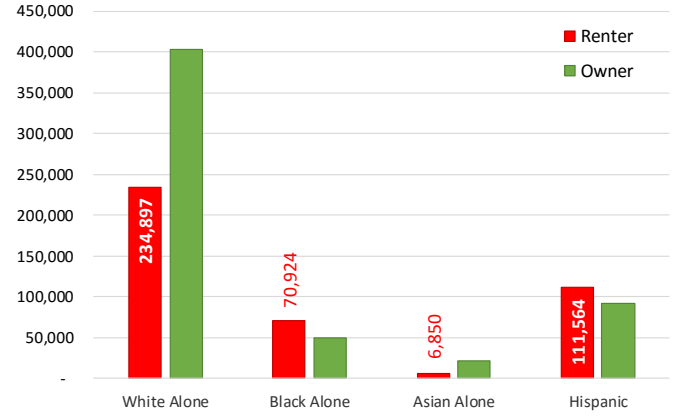
Households by Age Cohort



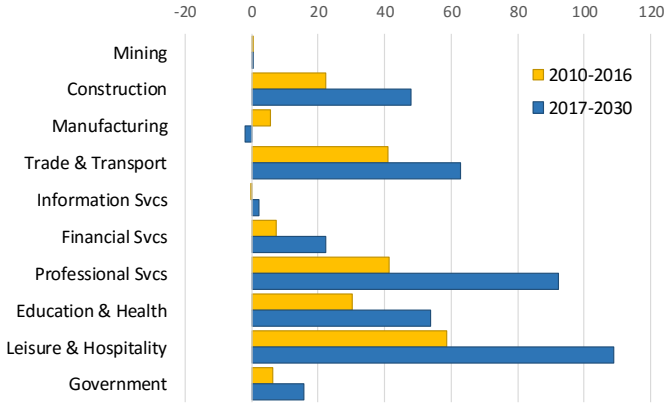
Households by Occupants



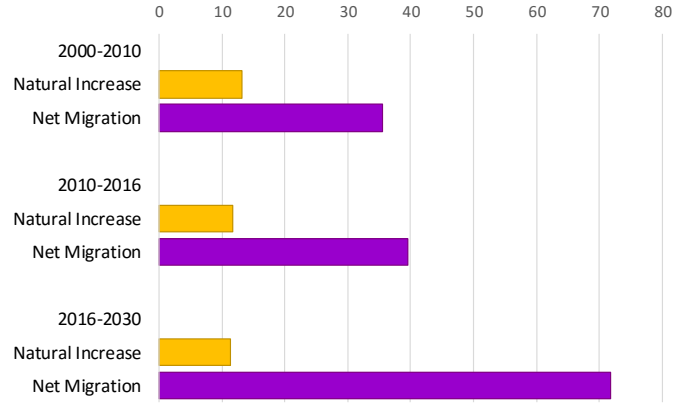
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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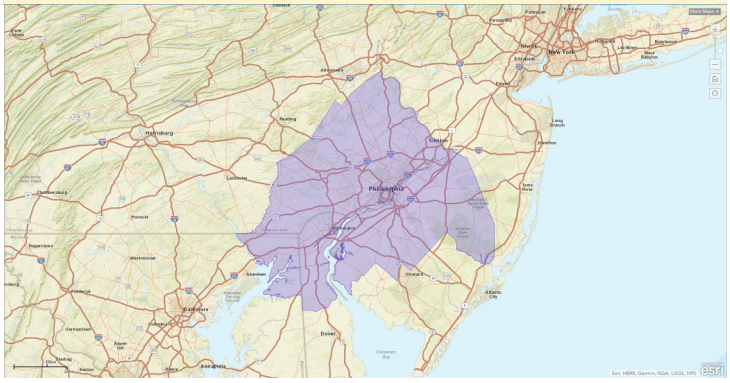
METRO MULTIFAMILY DEMAND OVERVIEW

PHILADELPHIA

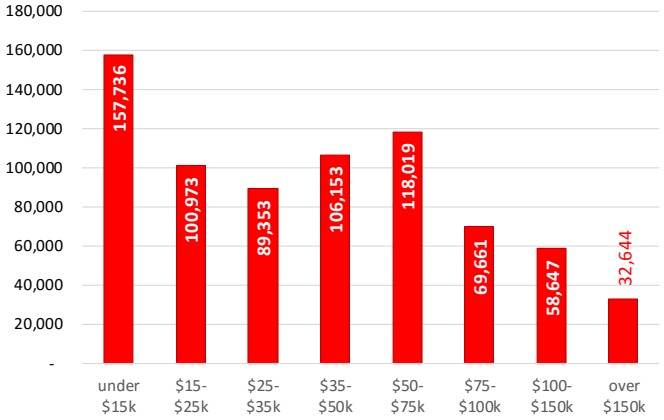
Net migrations are slight and negative, rental household growth depends upon natural population growth. New rental households will source from ages 35-54 and seniors over 65. Economy is strong with manufacturing the only drag. Rental stock is older and significant supply restrictions may hamper new product. Multifamily demand ahead is positive and rising.

Definitions on back

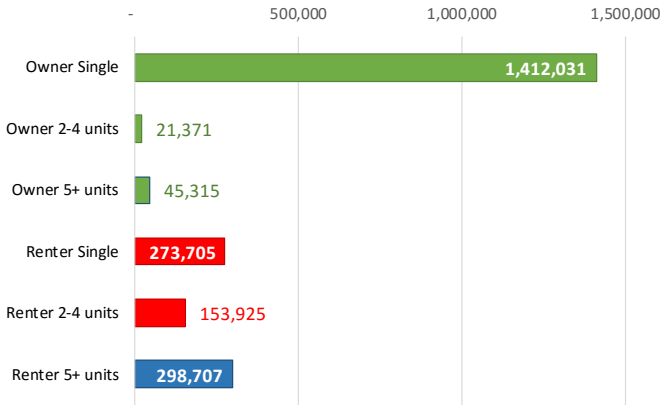
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
31	212	8.2	37%



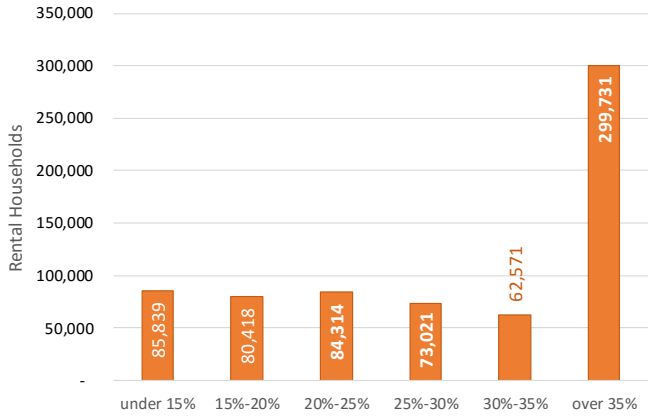
Rental Households by Income



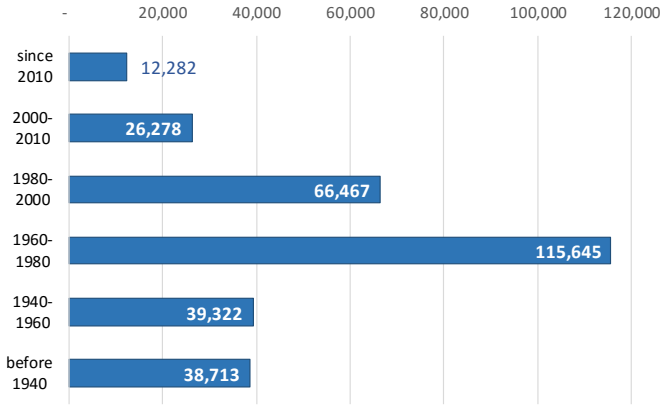
Housing Stock by Tenure & Type



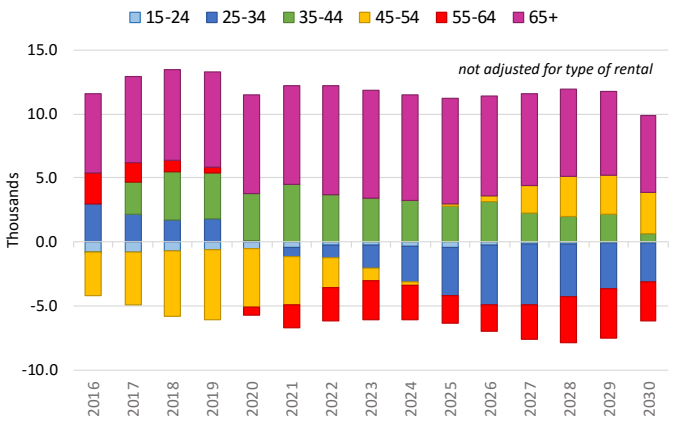
Rent as a Percent of Household Income



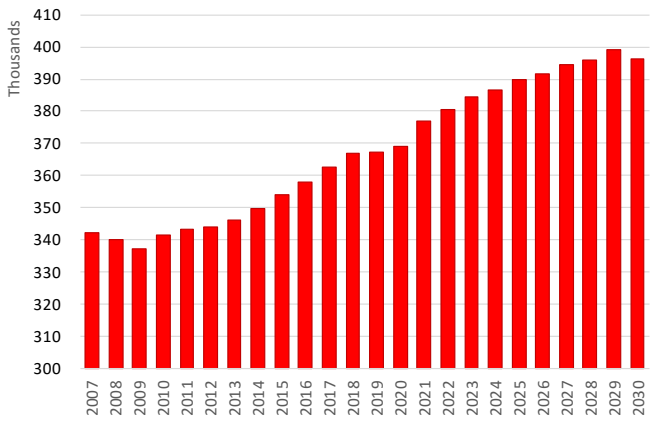
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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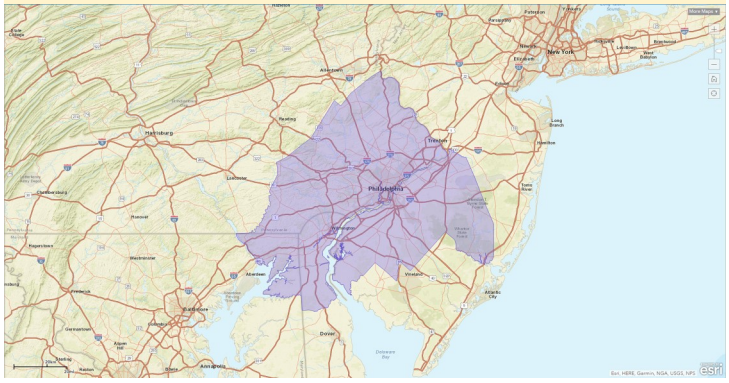
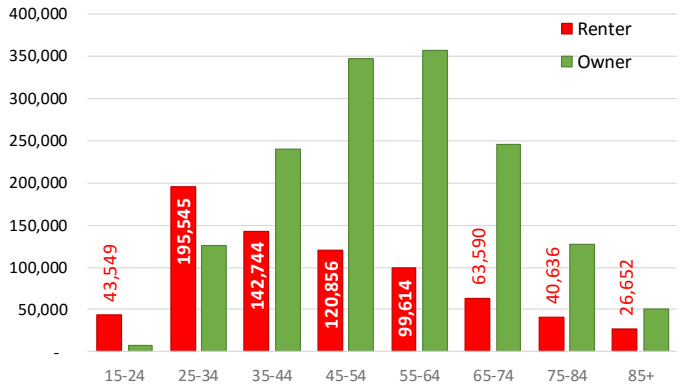
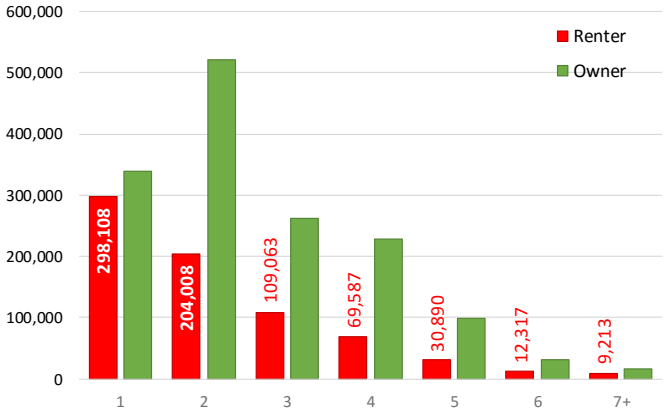


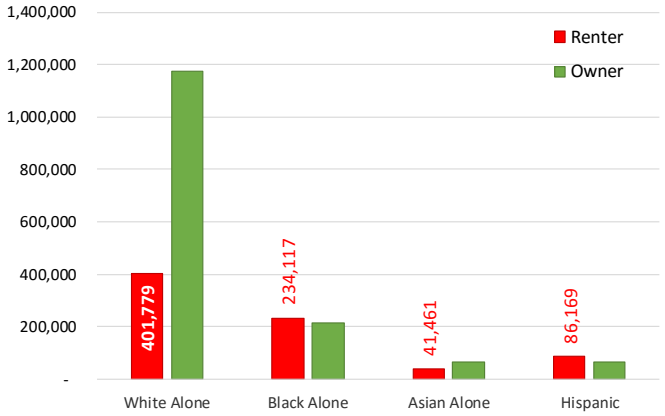
Households by Age Cohort



Households by Occupants



Households by Ethnicity and Origin



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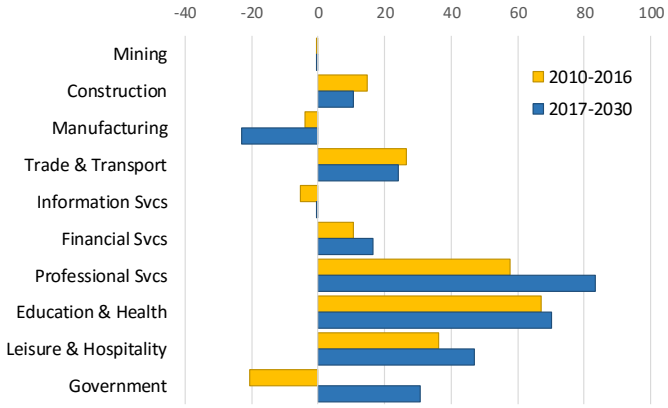

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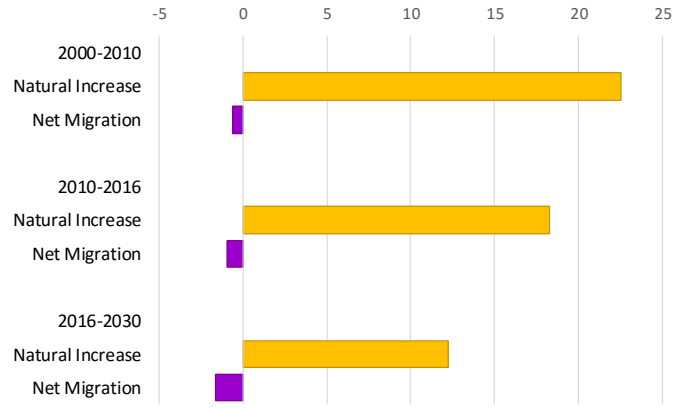

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METRO MULTIFAMILY DEMAND OVERVIEW

PHOENIX

Rental household growth very dependent on strong in migrations, soon over 3 times the natural population growth. New renters will source from all ages with strong incomes, though 40% now pay over 35% of income on rent. Strong economic prospects. Strong multifamily demand increases steadily, though supply restrictions may hamper new supply to match.

Definitions on back

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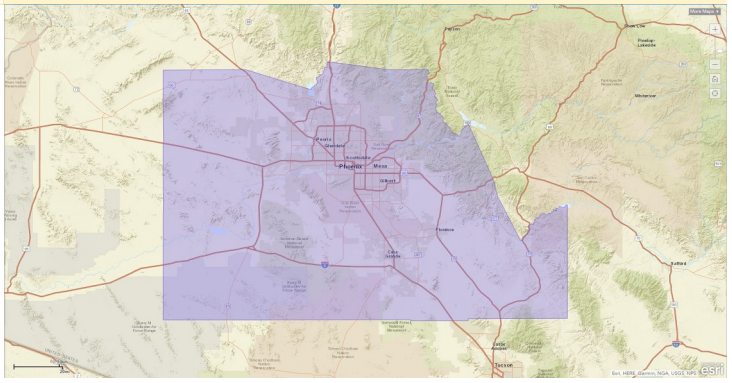
5	155	4.8	30%



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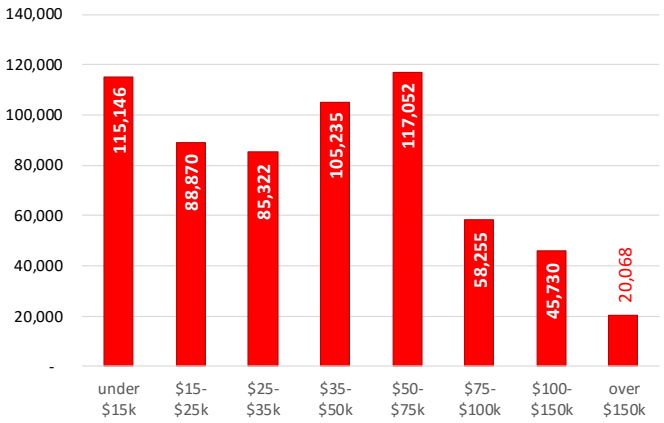

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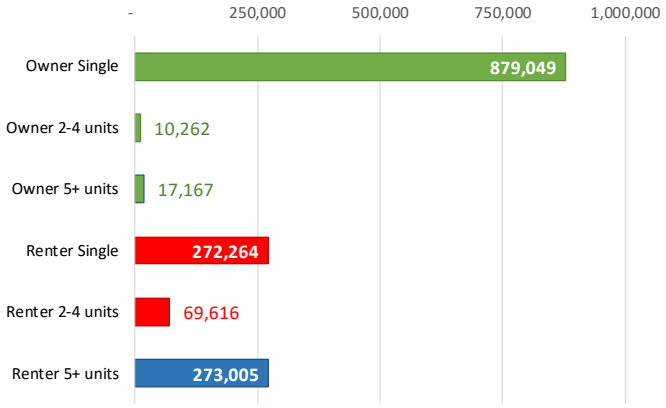
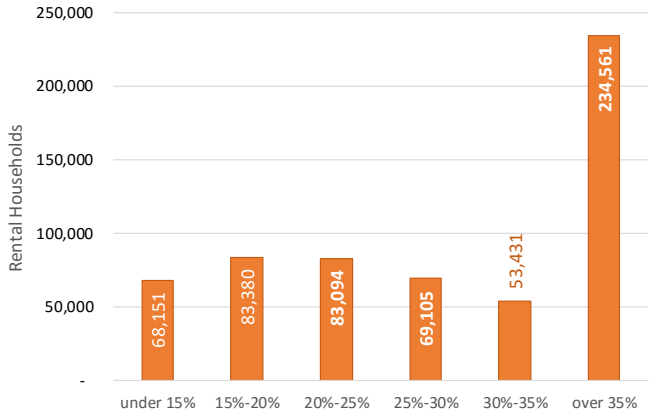
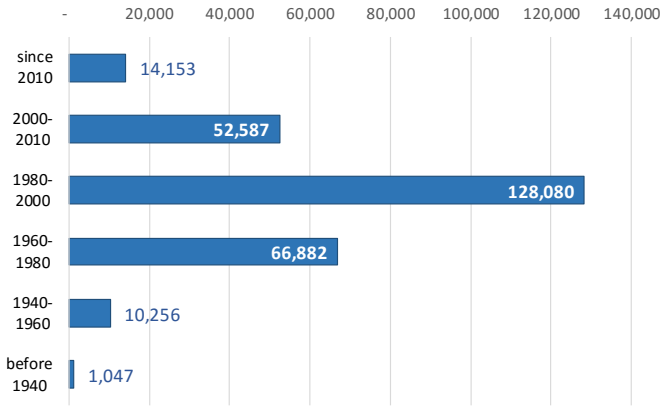


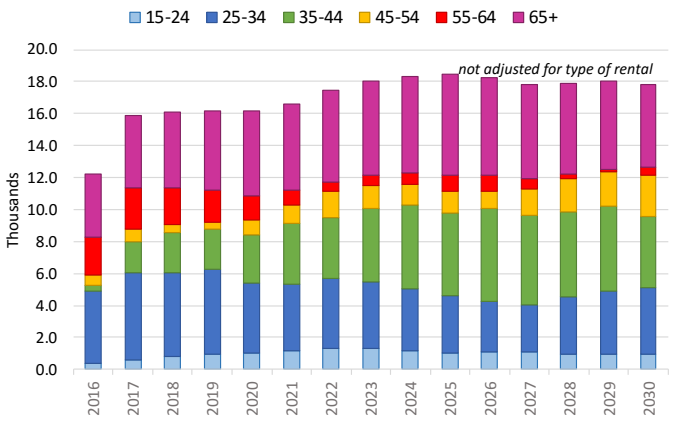
Rent as a Percent of Household Income



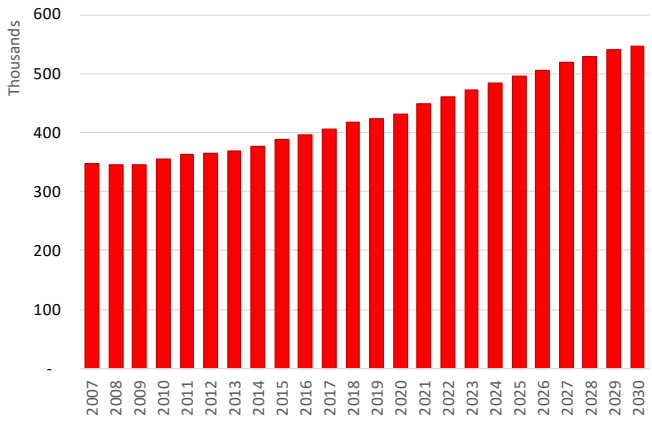
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



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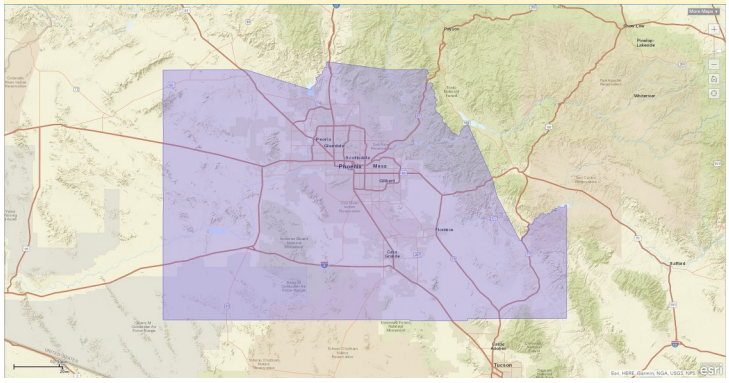
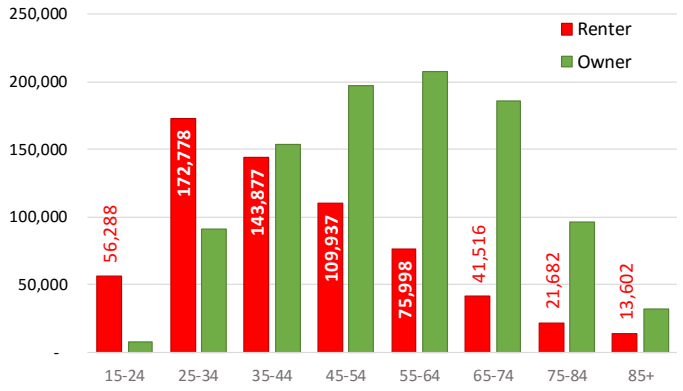
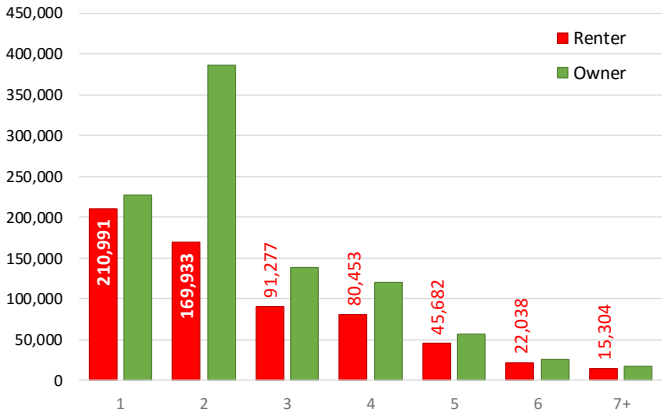


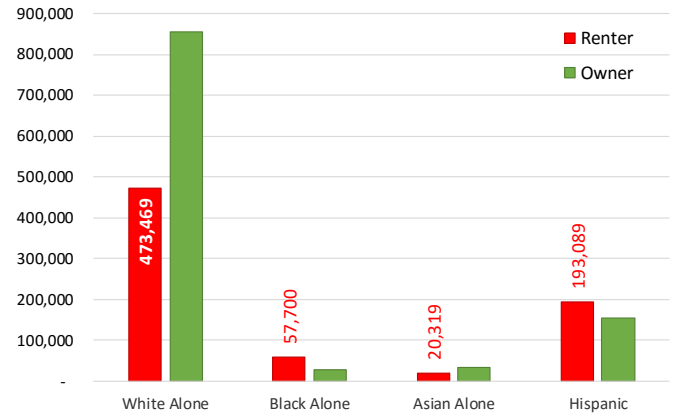
Households by Age Cohort



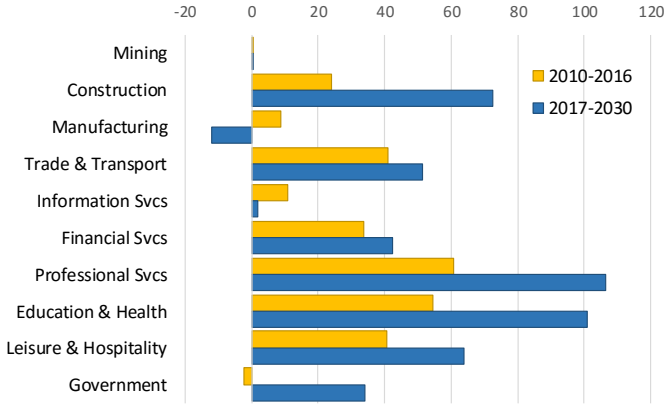
Households by Occupants



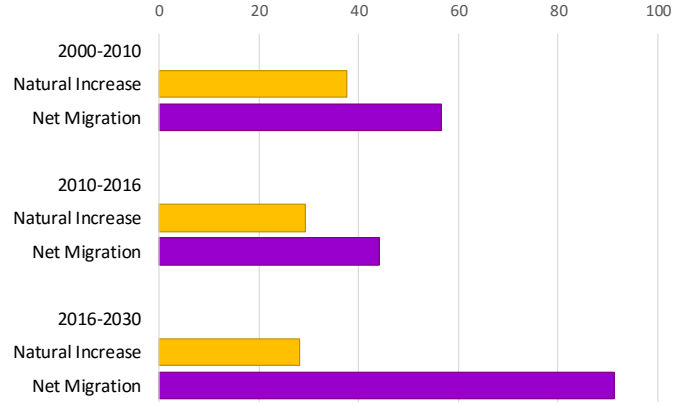
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

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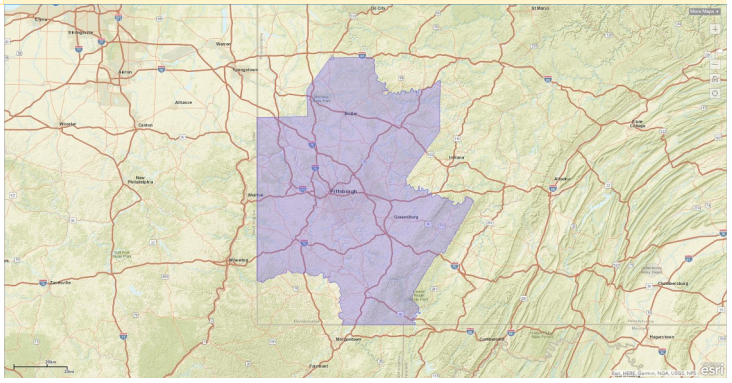
METRO MULTIFAMILY DEMAND OVERVIEW

PITTSBURGH

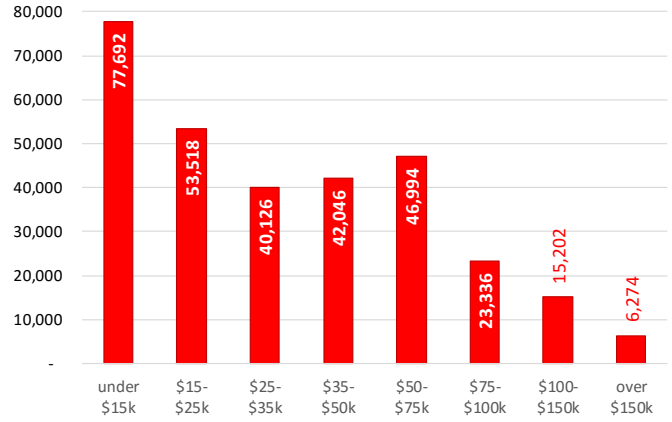
Net in migrations counter the slide in natural population growth to hold new households fairly constant. New renters will source from ages 35-54 and seniors over 65 with lower incomes reliant on affordability. Economic growth is modest. Most of multifamily is seen in STAR units, more than most metros. Demand ahead is flat for two years, rising steadily to 2029.

Definitions on back

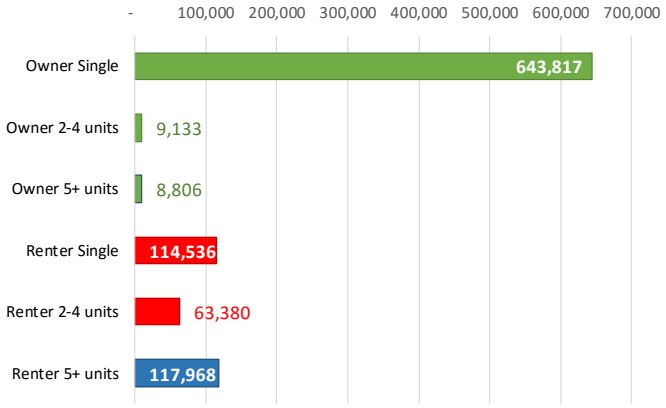
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
47	287	1.8	54%



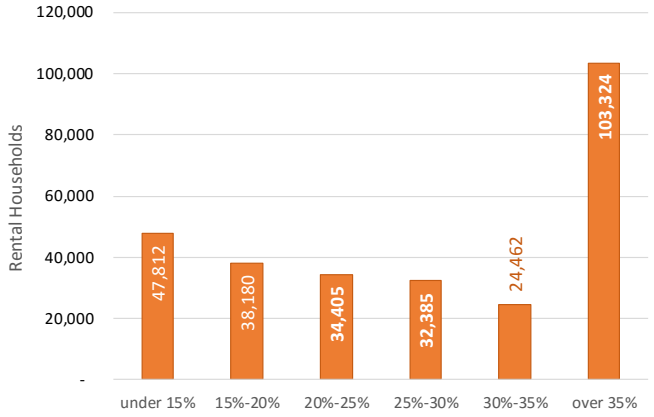
Rental Households by Income



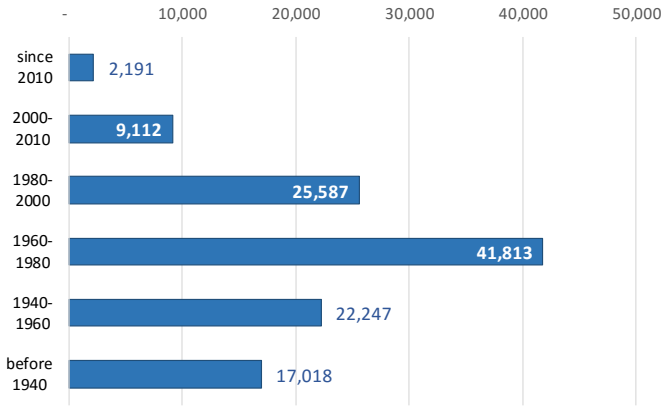
Housing Stock by Tenure & Type



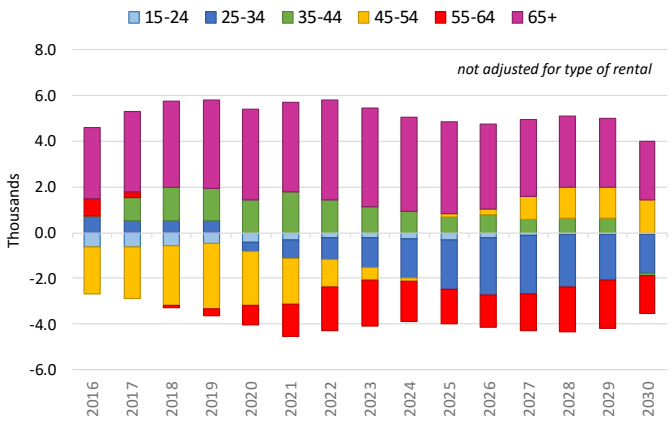
Rent as a Percent of Household Income



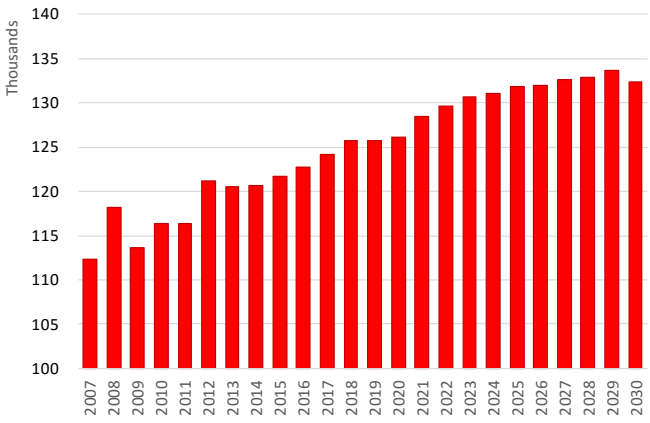
5+ Unit Rental Stock by Year Built



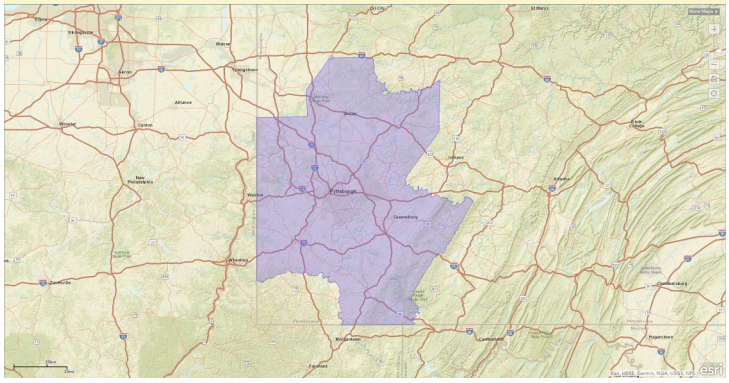
New Rental Households by Age Cohort



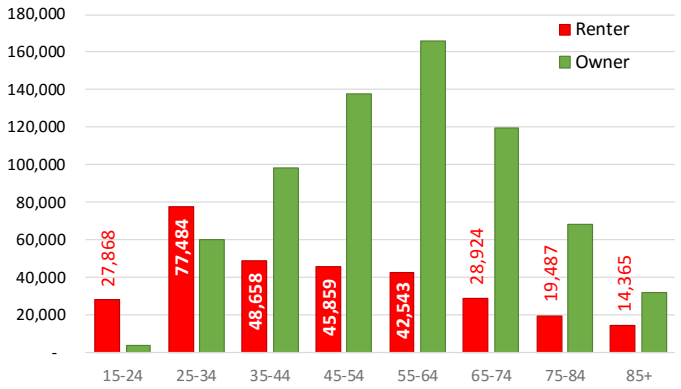
5+ Unit Apartment Demand Forecast



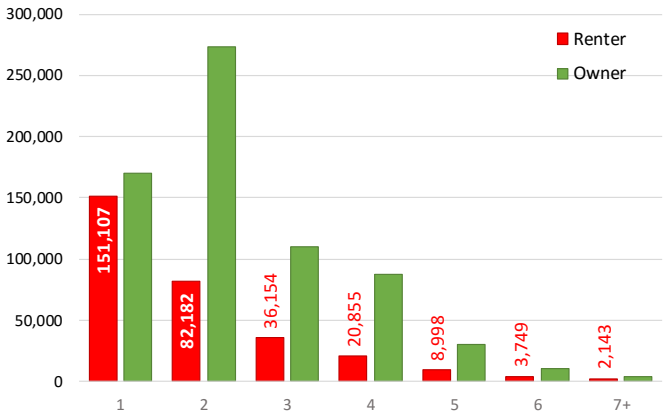
PITTSBURGH page 2



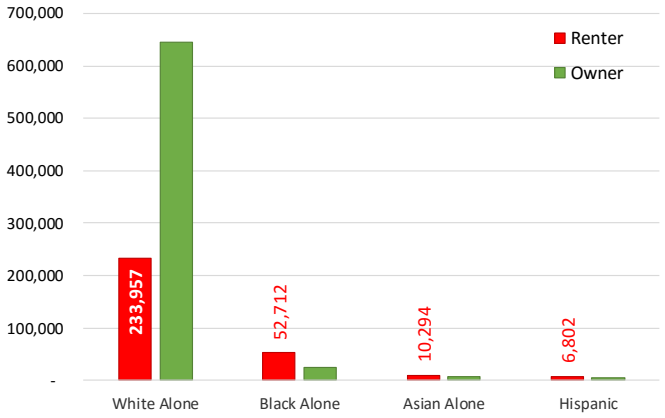
Households by Age Cohort



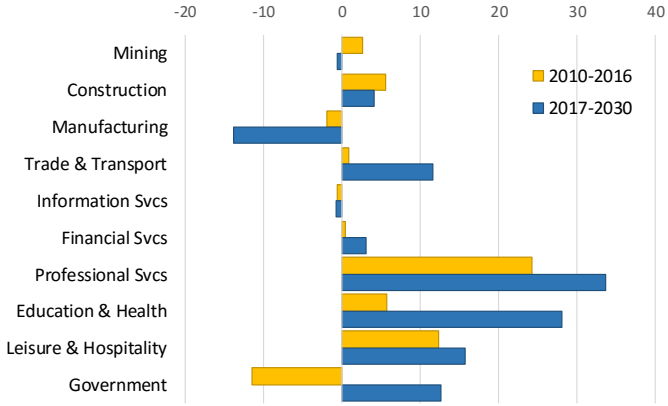
Households by Occupants



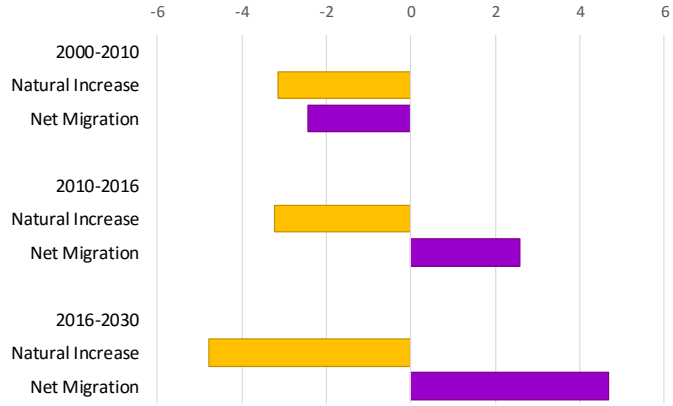
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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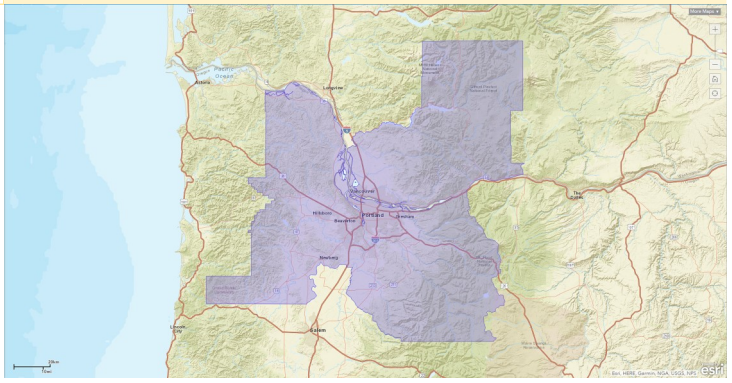
METRO MULTIFAMILY DEMAND OVERVIEW

PORTLAND

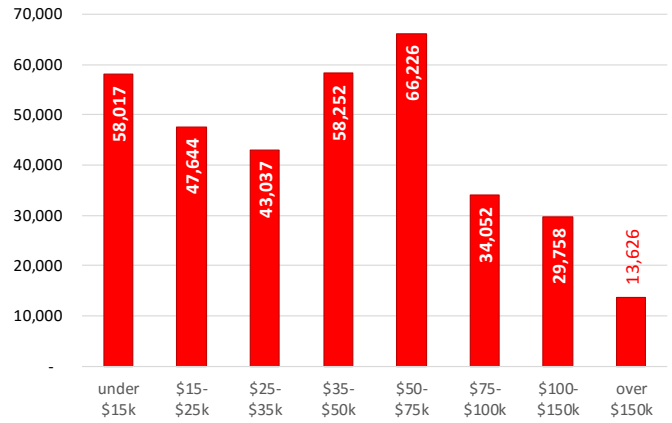
Substantial net in migrations fueled a surge in rental households and continue to drive demand. Rental households bring strong incomes and a mix of ages. Economic trends are superlative. With relatively younger rental stock and 37% seen in STAR units, the overall supply is balanced today. Ahead is steady and consistent multifamily demand through 2030.

Definitions on back

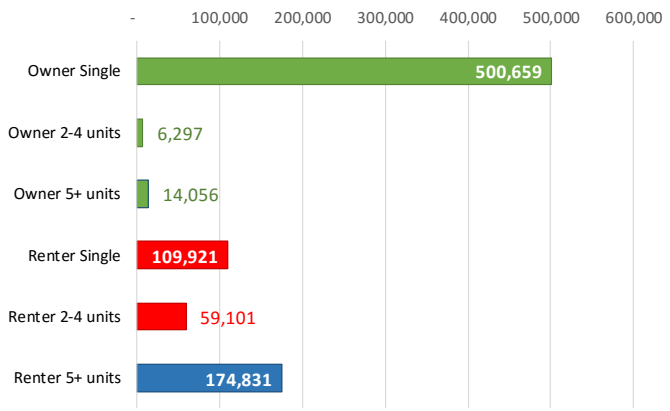
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
21	125	3.2	37%



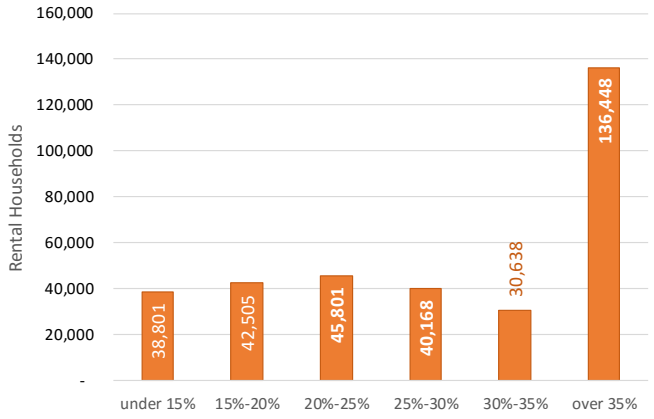
Rental Households by Income



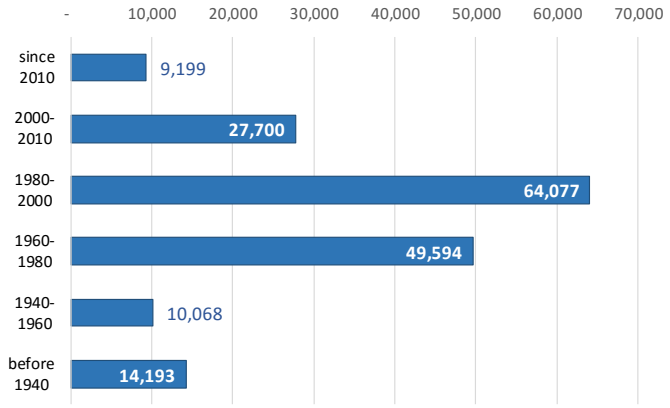
Housing Stock by Tenure & Type



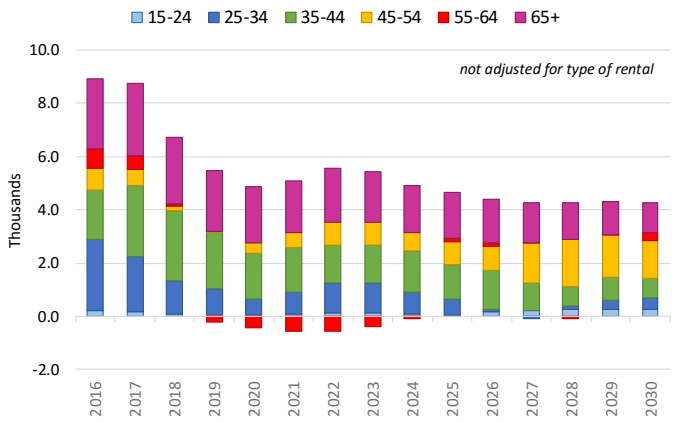
Rent as a Percent of Household Income



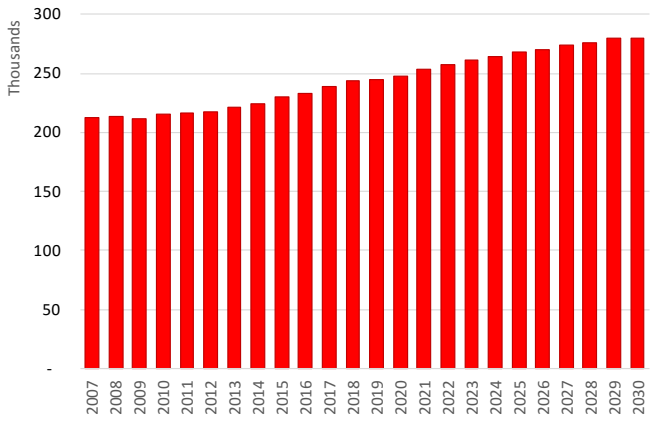
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

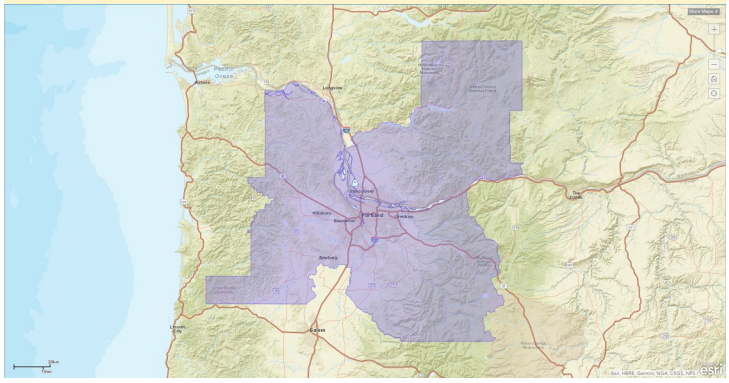
University of San Diego SCHOOL OF BUSINESS

WREA

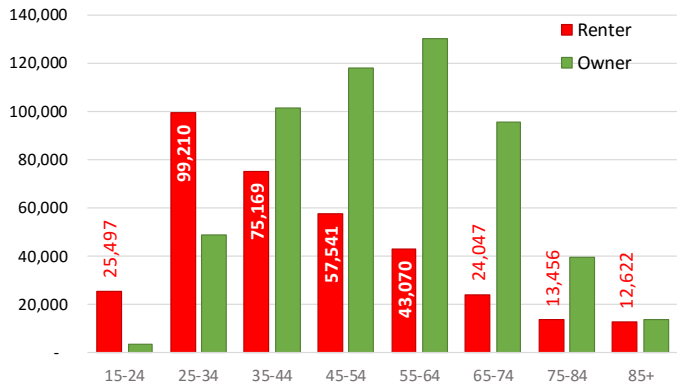
dfm

Version 1

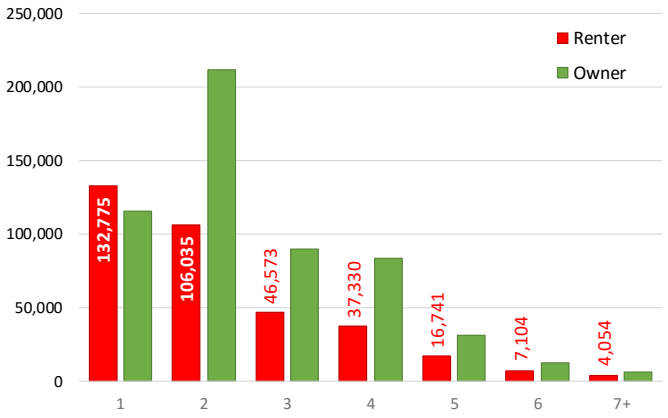
PORTLAND page 2



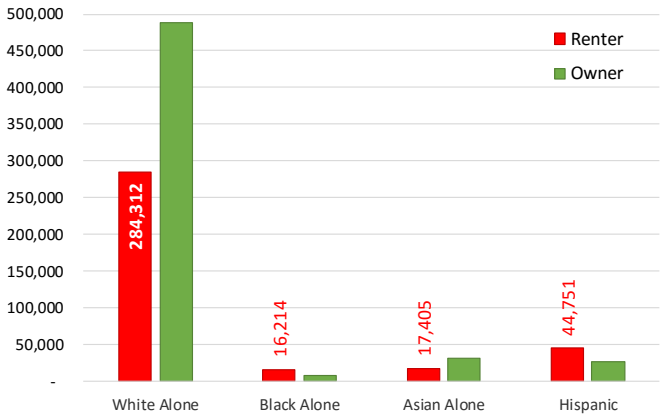
Households by Age Cohort



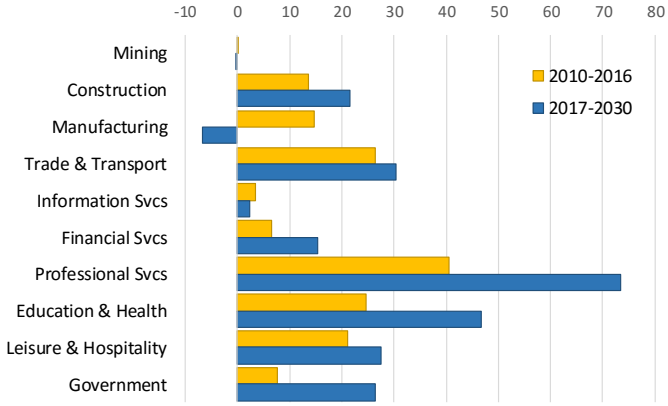
Households by Occupants



Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



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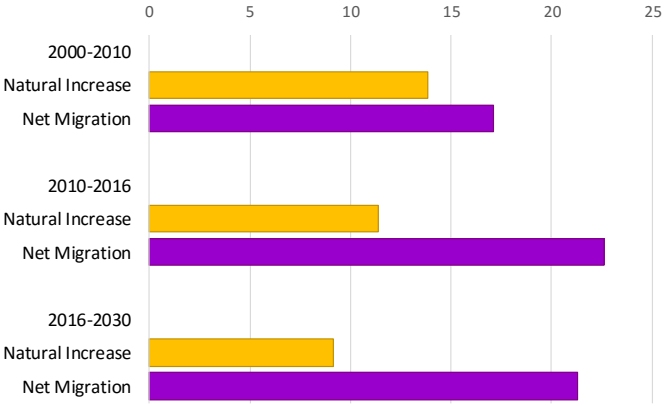

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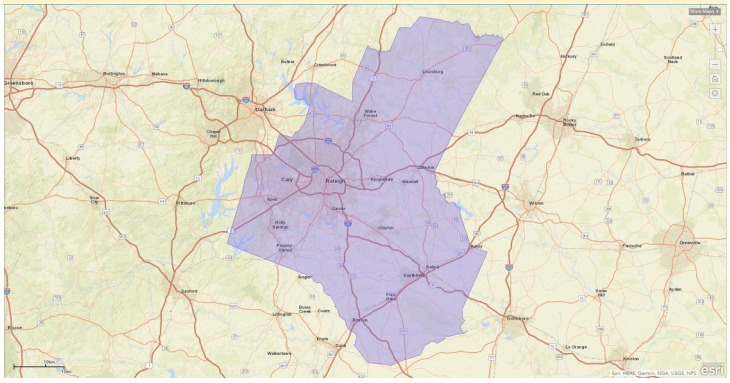
METRO MULTIFAMILY DEMAND OVERVIEW

RALEIGH

Strong net in migrations are double the natural population growth and should increase 2.5 times more, fueling rental household growth across all ages. Renter household sizes are smaller and incomes notable. The economy is strong, led by professional services and trade. Rental stock is younger with fewer STAR units, in balance for strong increases in demand ahead.



Definitions on back

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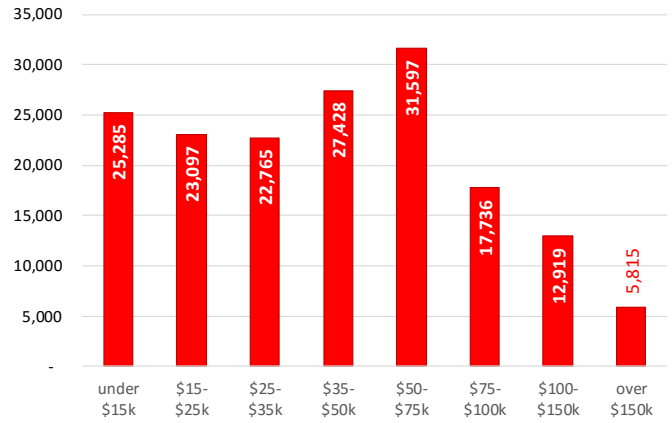
8	183	4.8	19%

Rental Households by Income



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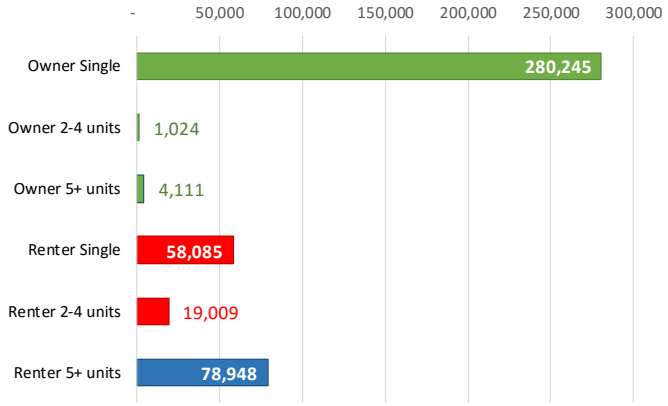
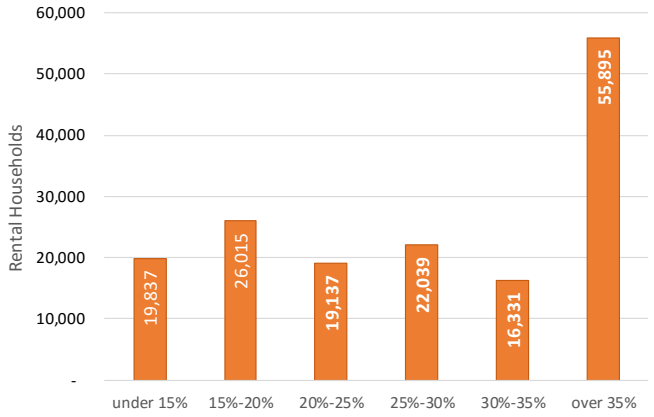
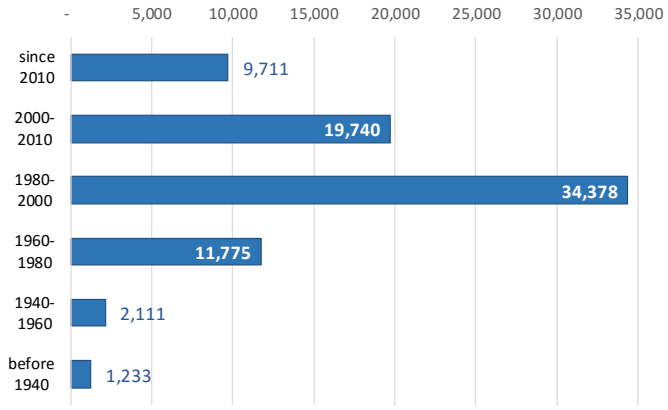


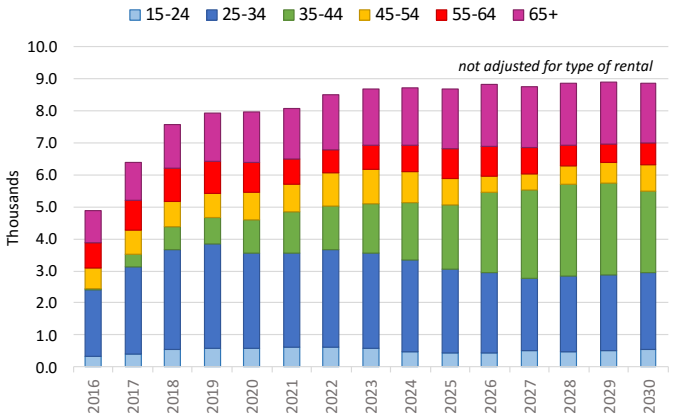
Rent as a Percent of Household Income



5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



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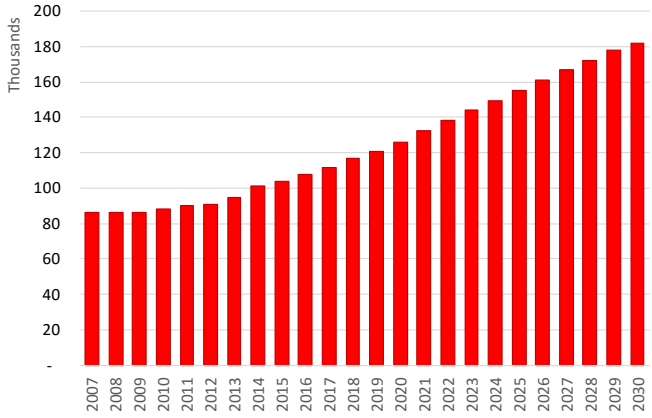

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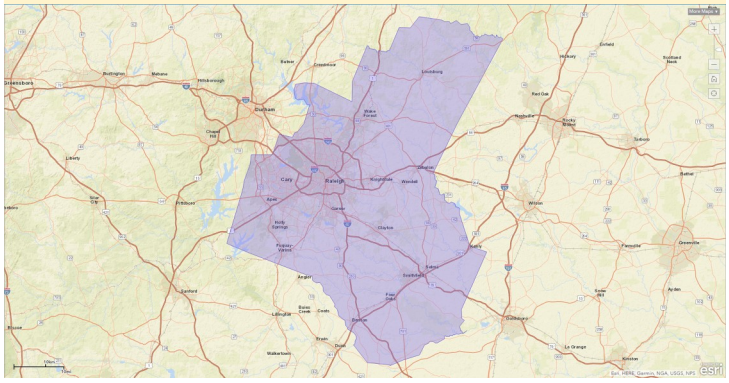
RALEIGH page 2



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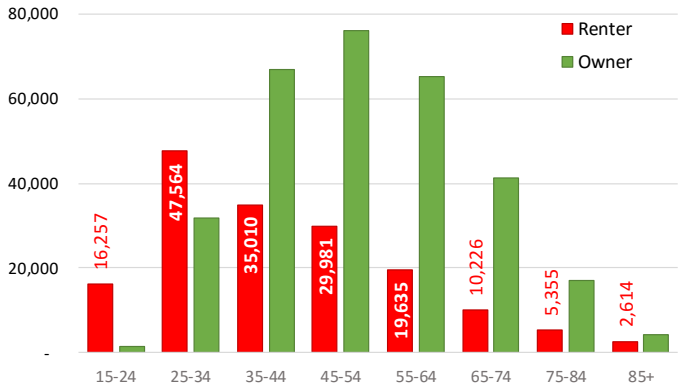

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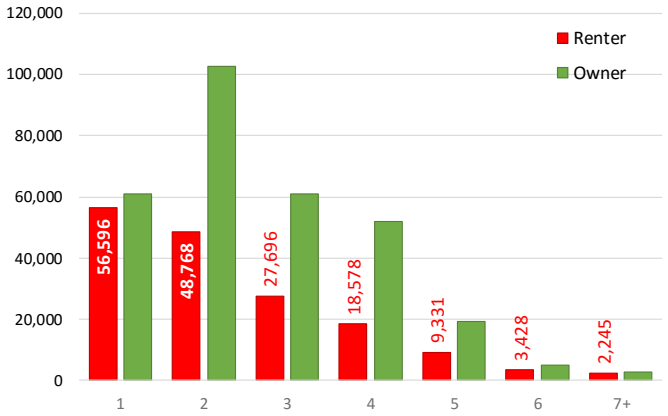

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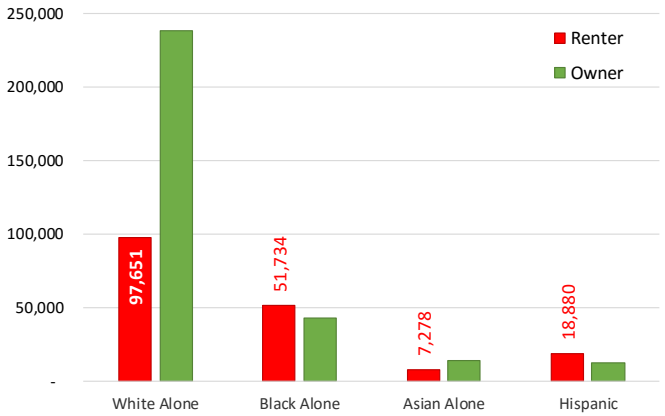

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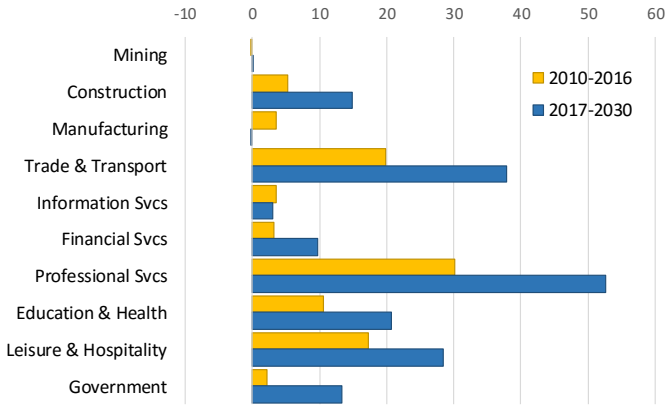

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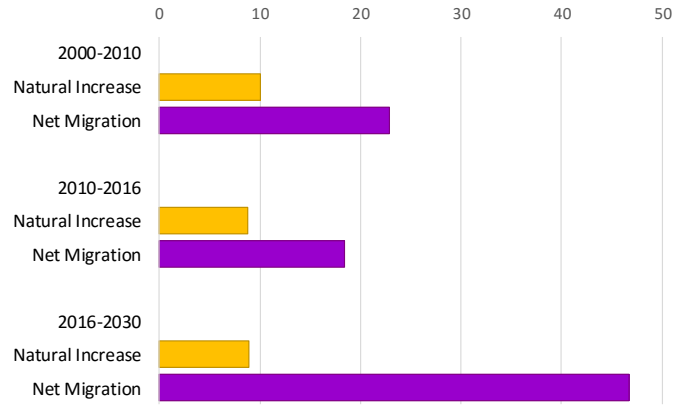

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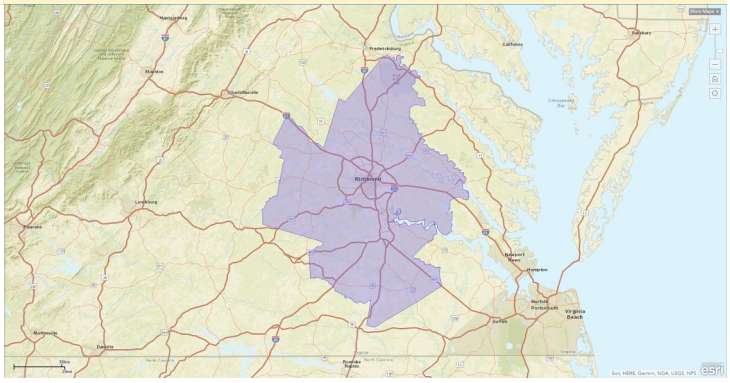
METRO MULTIFAMILY DEMAND OVERVIEW

RICHMOND

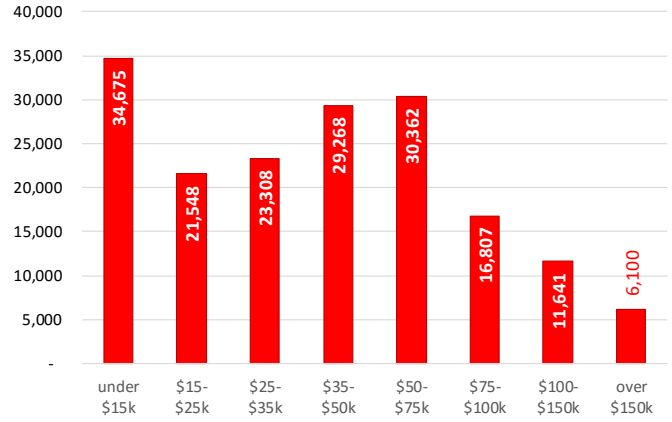
Continued net in migrations exceed natural population growth, fueling new rental households. Renters have good incomes across a range of ages with growth ahead increasingly coming from ages 35-44 and seniors over 65. The economy is solid, yet with declines in trade and financial services. Renter stock is older but balanced. Multifamily demand rises steadily.

Definitions on back

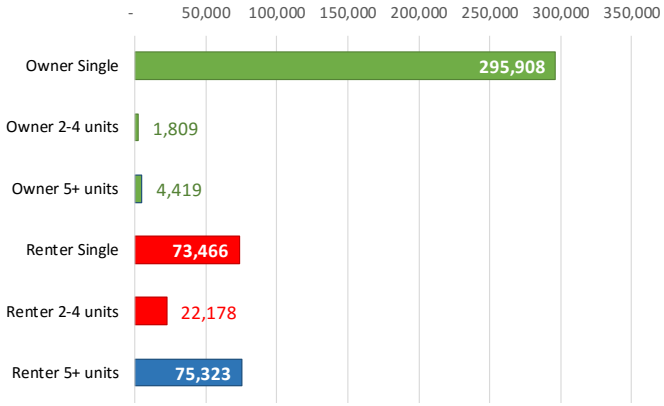
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
33	188	-2.3	37%



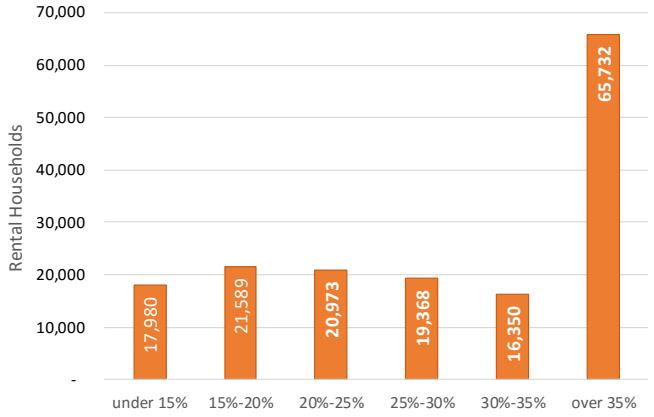
Rental Households by Income



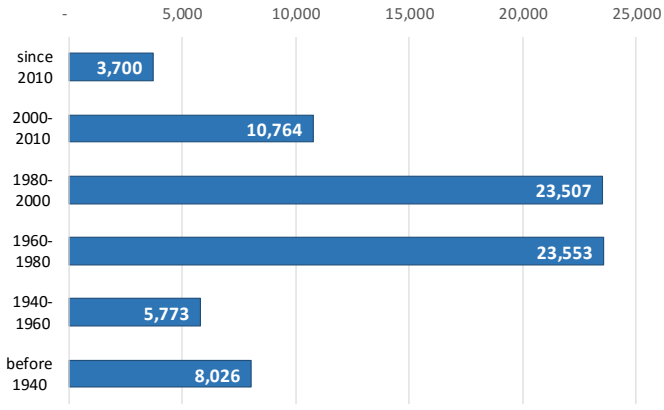
Housing Stock by Tenure & Type



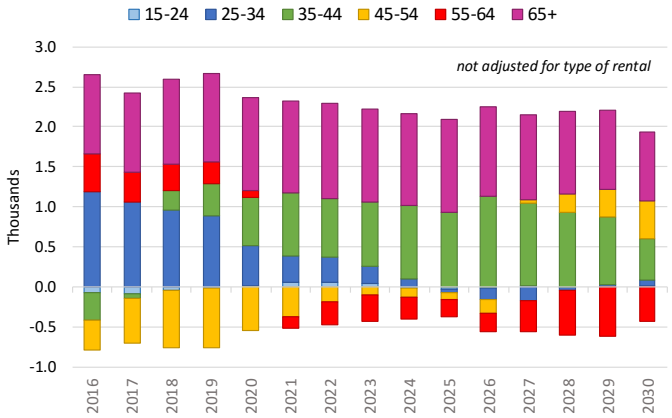
Rent as a Percent of Household Income



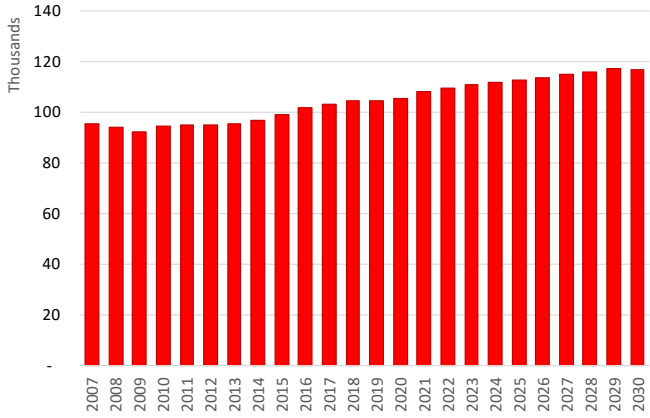
5+ Unit Rental Stock by Year Built



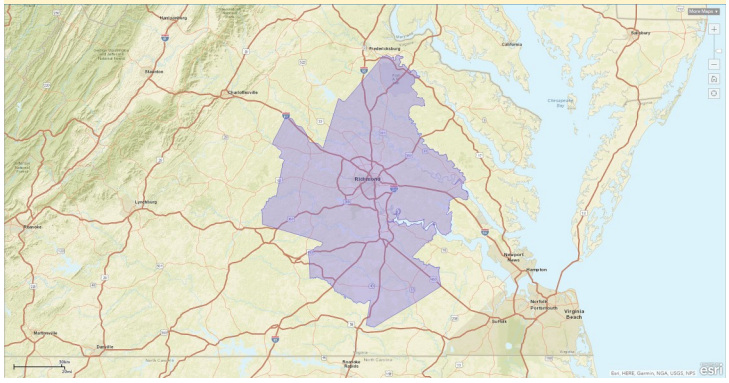
New Rental Households by Age Cohort



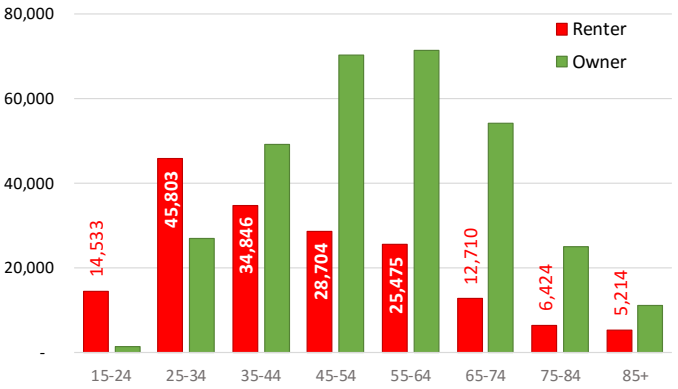
5+ Unit Apartment Demand Forecast



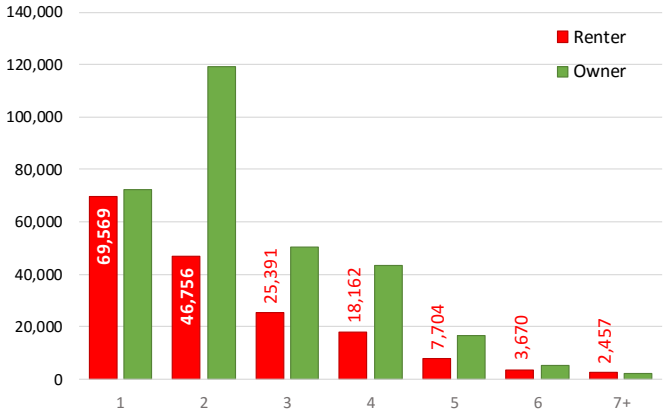
RICHMOND page 2



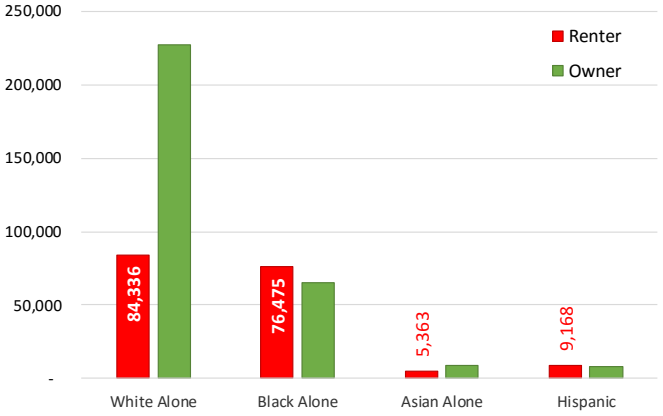
Households by Age Cohort



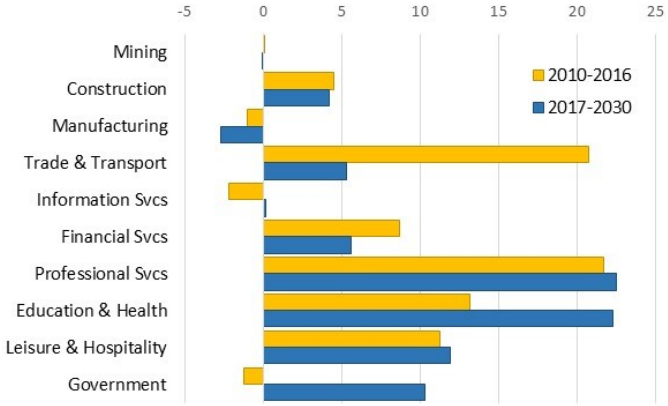
Households by Occupants



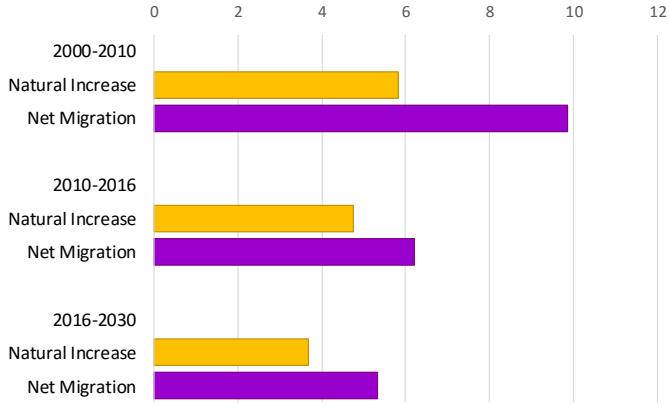
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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METRO MULTIFAMILY DEMAND OVERVIEW

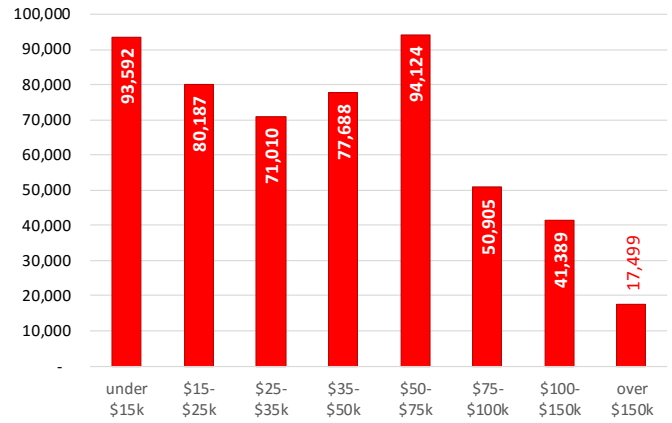
RIVERSIDE

Though natural growth is constant, significant net in migrations have receded. New renters will source from most ages but will rely on those 35-54 ahead. Economy is good with gains in most sectors, but trade will retreat. Rental stock is older with nearly half in more affordable STAR units amid heavy supply restrictions. Multifamily demand ahead is positive, steady.

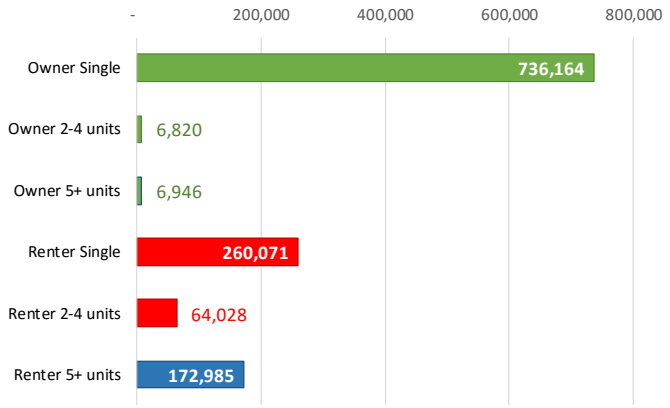
Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
26	113	5.1	48%

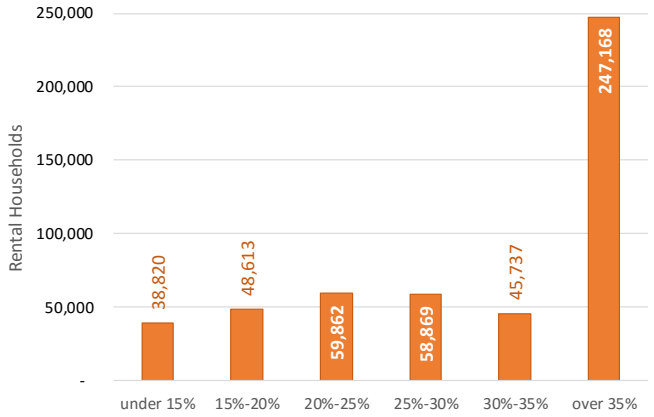
Rental Households by Income



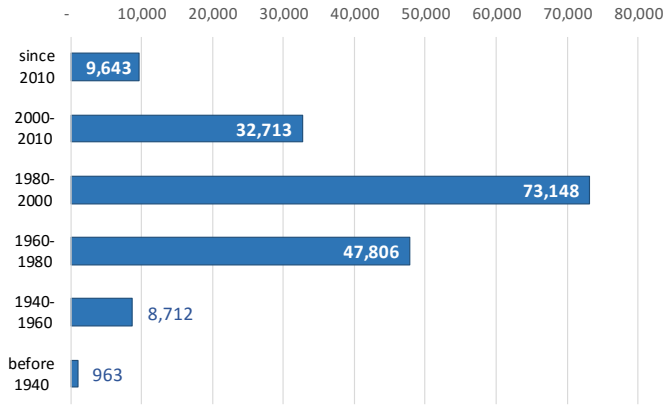
Housing Stock by Tenure & Type



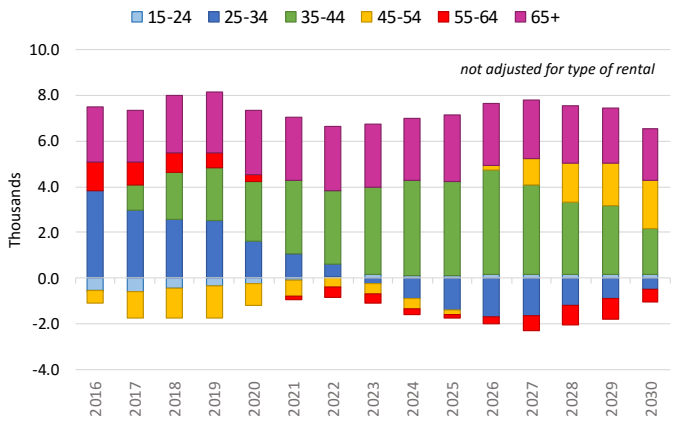
Rent as a Percent of Household Income



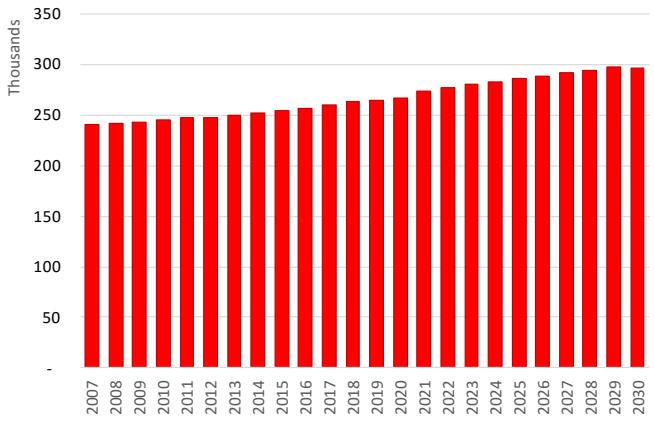
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

University of San Diego SCHOOL OF BUSINESS

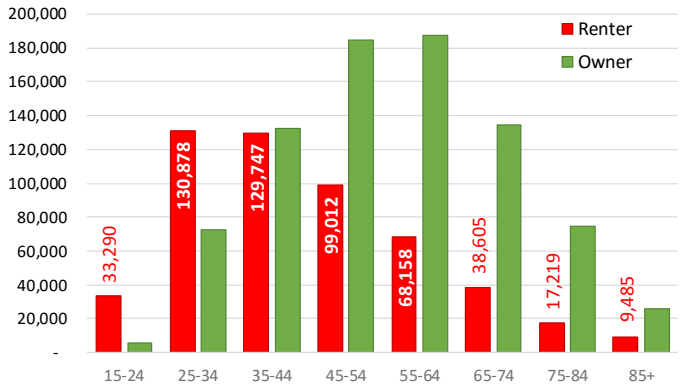
WREA

dfm

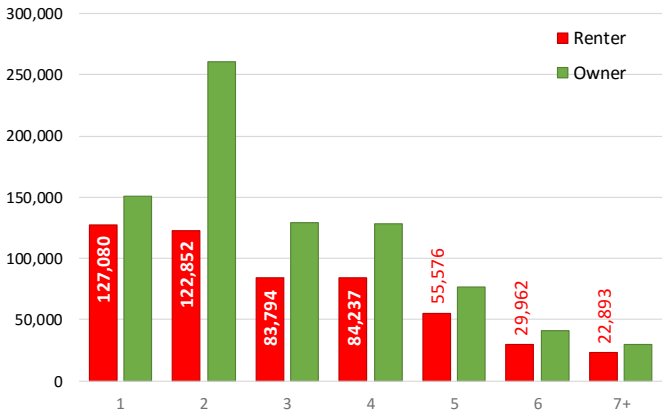
Version 1

RIVERSIDE page 2

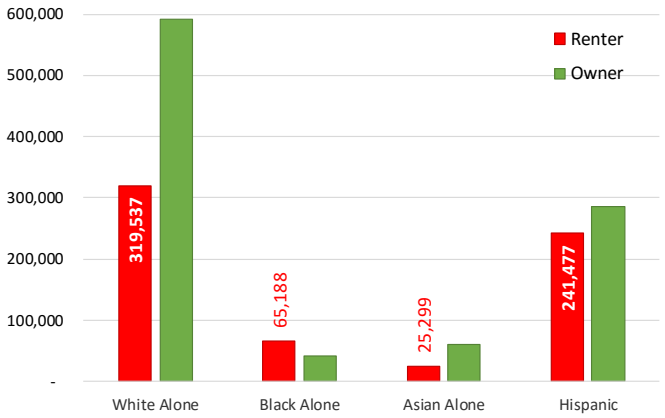
Households by Age Cohort



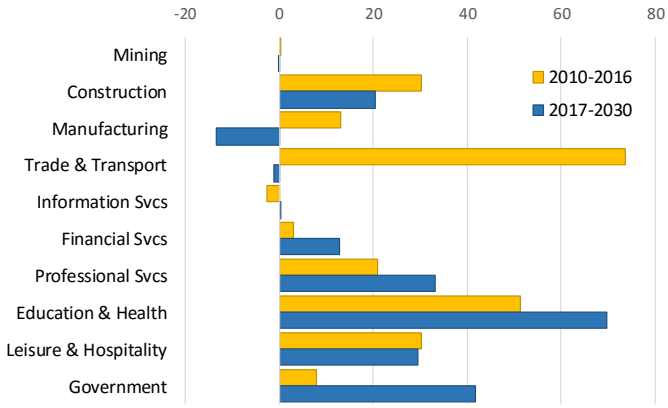
Households by Occupants



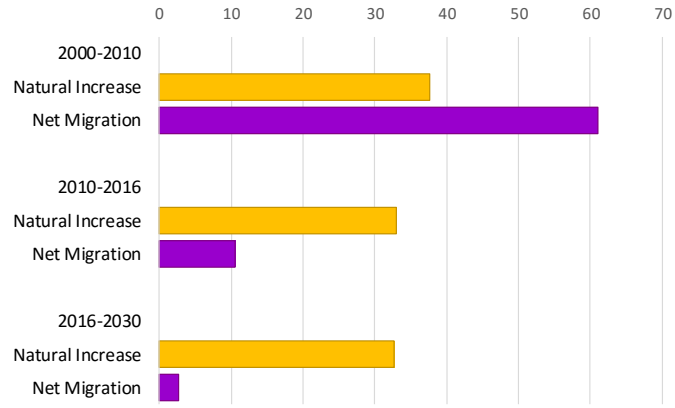
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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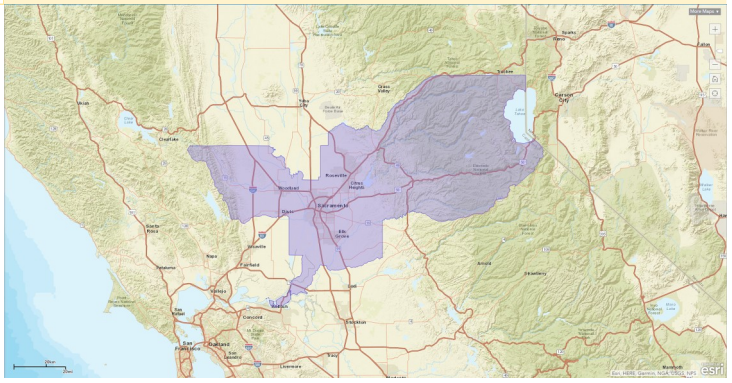
METRO MULTIFAMILY DEMAND OVERVIEW

SACRAMENTO

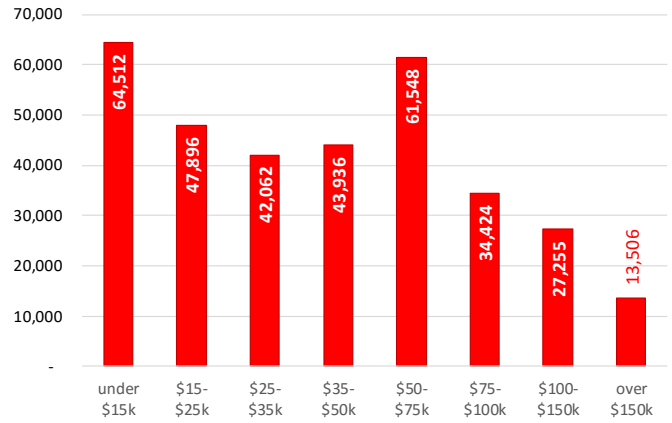
Net in migrations and natural population growth fuel new rental households. These will source mainly from 25-44 year olds and seniors over 65. Economic prospects are solid, led by education and government. Rental stock is older than most metros with 42% in more affordable STAR units. Multifamily demand ahead is steadily increasing.

Definitions on back

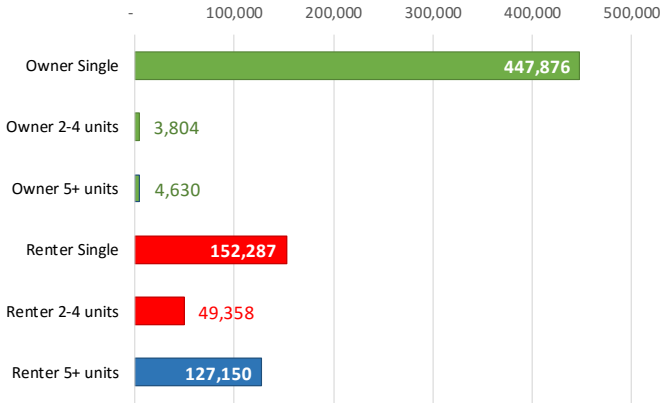
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
27	137	4.1	42%



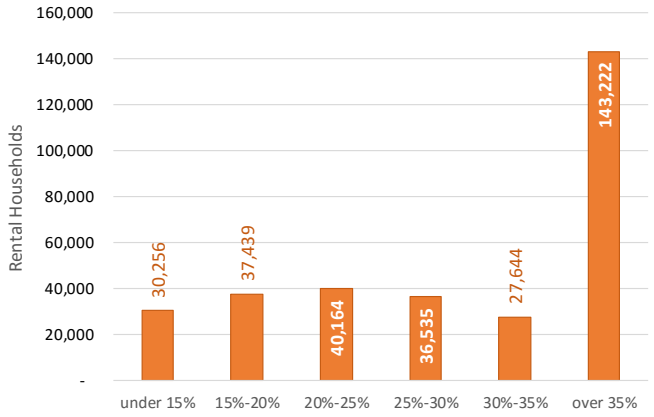
Rental Households by Income



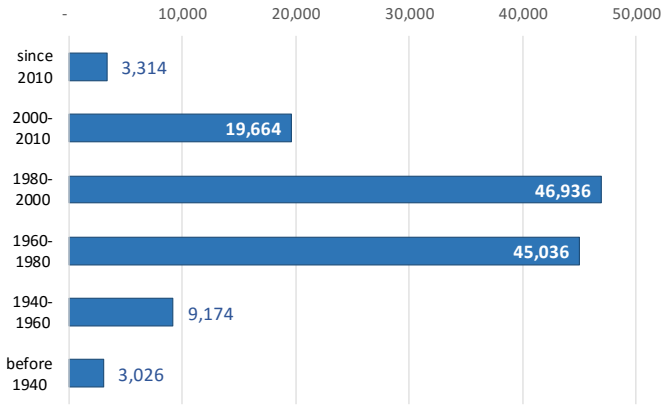
Housing Stock by Tenure & Type



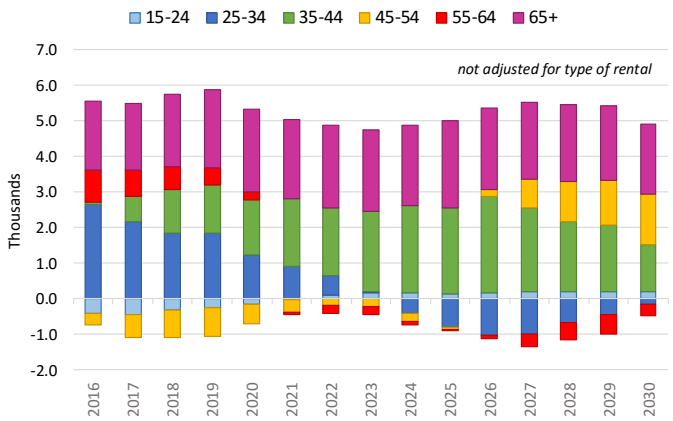
Rent as a Percent of Household Income



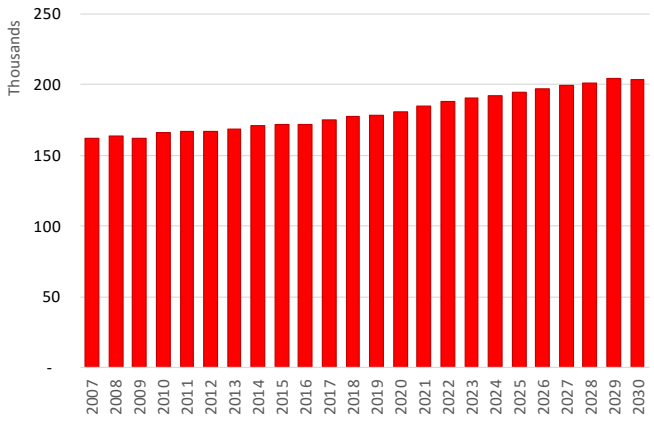
5+ Unit Rental Stock by Year Built



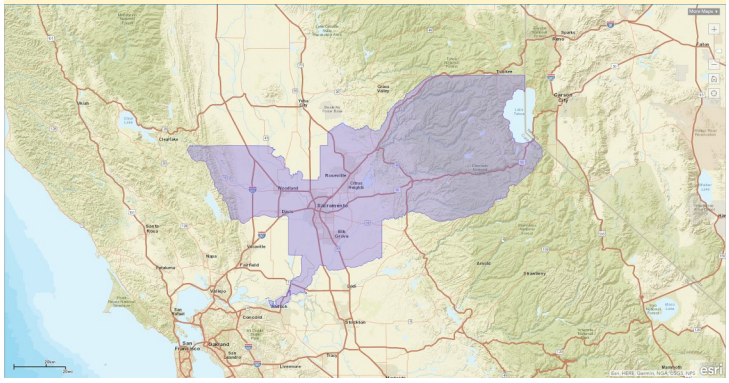
New Rental Households by Age Cohort



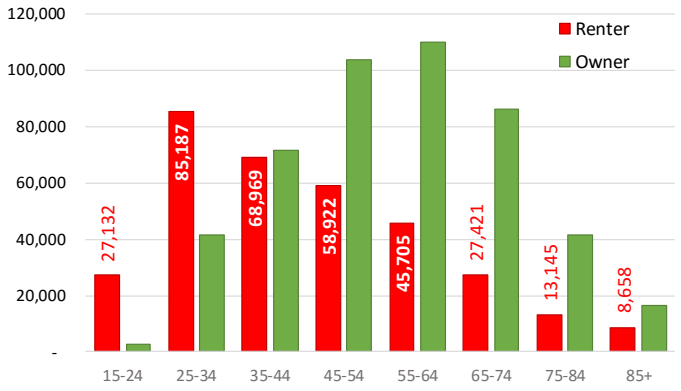
5+ Unit Apartment Demand Forecast



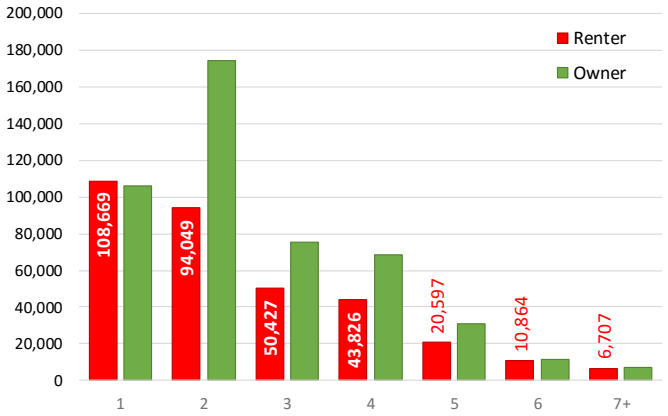
SACRAMENTO page 2



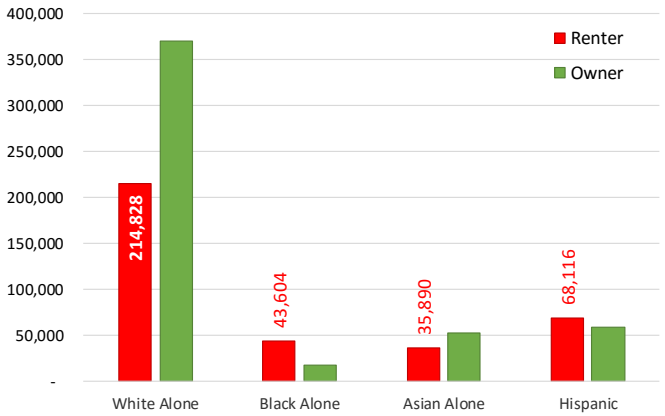
Households by Age Cohort



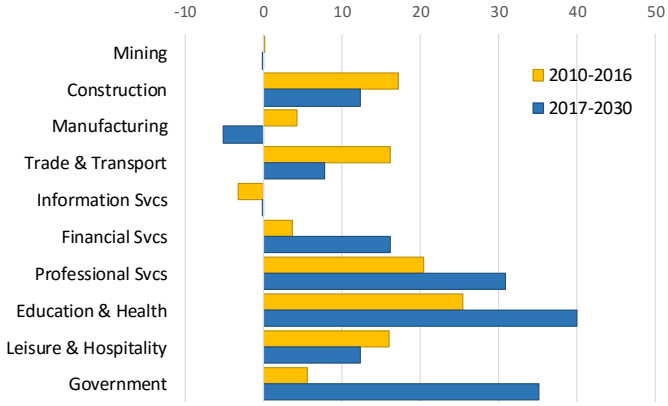
Households by Occupants



Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



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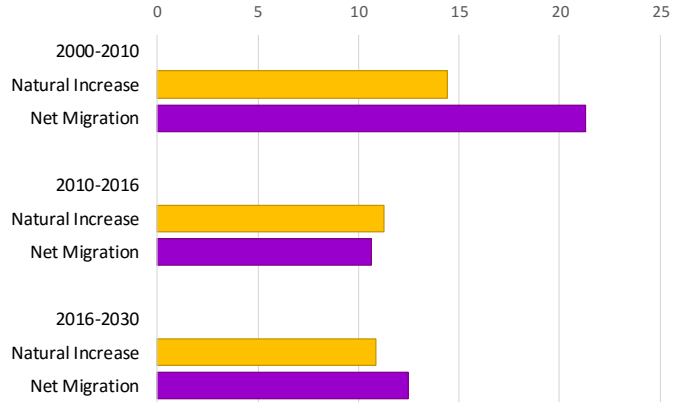

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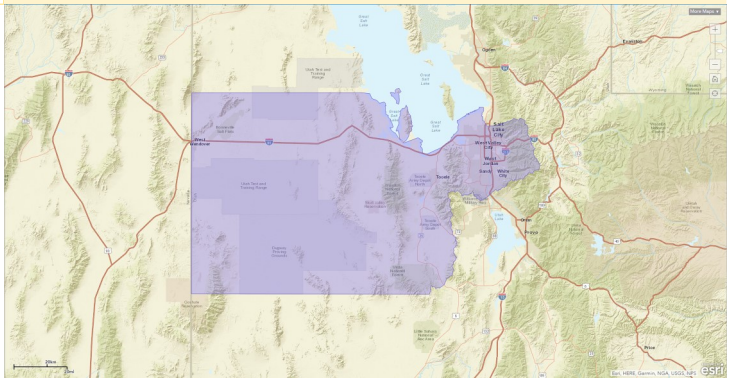
METRO MULTIFAMILY DEMAND OVERVIEW

SALT LAKE CITY

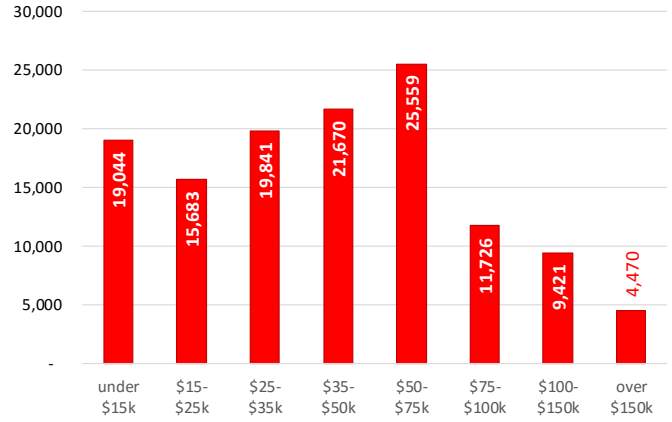
With only modest net in migrations, natural population growth is the driver for new rental households. Today's renters are smaller, younger and with strong incomes up to $75,000. Economy is strong, led by professional services and education. Rental stock has less STAR units than other metros. Demand for multifamily steadily increases through 2030.

Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
25	153	2.4	29%



Rental Households by Income



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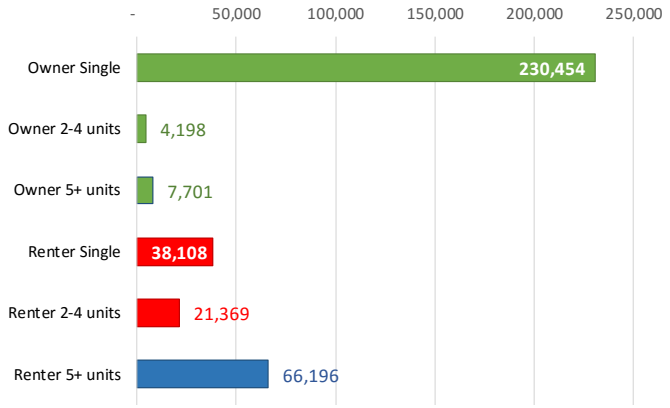
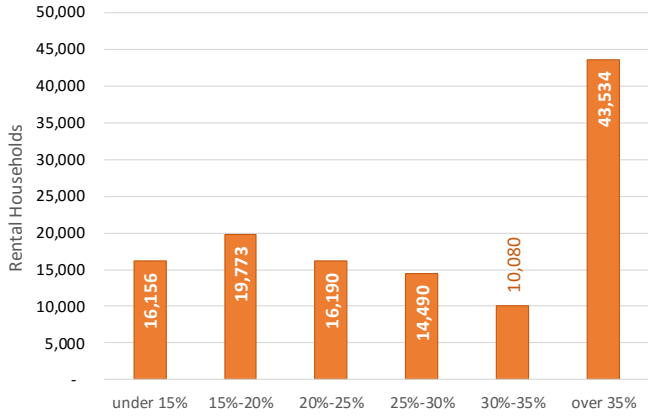
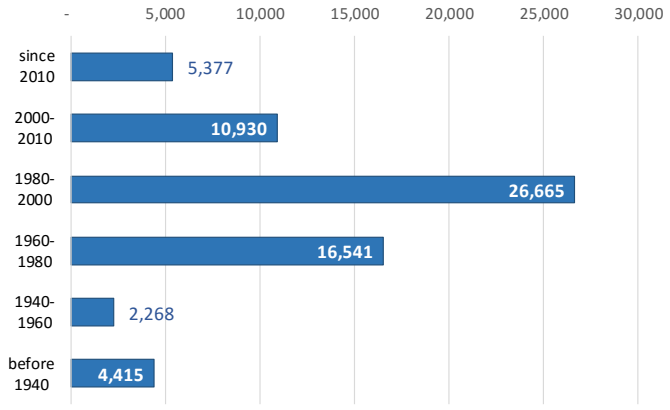


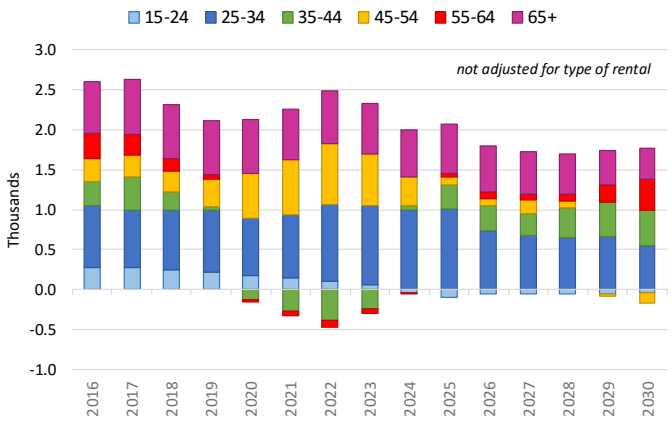
Rent as a Percent of Household Income



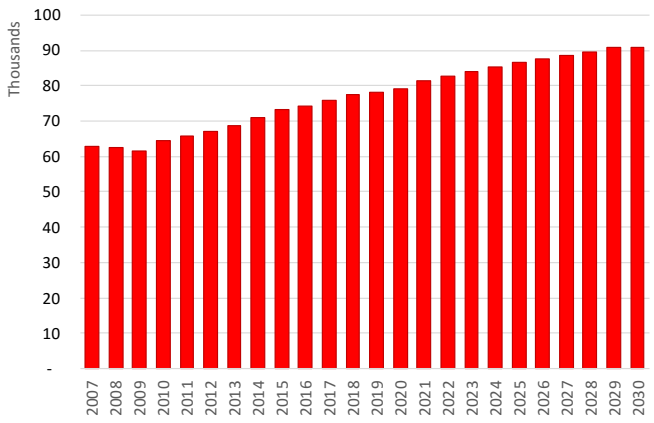
5+ Unit Rental Stock by Year Built



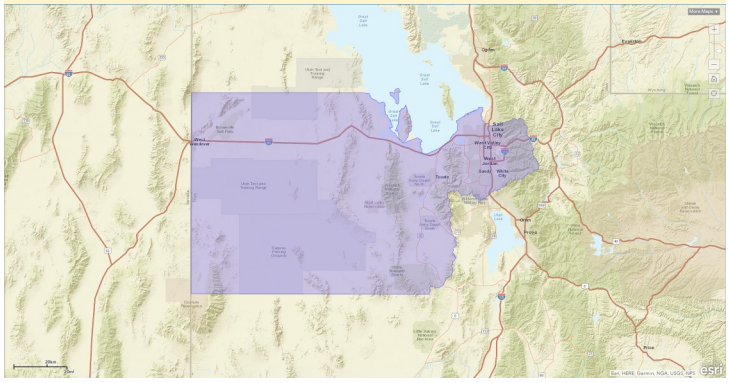
New Rental Households by Age Cohort



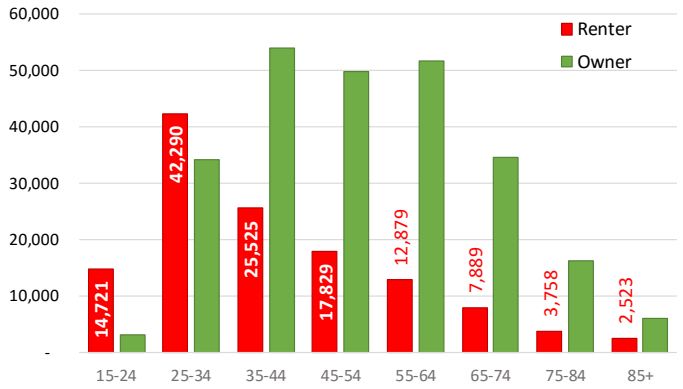
5+ Unit Apartment Demand Forecast



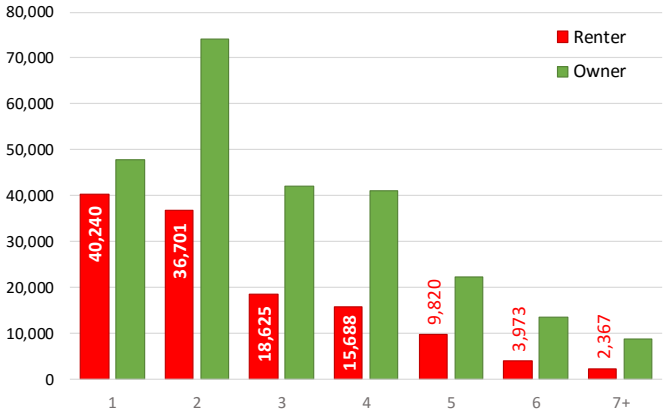
SALT LAKE CITY page 2



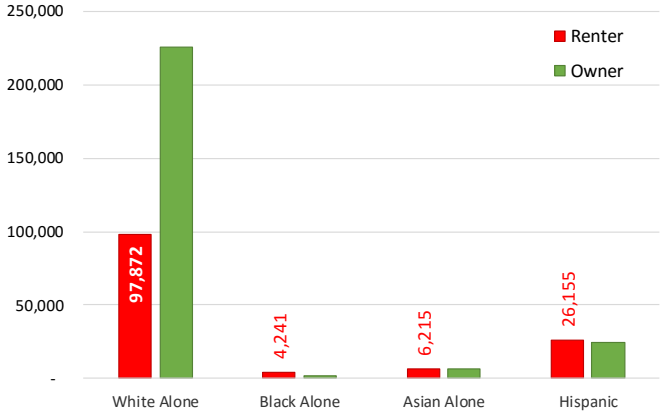
Households by Age Cohort



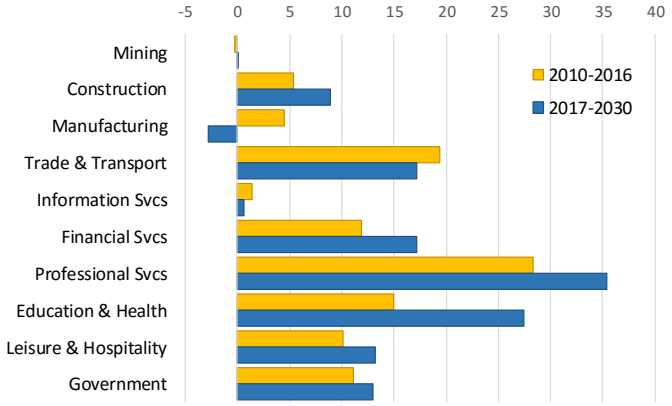
Households by Occupants



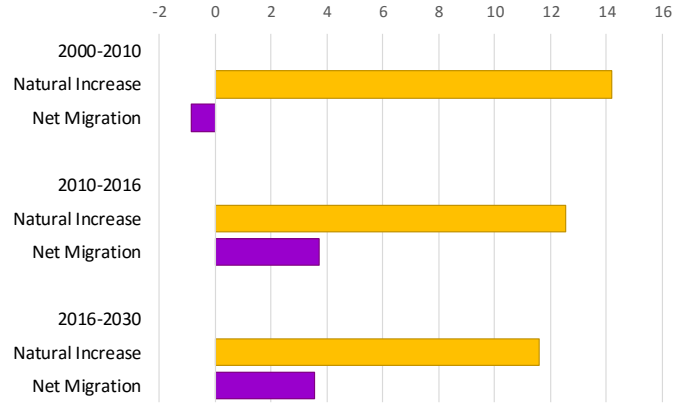
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

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NMHC NATIONAL MULTIFAMILY HOUSING COUNCIL · NAA NATIONAL APARTMENT ASSOCIATION · HAS · University of San Diego SCHOOL OF BUSINESS · WREA · dfm Version 1

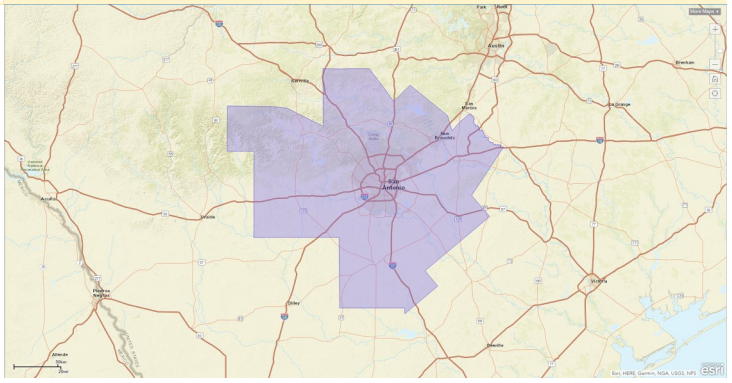
METRO MULTIFAMILY DEMAND OVERVIEW

SAN ANTONIO

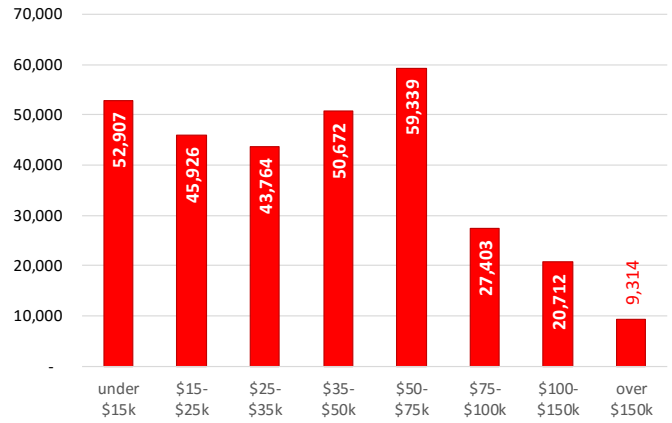
Net in migrations are 65% ahead of natural population growth, a strong driver for new rental households that will source from all ages. Renter ages and sizes are more diverse, likely tied to strong Hispanic share. Gains in all job sectors portend a strong economy. Rental stock is newer with a smaller share of STAR units. Multifamily demand is strong and increasing.

Definitions on back

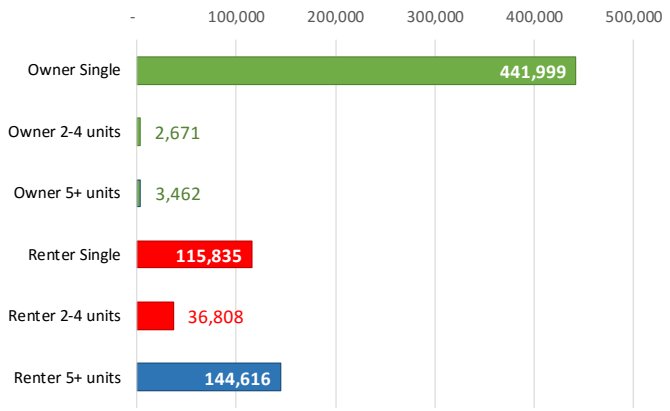
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
14	166	-1.3	24%



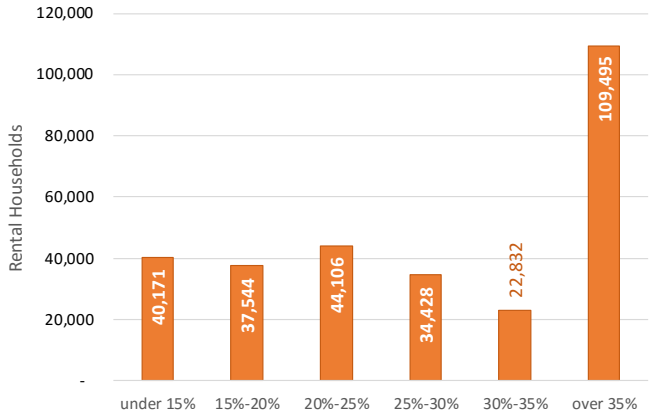
Rental Households by Income



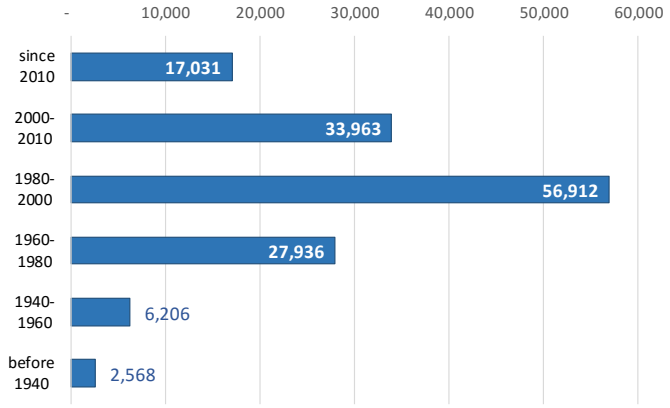
Housing Stock by Tenure & Type



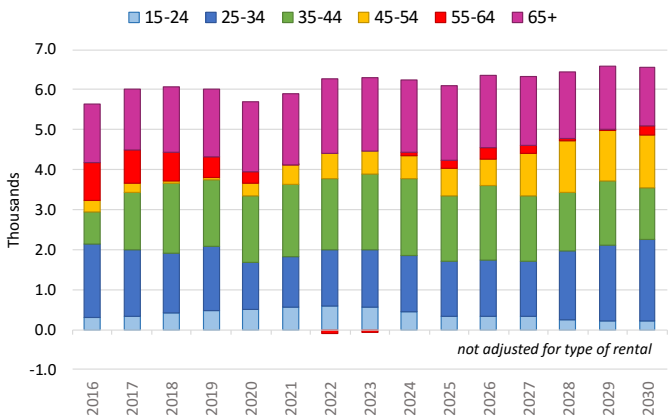
Rent as a Percent of Household Income



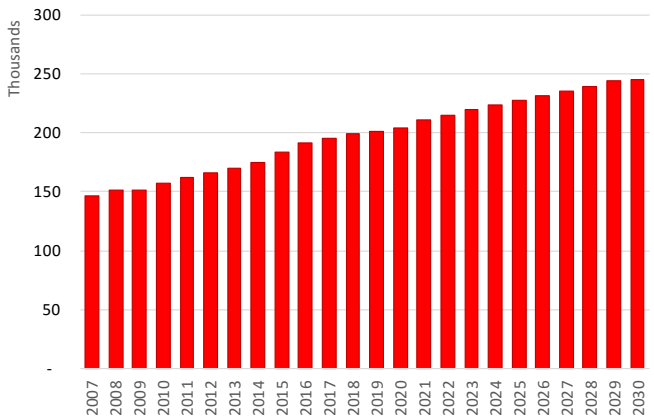
5+ Unit Rental Stock by Year Built



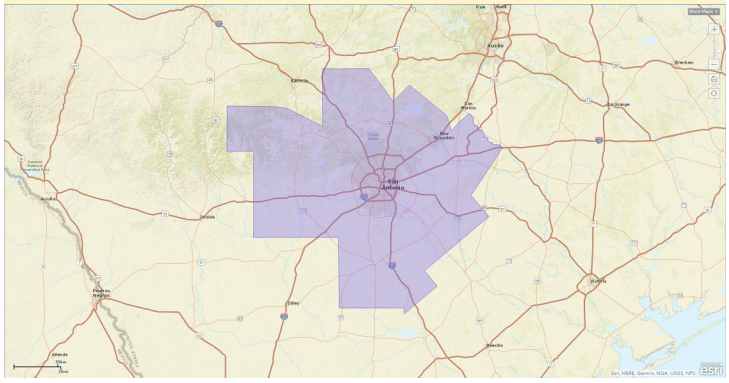
New Rental Households by Age Cohort



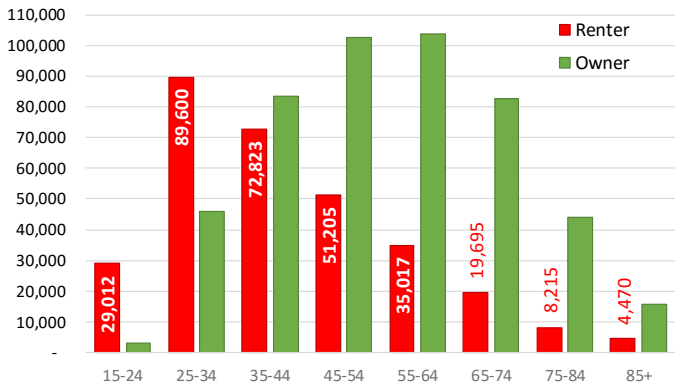
5+ Unit Apartment Demand Forecast



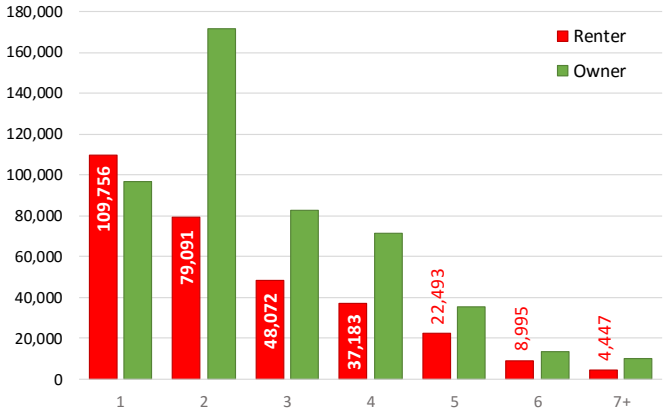
SAN ANTONIO page 2



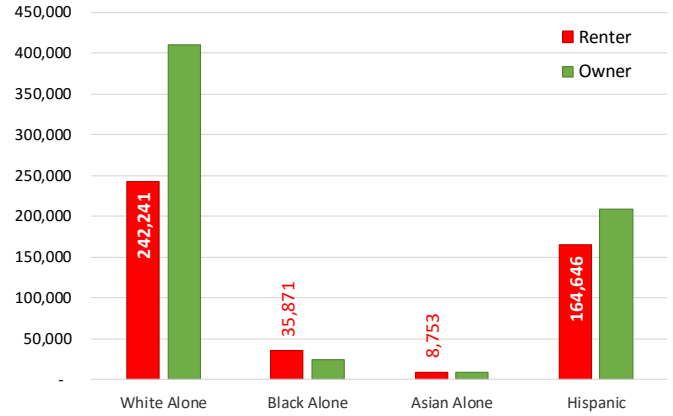
Households by Age Cohort



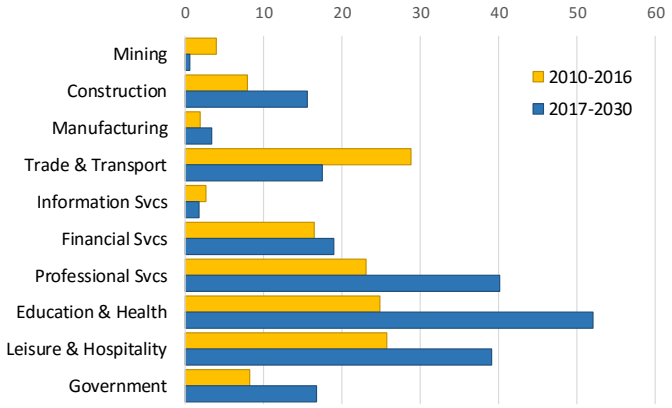
Households by Occupants



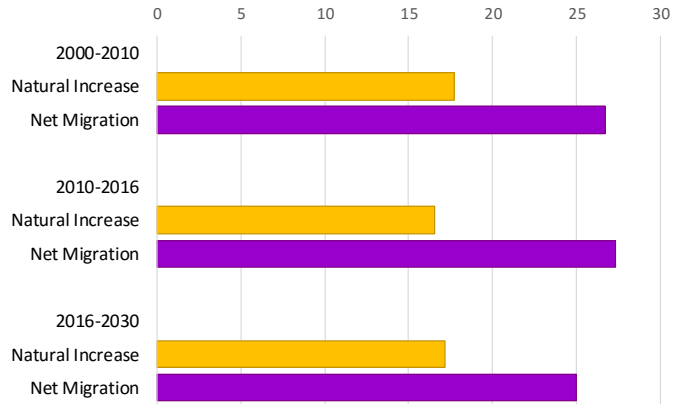
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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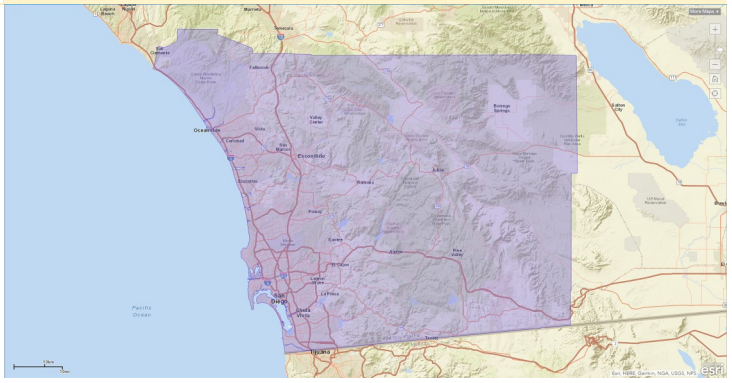
METRO MULTIFAMILY DEMAND OVERVIEW

SAN DIEGO

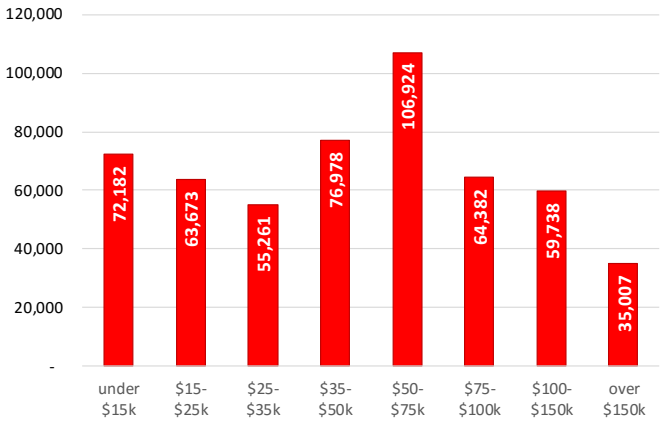
Net in migrations are back, but a modest component of new rental households after natural population growth. Economy is fairly strong ahead. Rental stock is older than most metros and 59% are STAR units, second only to L.A. Supply restrictions may hamper meeting strong multifamily demand ahead, steadily increasing through 2030.

Definitions on back

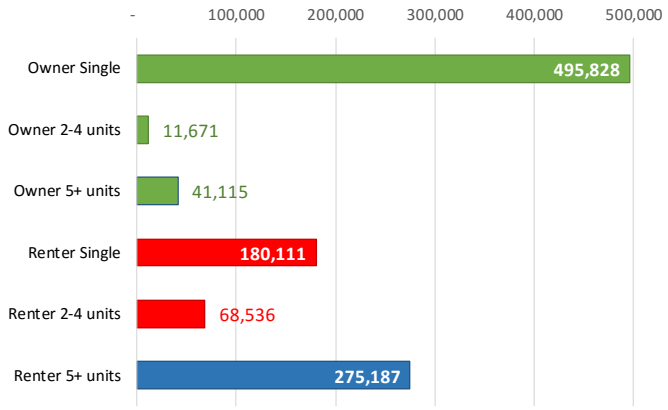
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
18	76	5.5	58%



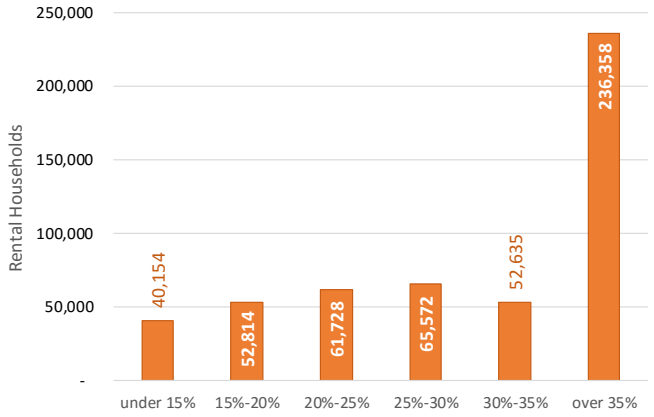
Rental Households by Income



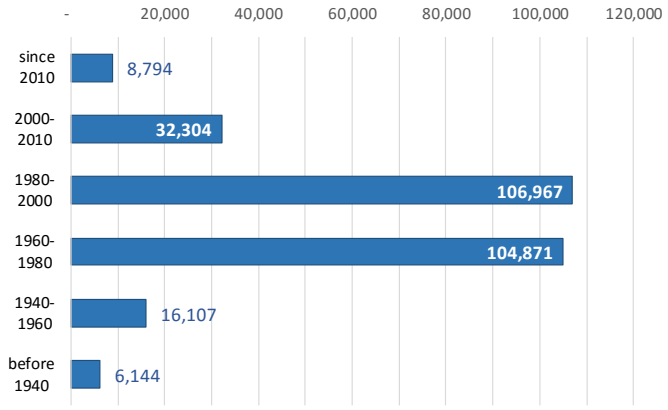
Housing Stock by Tenure & Type



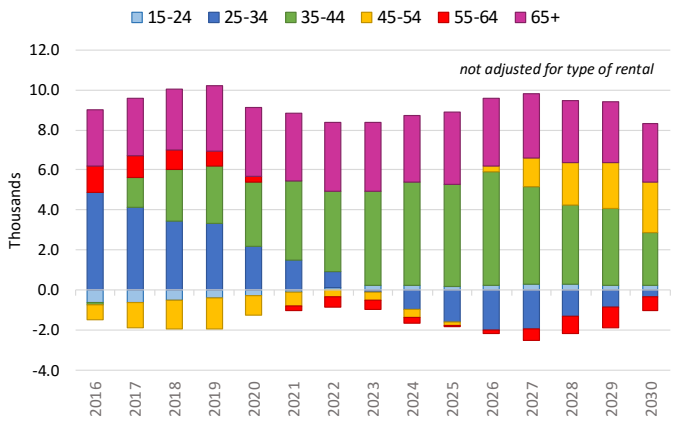
Rent as a Percent of Household Income



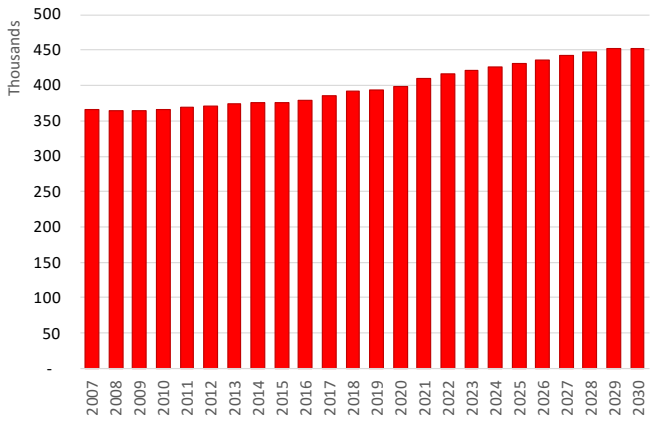
5+ Unit Rental Stock by Year Built



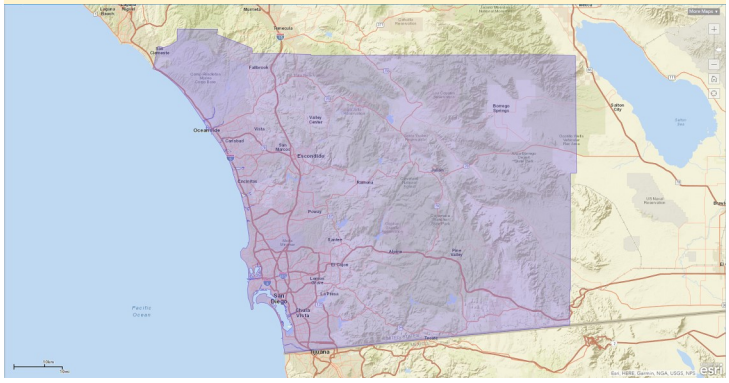
New Rental Households by Age Cohort



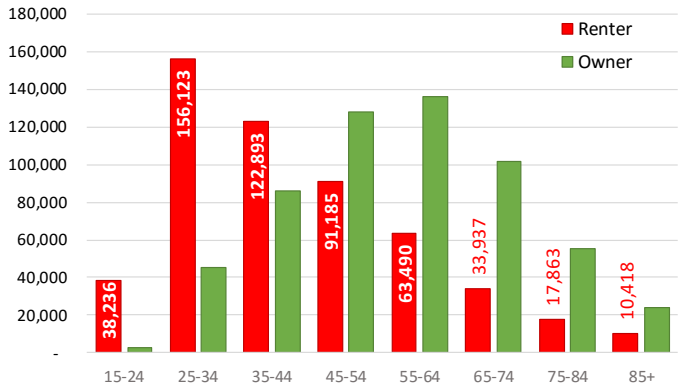
5+ Unit Apartment Demand Forecast



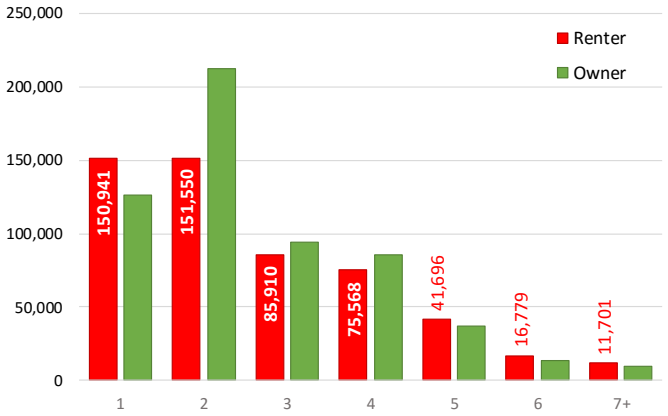
SAN DIEGO page 2



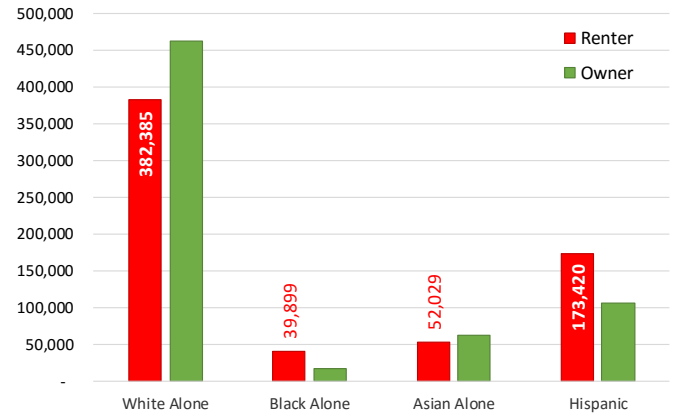
Households by Age Cohort



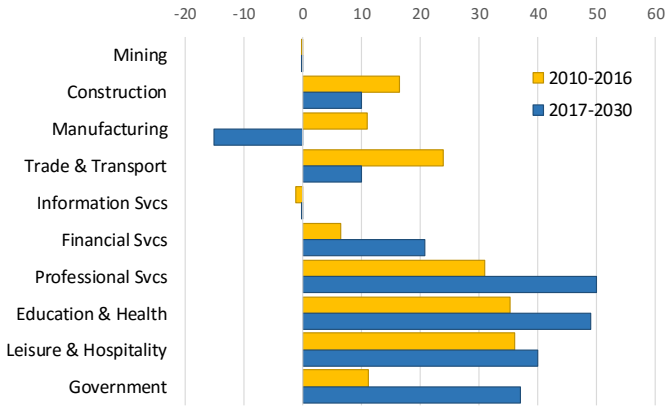
Households by Occupants



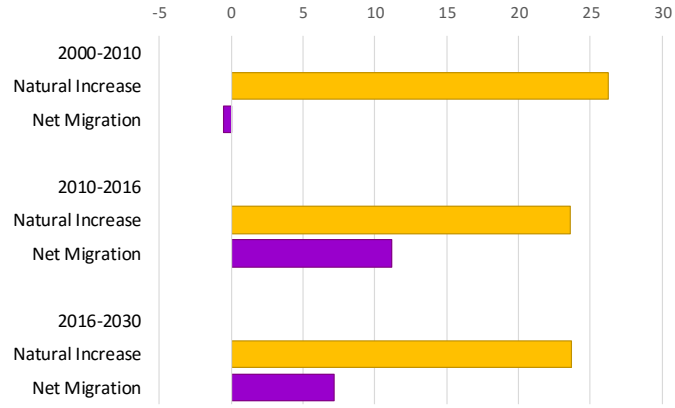
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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METRO MULTIFAMILY DEMAND OVERVIEW

SAN FRANCISCO

Net in migrations continue to match consistent natural population growth, fueling new rental households. Strong renter incomes and diverse ages. Economic prospects are strong. Housing affordability is low amid steep supply restrictions. Rental stock is older with 54% seen in more affordable STAR units. Demand ahead is strong and steadily increasing through 2030.

Definitions on back

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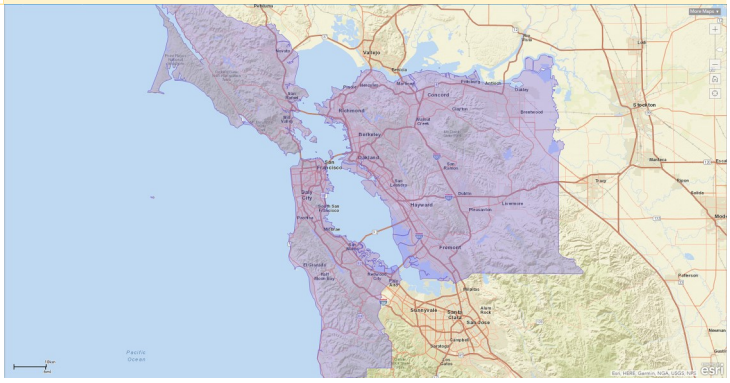
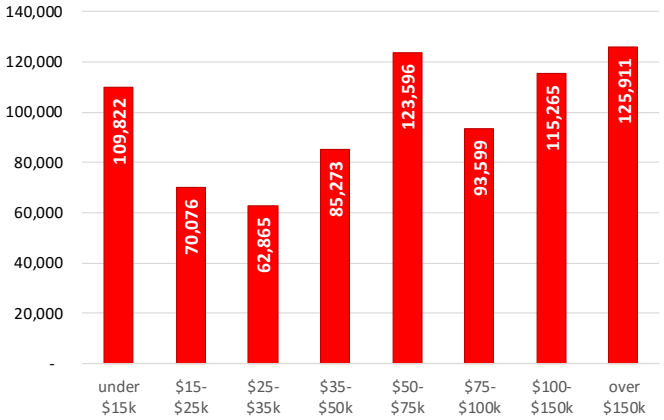
19	72	7.6	54%



Rental Households by Income



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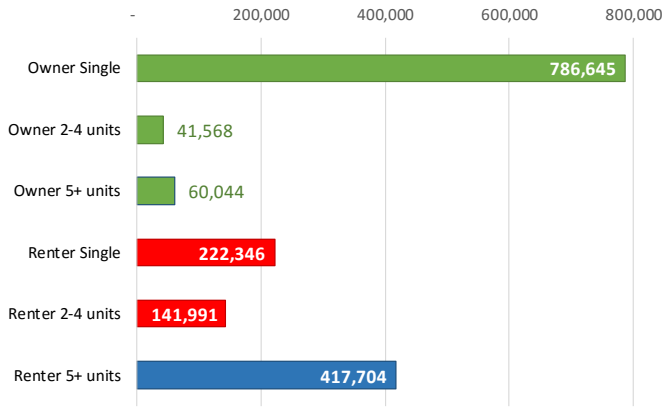
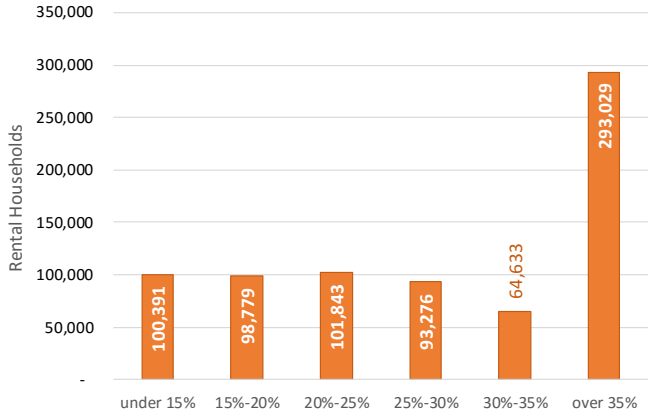
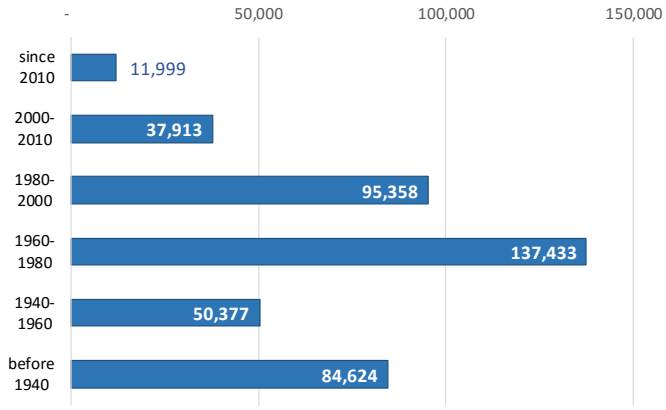


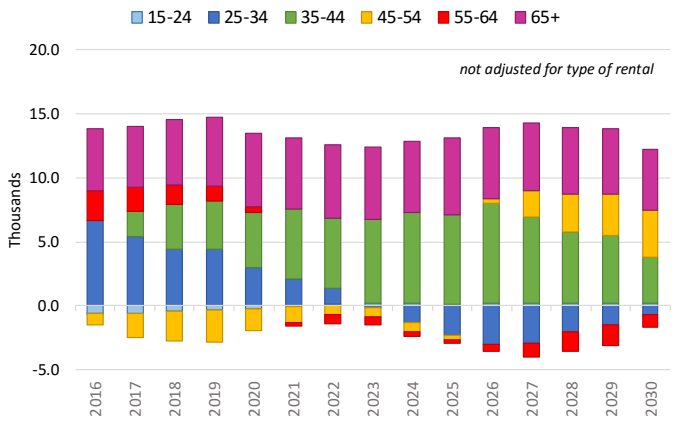
Rent as a Percent of Household Income



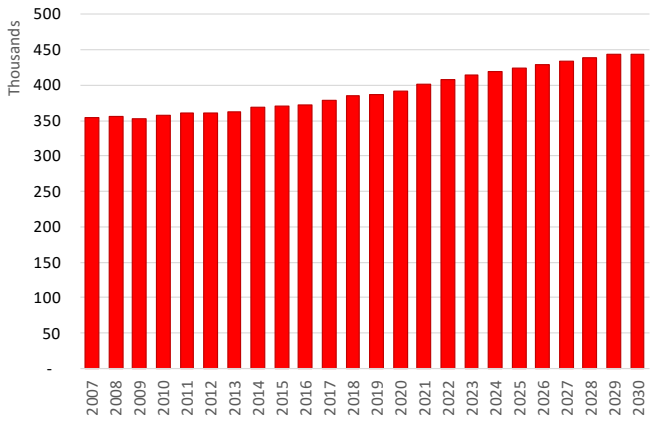
5+ Unit Rental Stock by Year Built



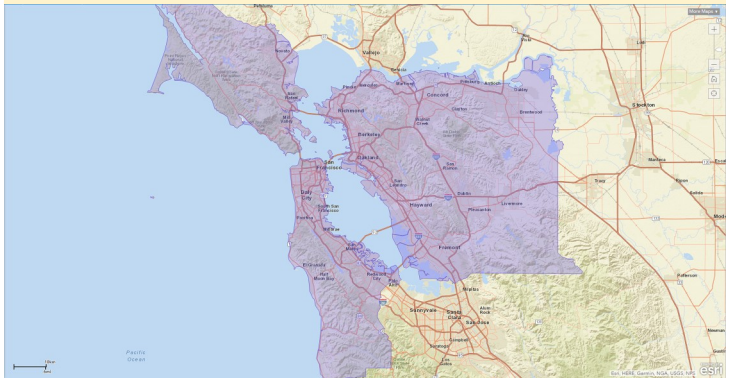
New Rental Households by Age Cohort



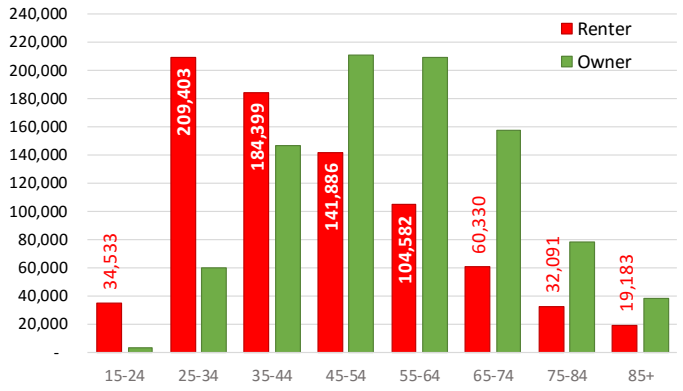
5+ Unit Apartment Demand Forecast



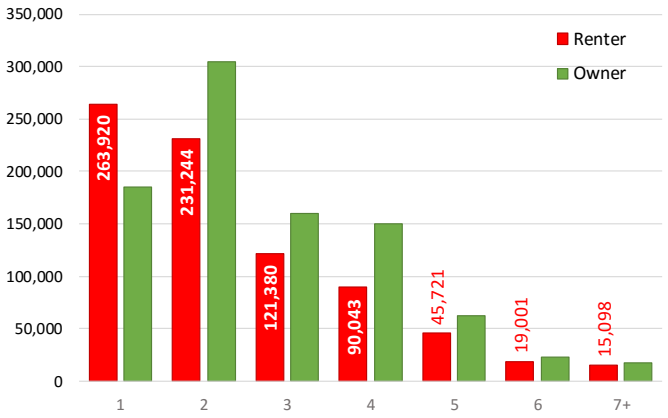
SAN FRANCISCO page 2



Households by Age Cohort



Households by Occupants



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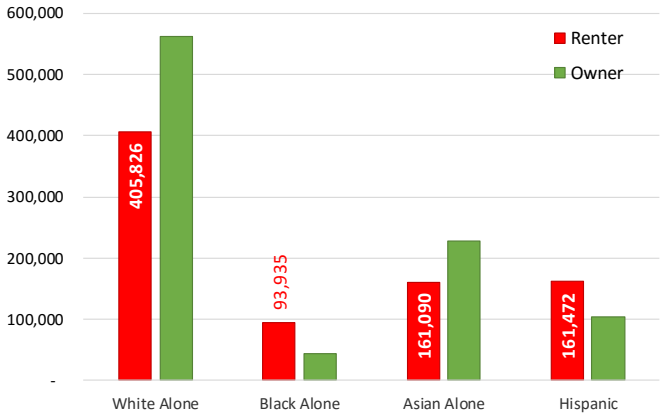

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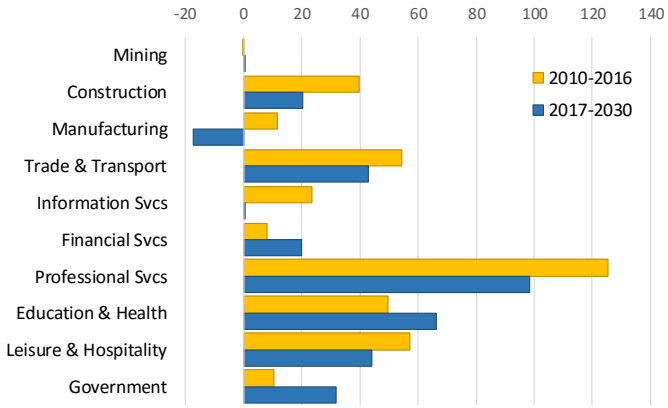

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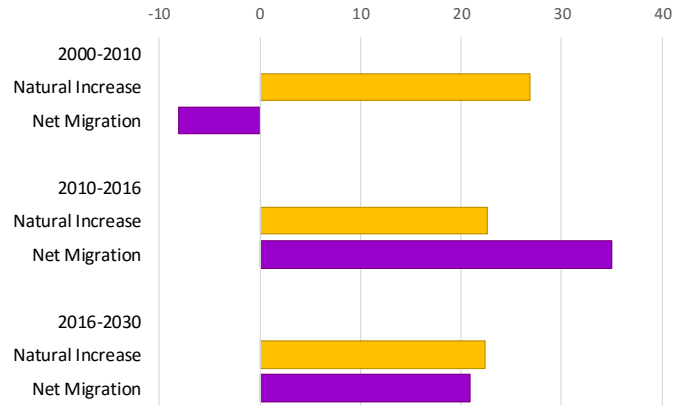

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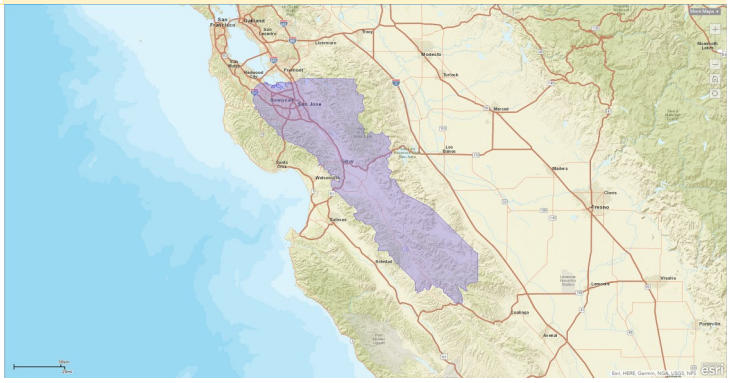
METRO MULTIFAMILY DEMAND OVERVIEW

SAN JOSE

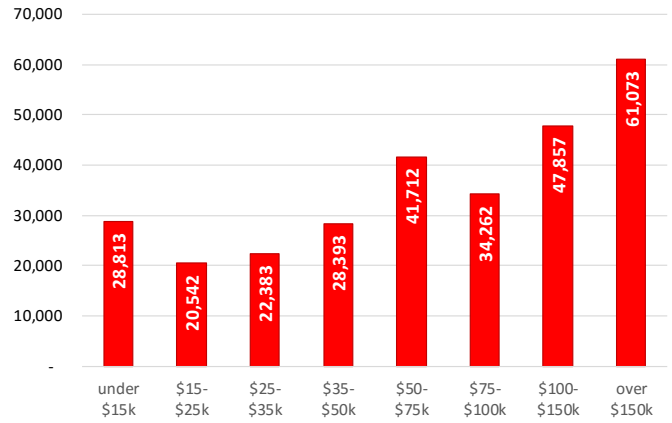
Net in migrations recede against consistent natural population growth. Renters have strong incomes, a range of ages and will source from all ages ahead. Economy is strong, led by professional services and education. Rental stock is older, but with fewer affordable STAR units as nearby SF. Multifamily demand ahead is strong and steadily increasing through 2030.

Definitions on back

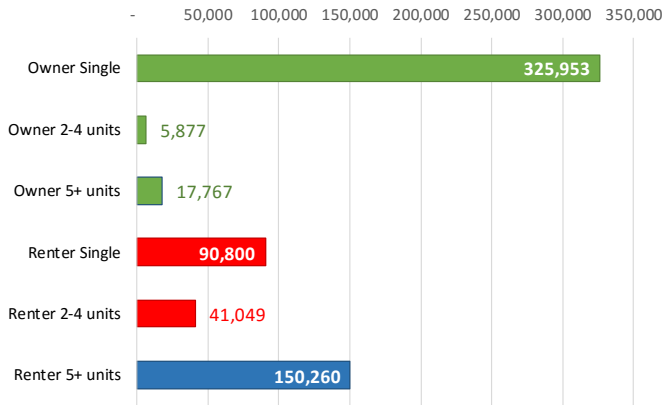
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
22	69	3.8	43%



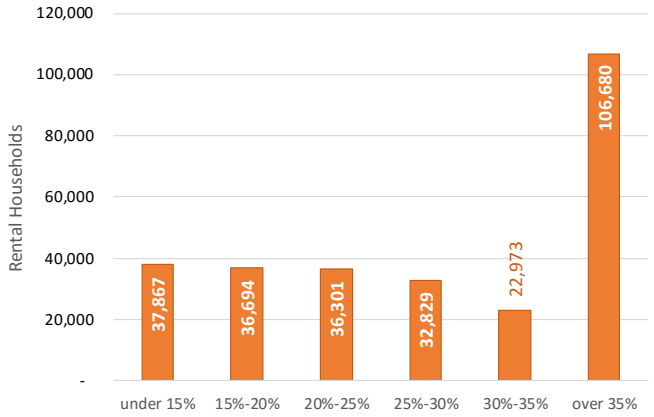
Rental Households by Income



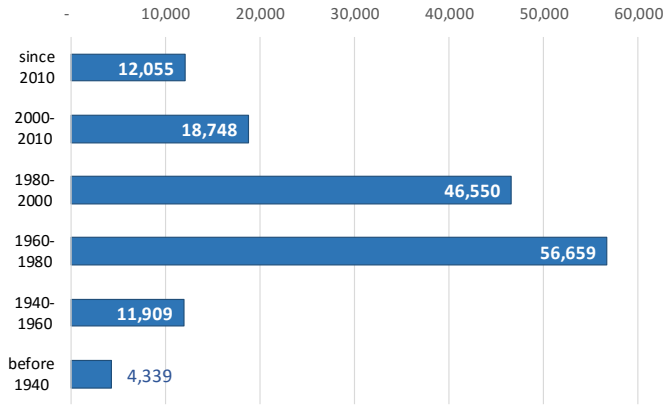
Housing Stock by Tenure & Type



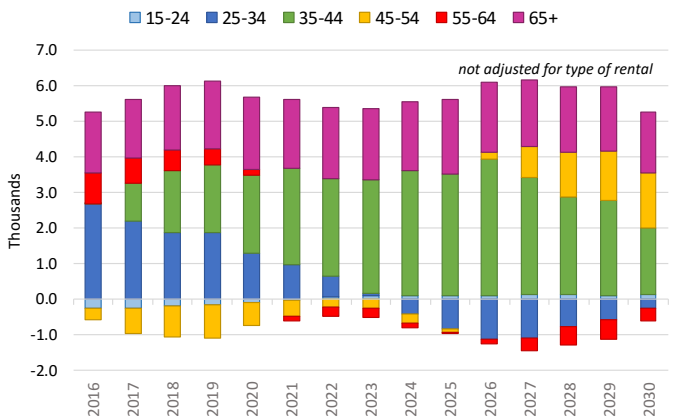
Rent as a Percent of Household Income



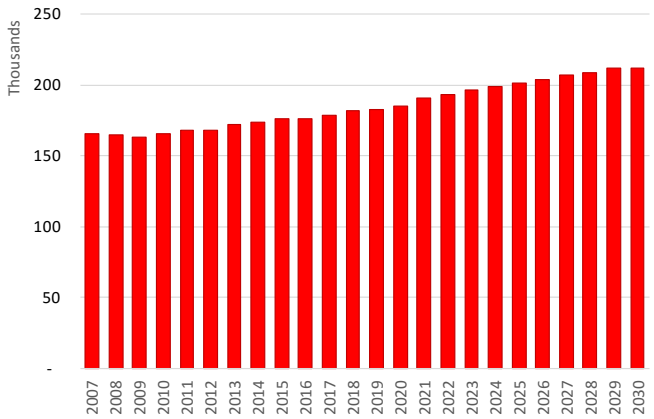
5+ Unit Rental Stock by Year Built



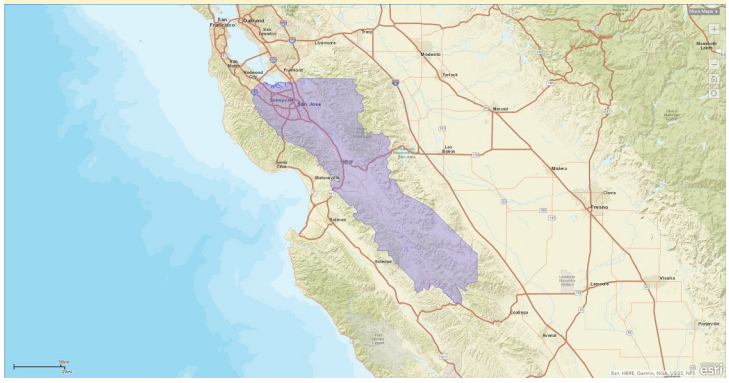
New Rental Households by Age Cohort



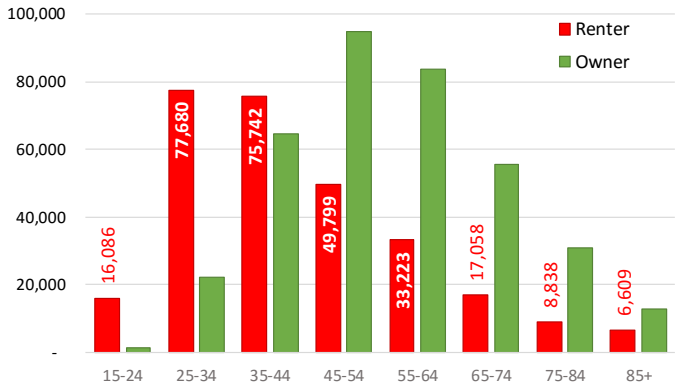
5+ Unit Apartment Demand Forecast



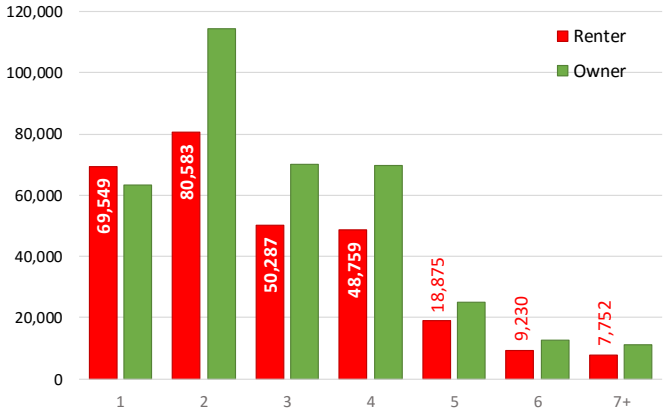
SAN JOSE page 2



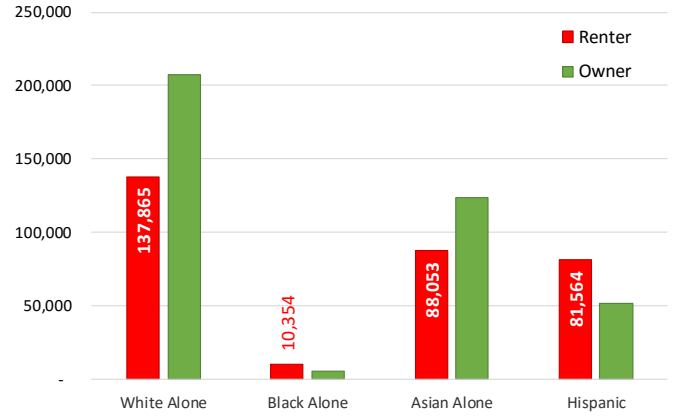
Households by Age Cohort



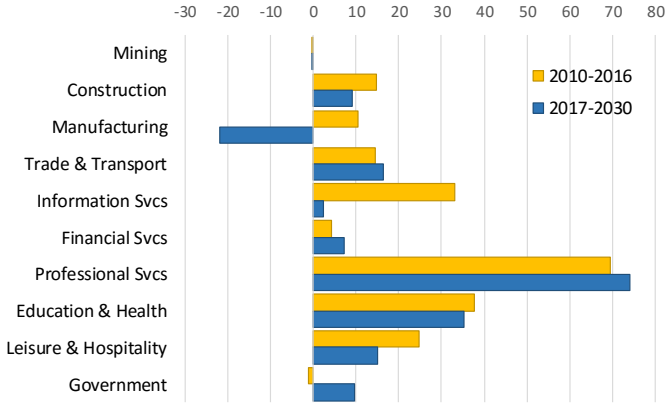
Households by Occupants



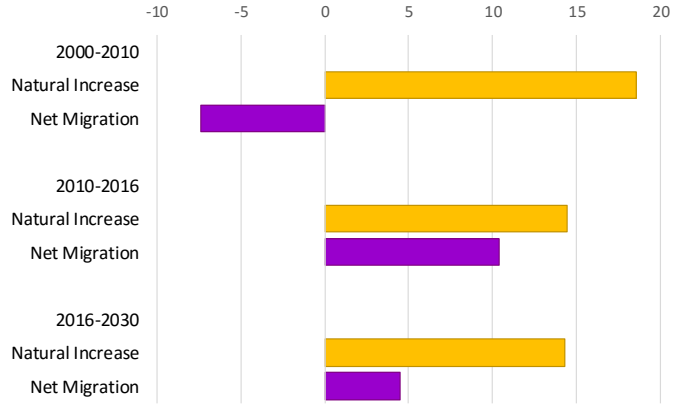
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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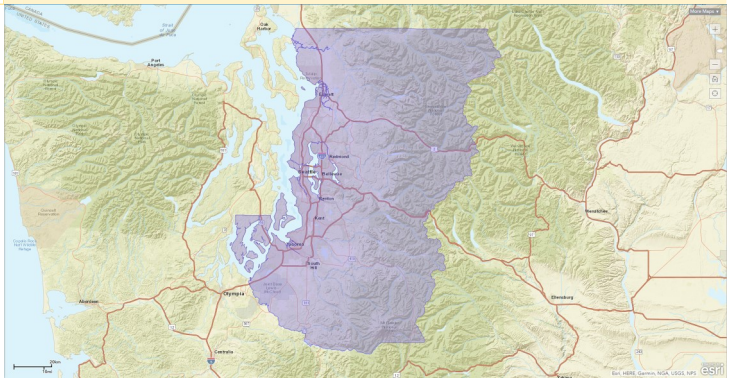
METRO MULTIFAMILY DEMAND OVERVIEW

SEATTLE

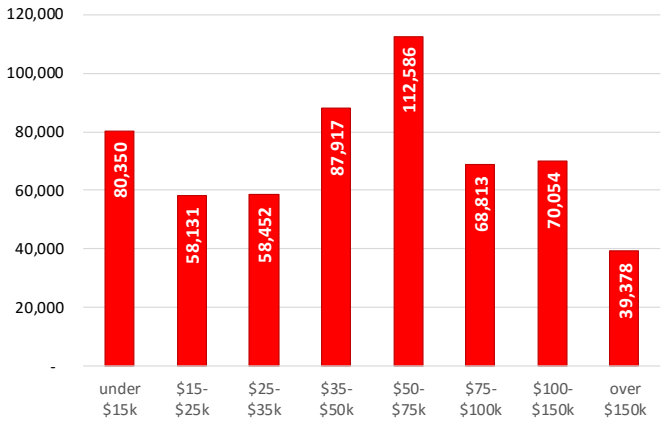
Net in migrations continue to outpace natural population growth as source of new renters from younger, affluent and smaller households. Strong economy will see gains in professional services, education and trade. The rental stock is older, but less than a third in more affordable STAR units. Multifamily demand ahead is strong and increasing each year to 2030.

Definitions on back

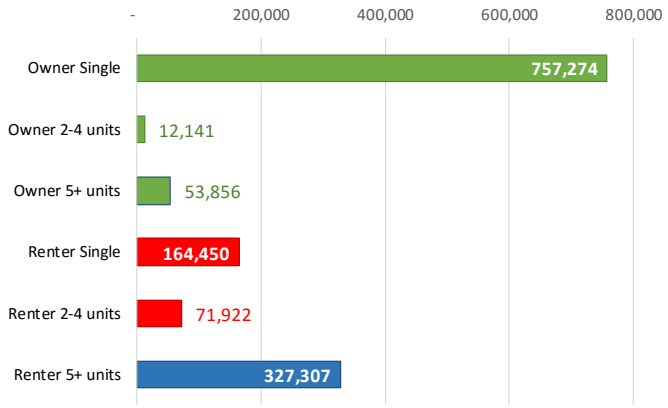
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
11	124	8.0	32%



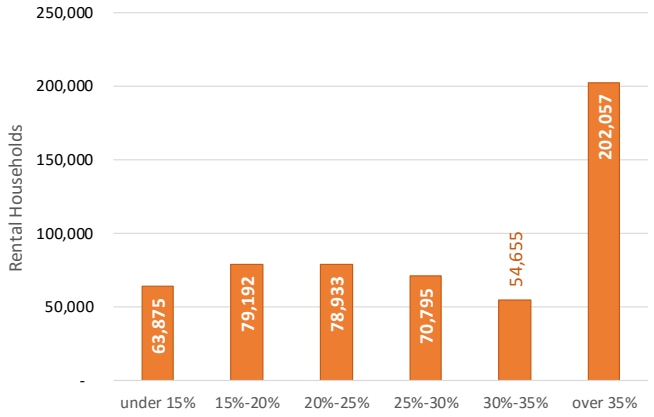
Rental Households by Income



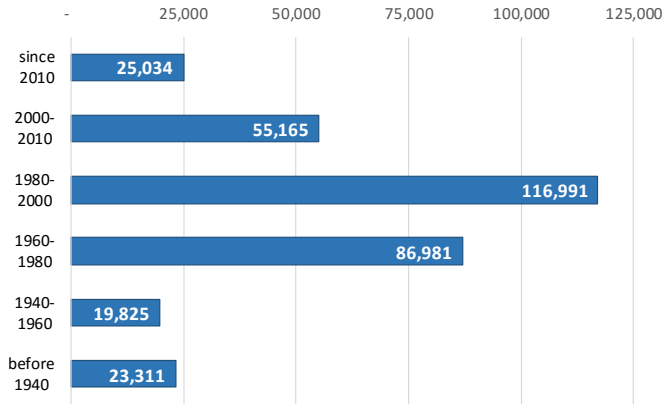
Housing Stock by Tenure & Type



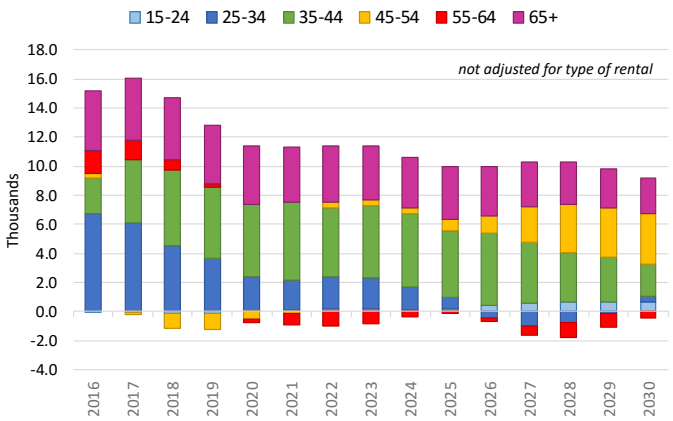
Rent as a Percent of Household Income



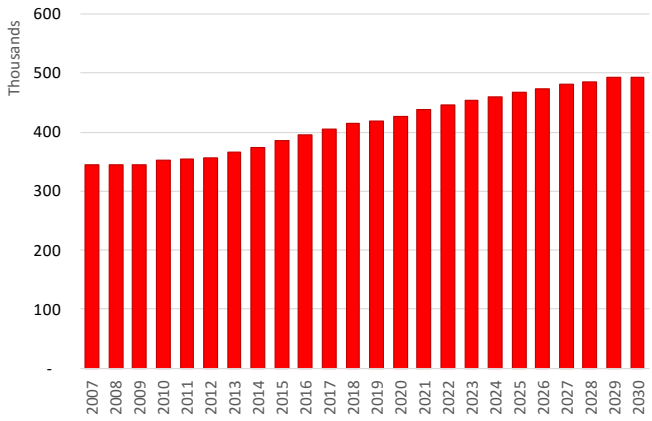
5+ Unit Rental Stock by Year Built



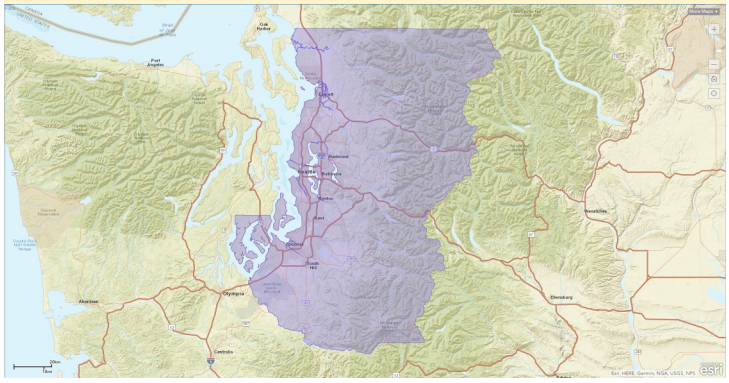
New Rental Households by Age Cohort



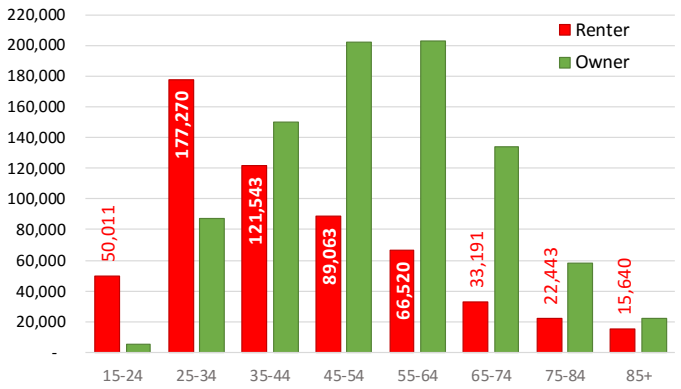
5+ Unit Apartment Demand Forecast



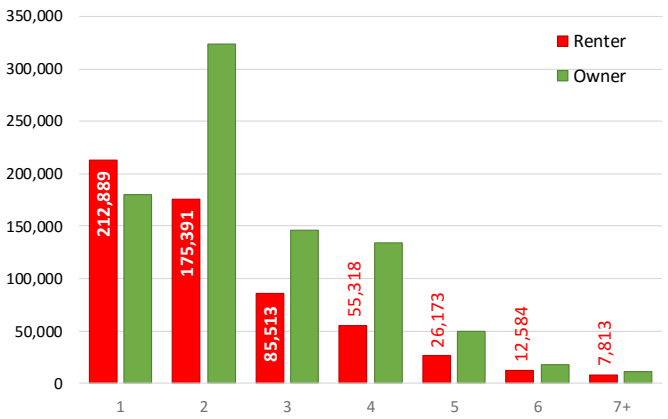
SEATTLE page 2



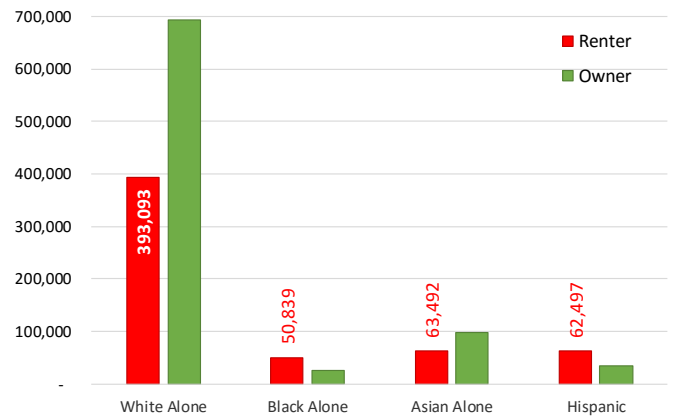
Households by Age Cohort



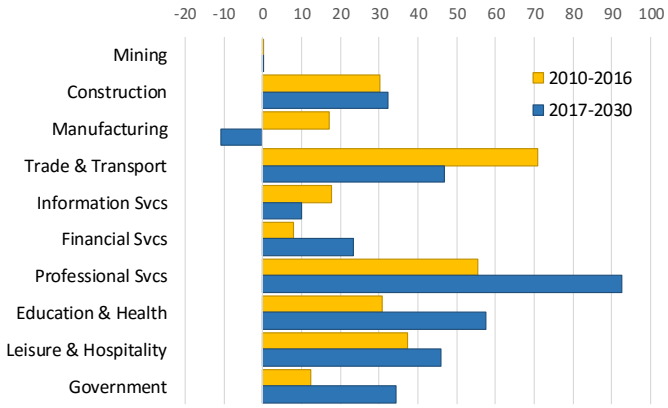
Households by Occupants



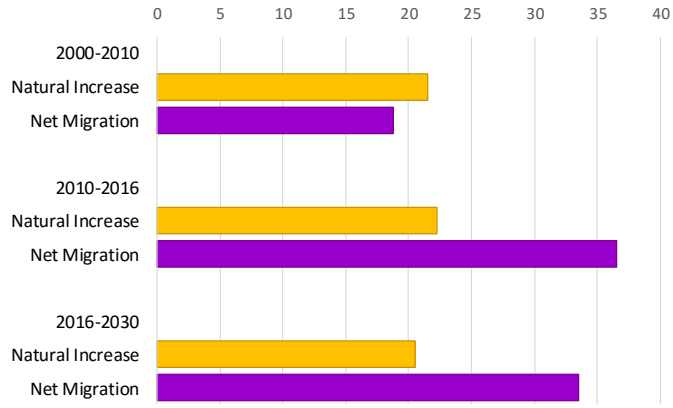
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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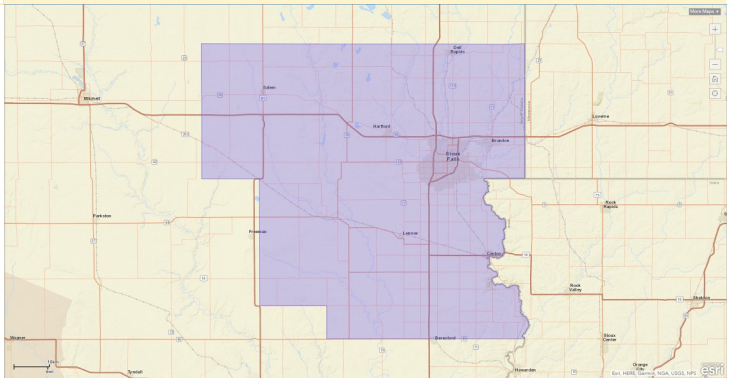
METRO MULTIFAMILY DEMAND OVERVIEW

SIOUX FALLS

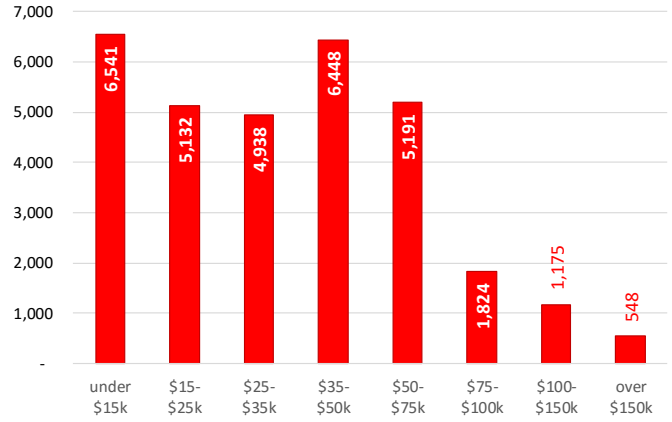
Mild growth is a combination of net in migrations and natural population growth. New renters will source from 35+ age cohort, particularly seniors over 65. Today's renters have good incomes up to $75,000, smaller households and a range of ages. Economic prospects are good. Rental stock is older, yet with fewer STAR units. Multifamily demand steadily increases.

Definitions on back

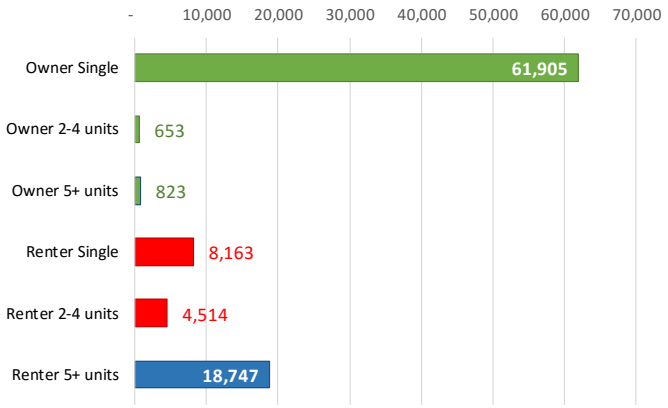
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
32	213	-3.1	23%



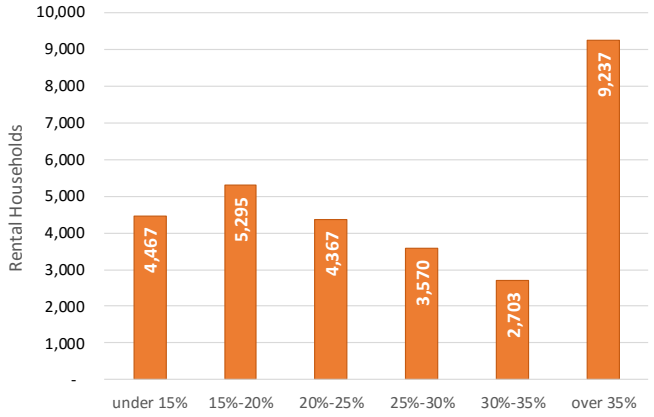
Rental Households by Income



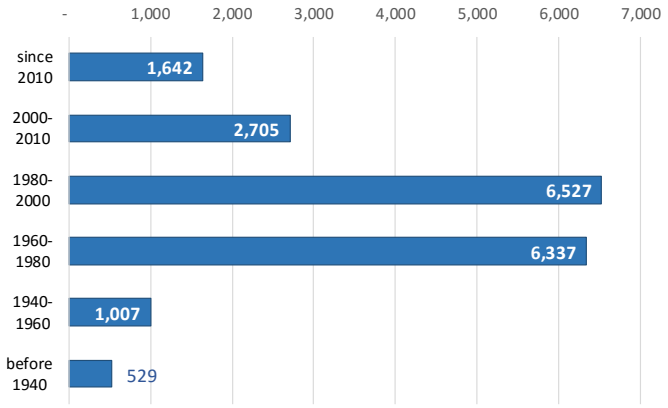
Housing Stock by Tenure & Type



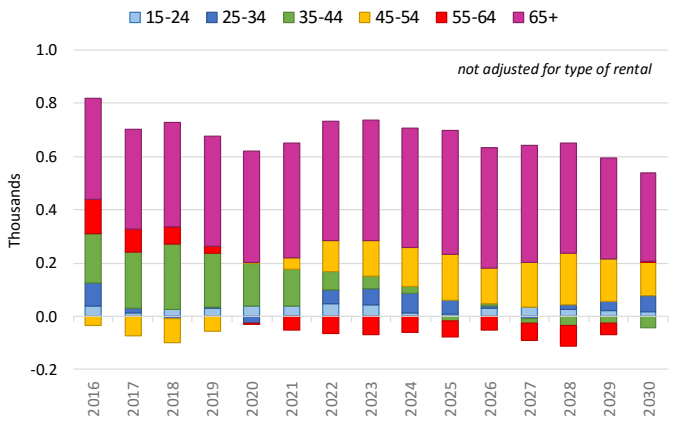
Rent as a Percent of Household Income



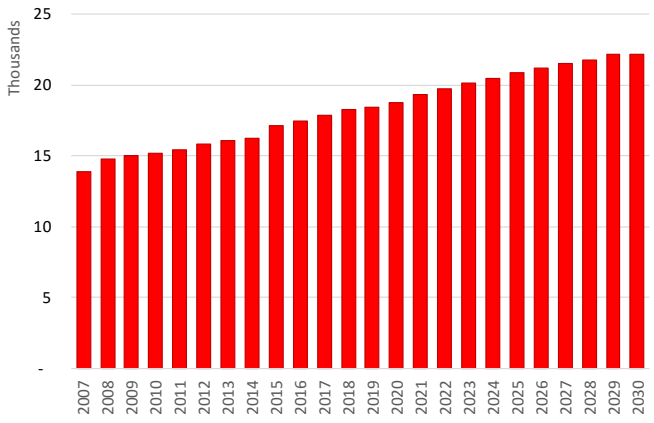
5+ Unit Rental Stock by Year Built



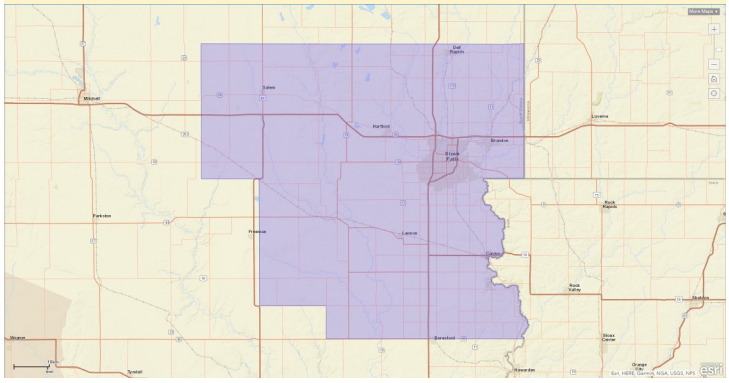
New Rental Households by Age Cohort



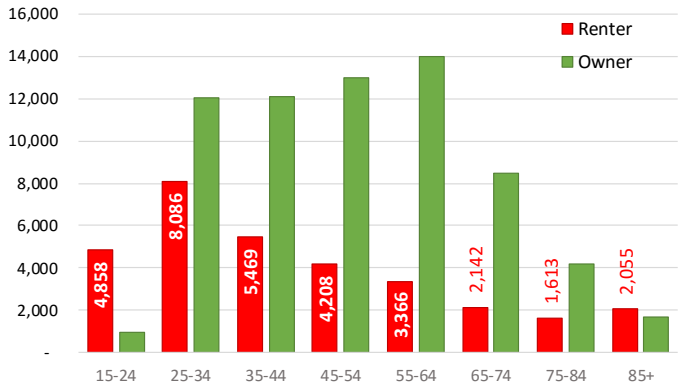
5+ Unit Apartment Demand Forecast



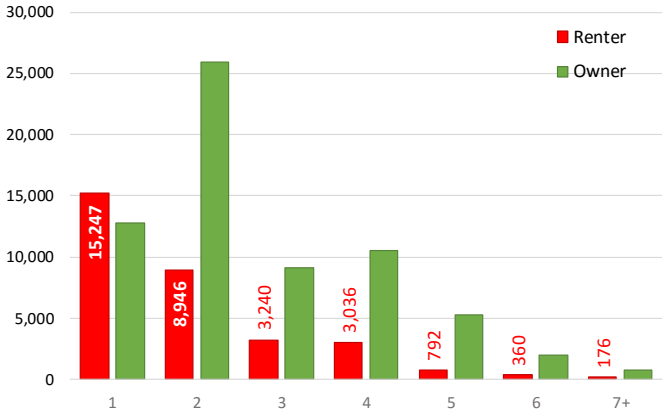
SIOUX FALLS page 2



Households by Age Cohort



Households by Occupants



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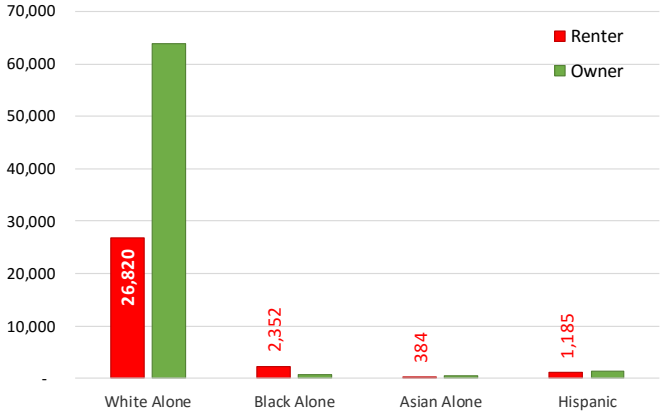

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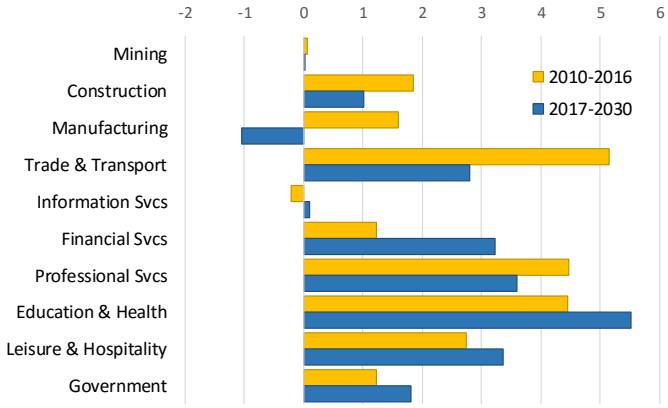

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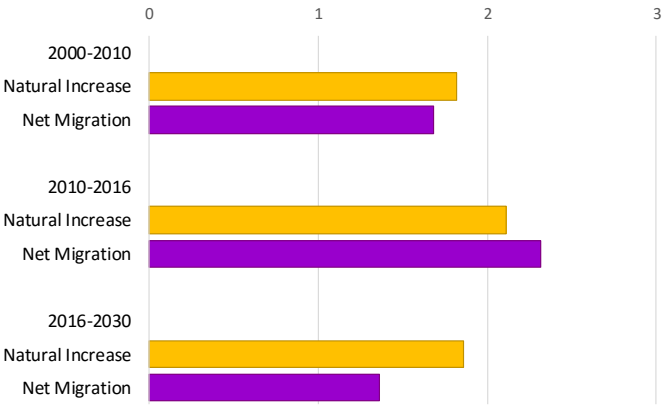

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NMHC NATIONAL MULTIFAMILY HOUSING COUNCIL · NAA NATIONAL APARTMENT ASSOCIATION · HAS · University of San Diego SCHOOL OF BUSINESS · WREA · dfm Version 1

METRO MULTIFAMILY DEMAND OVERVIEW

ST. LOUIS

Net out migrations have countered natural population growth. Slight in migrations expected as overall growth slows. New rental households will source from 35-44 year olds and seniors over 65. Economic prospects are improving and good. Rental stock is older, yet with few supply restrictions. Multifamily demand will be flat for three years, then improve though 2029.

Definitions on back

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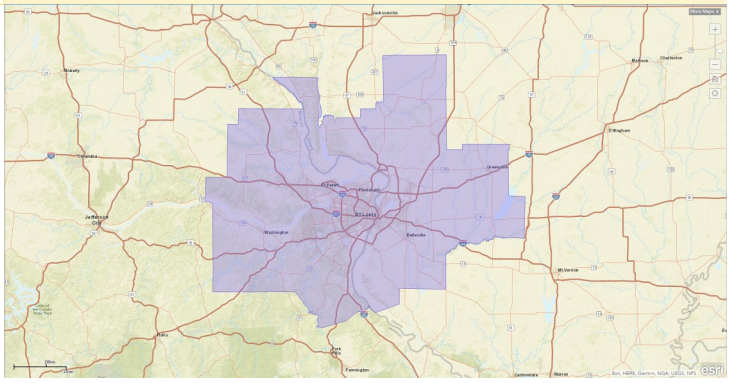
45	252	-4.7	39%



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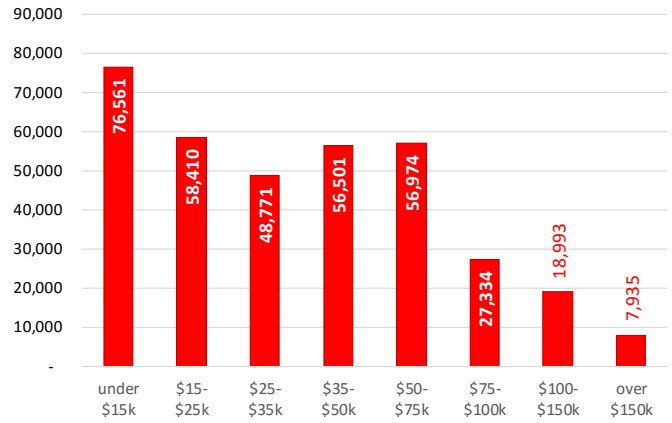

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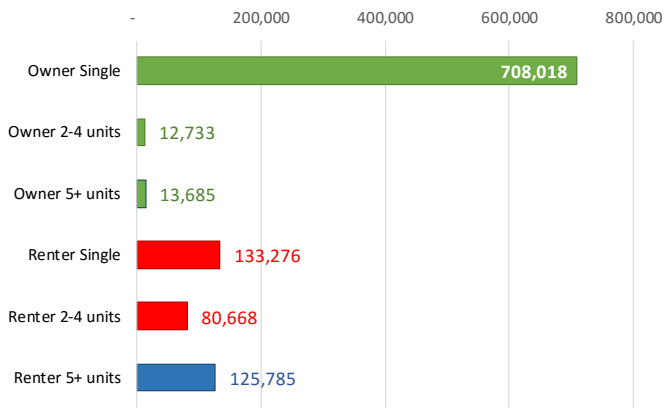
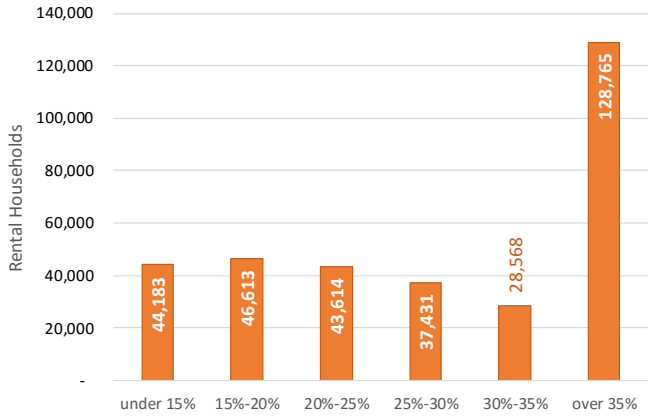
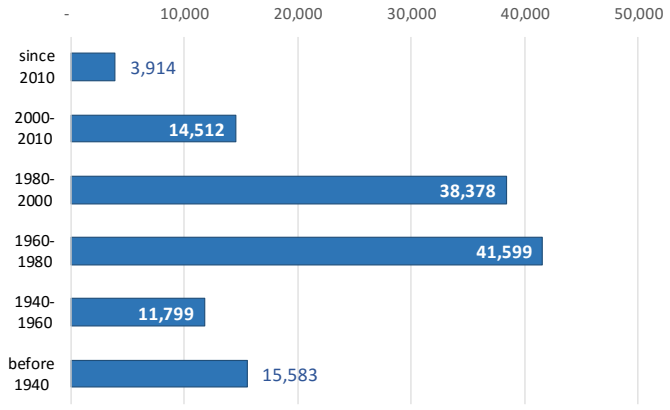


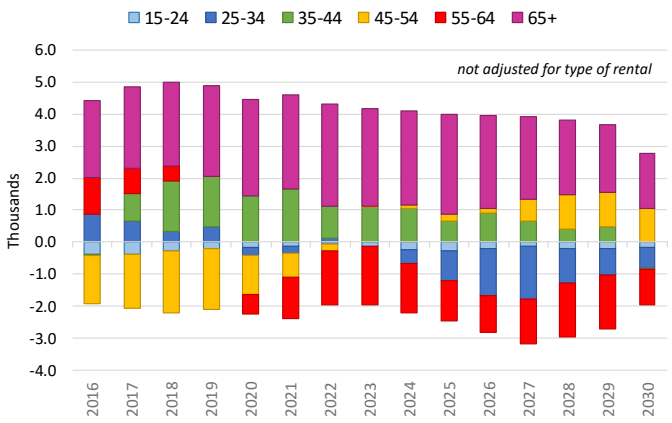
Rent as a Percent of Household Income



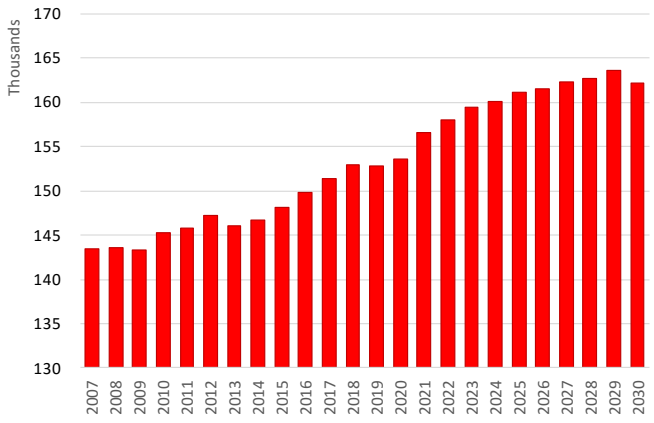
5+ Unit Rental Stock by Year Built



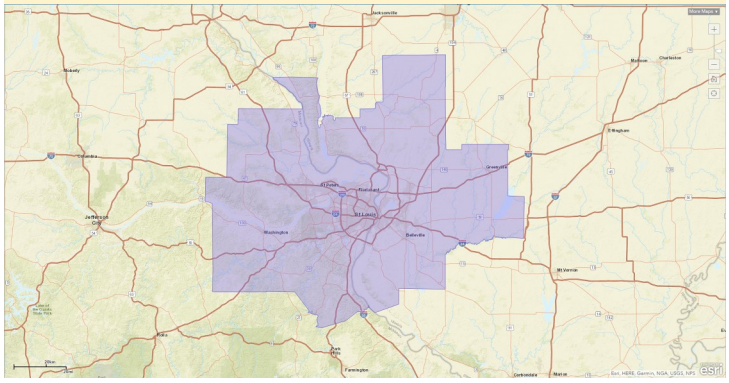
New Rental Households by Age Cohort



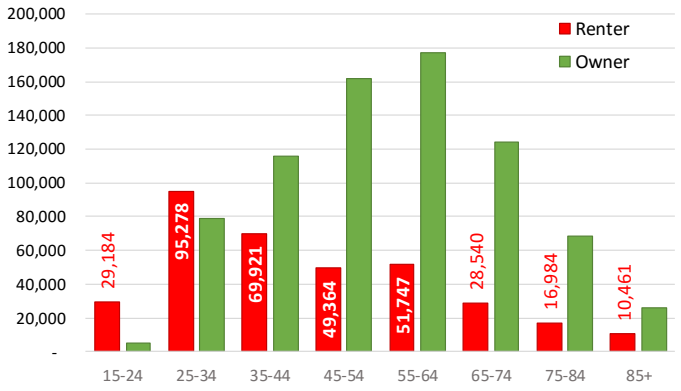
5+ Unit Apartment Demand Forecast



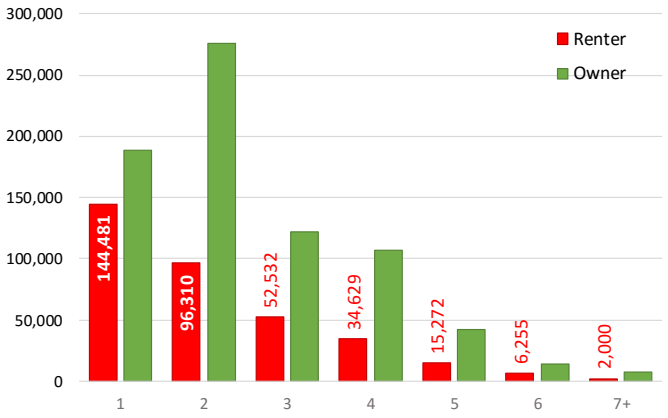
ST. LOUIS page 2



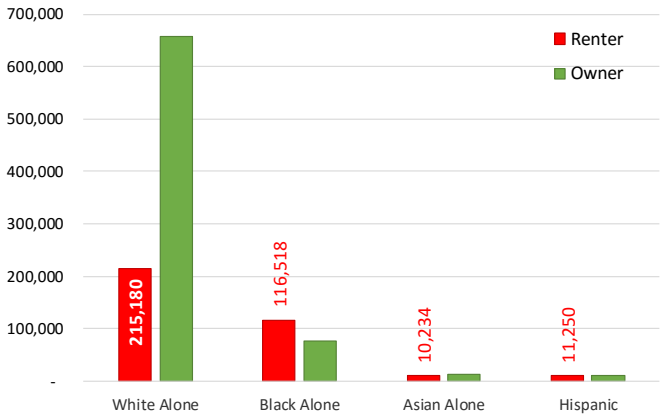
Households by Age Cohort



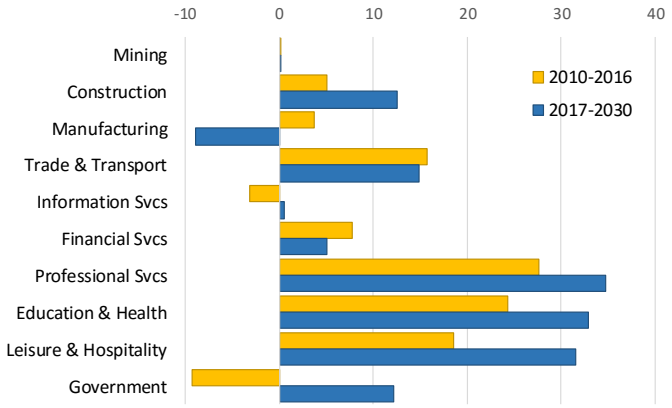
Households by Occupants



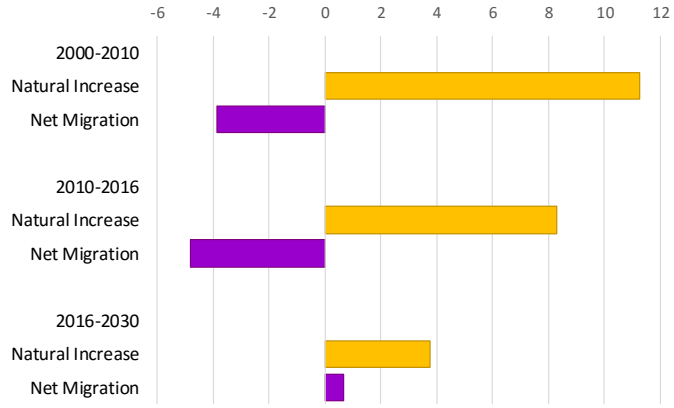
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



RANKING and DEFINITIONS:

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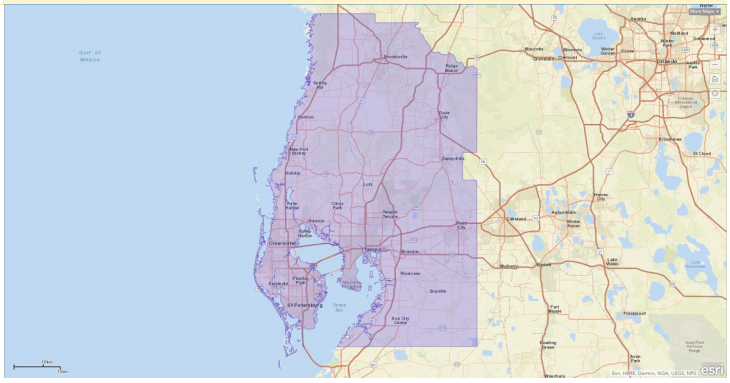
METRO MULTIFAMILY DEMAND OVERVIEW

TAMPA

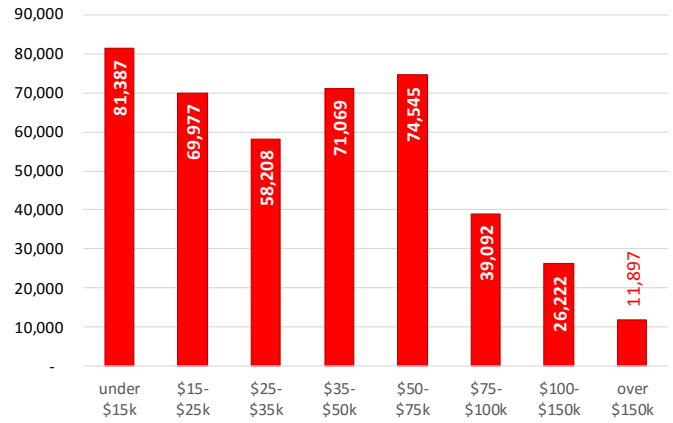
Slight natural population growth will go negative, relying on the surge in net in migrations to fuel new rental households. Renters today enjoy strong incomes, a range of ages and household sizes. Economic prospects are great, with growth in most sectors. Rental stock is old, yet less than a third in STAR units. Demand ahead is strong and steadily increasing.



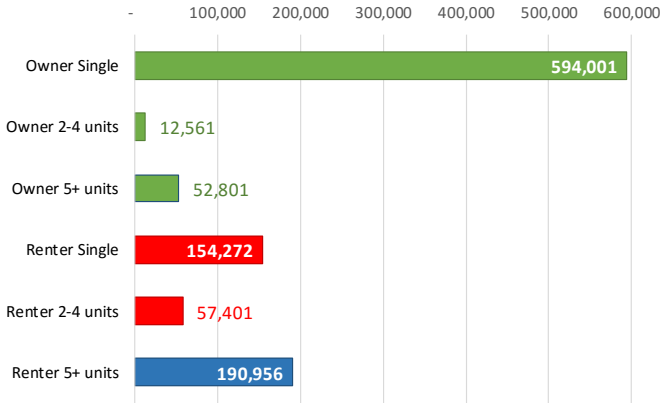
Definitions on back

DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
12	174	0.0	32%

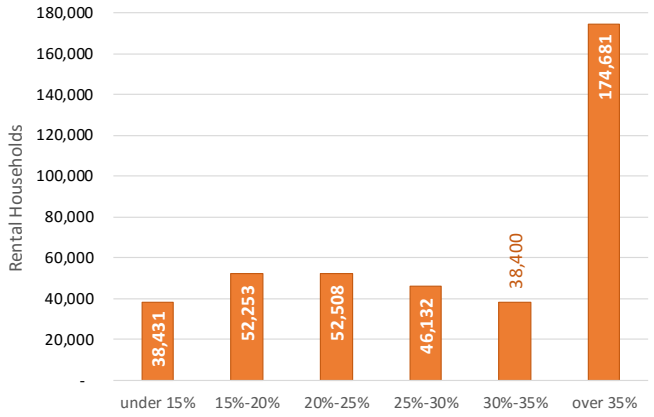
Rental Households by Income



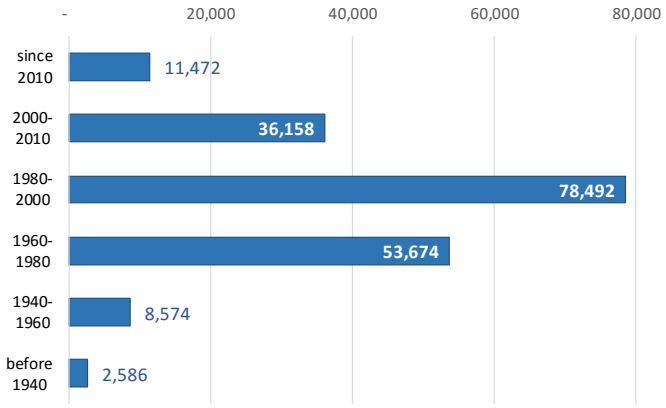
Housing Stock by Tenure & Type



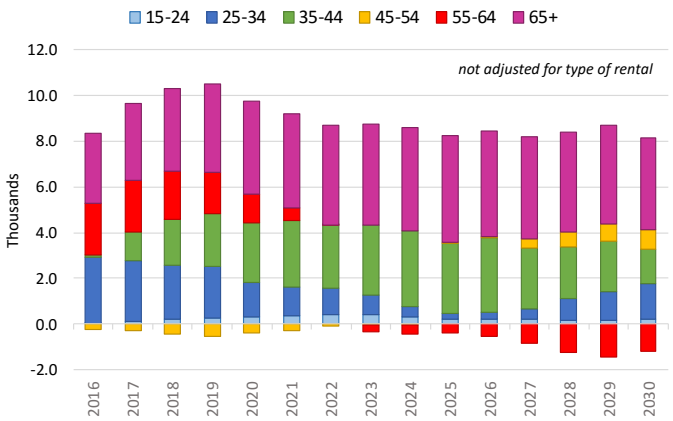
Rent as a Percent of Household Income



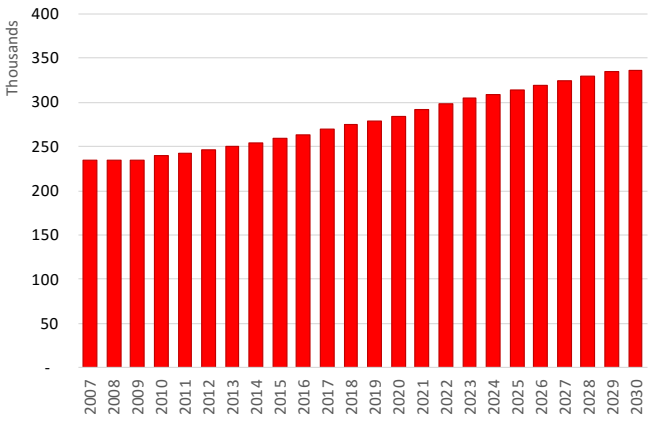
5+ Unit Rental Stock by Year Built



New Rental Households by Age Cohort



5+ Unit Apartment Demand Forecast



NATIONAL MULTIFAMILY HOUSING COUNCIL

NATIONAL APARTMENT ASSOCIATION

HAS

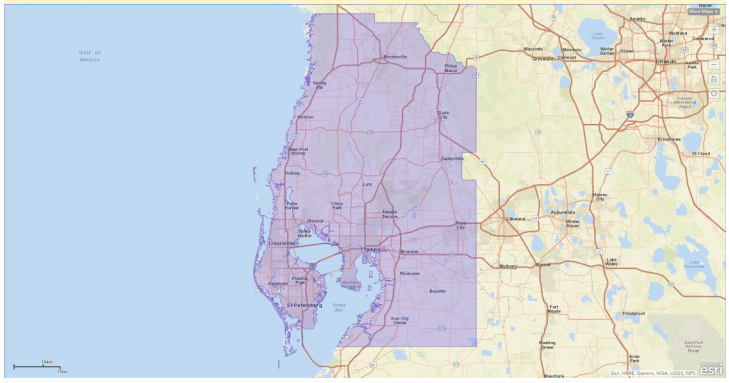
University of San Diego SCHOOL OF BUSINESS

WREA

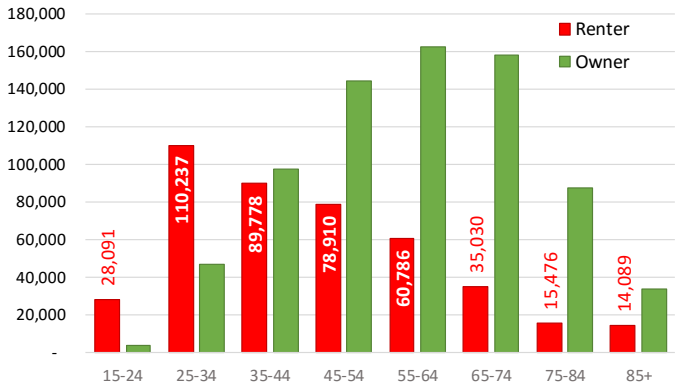
dfm

Version 1

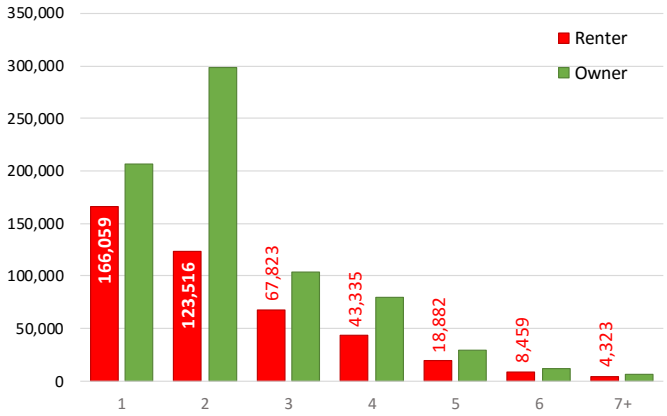
TAMPA page 2



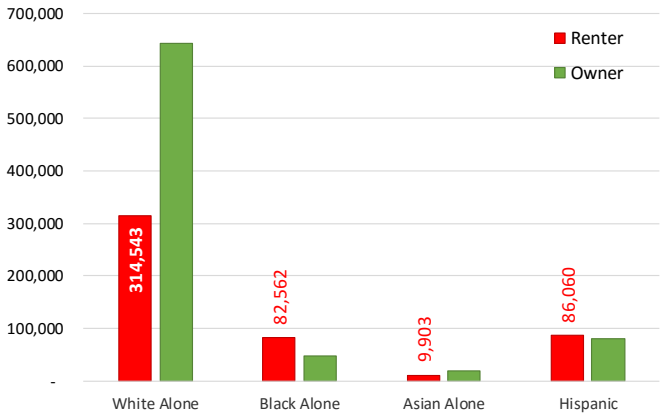
Households by Age Cohort



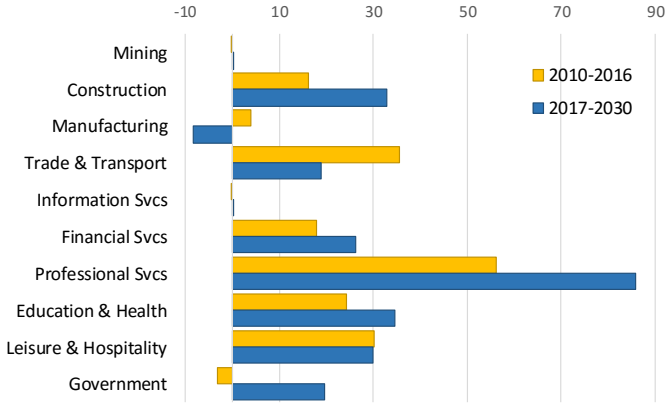
Households by Occupants



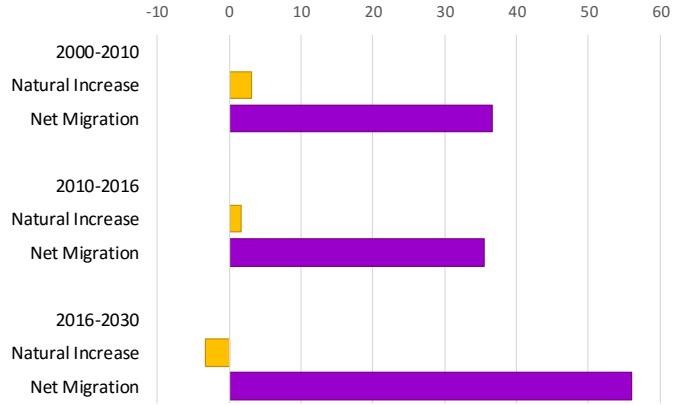
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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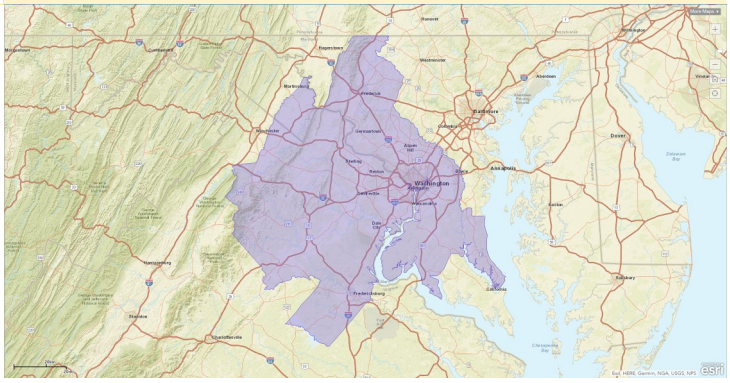
METRO MULTIFAMILY DEMAND OVERVIEW

WASHINGTON, DC

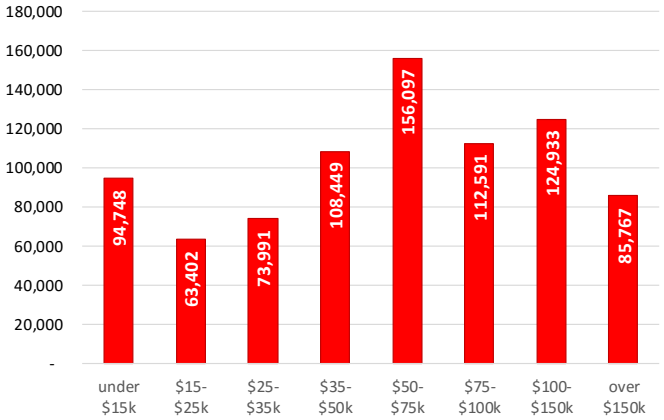
Consistent natural population growth is augmented by fewer net in migrations for new renter households. Renters have strong incomes and smaller households across a range of ages. Economic outlook is strong, led by professional services. Rental stock age is typically older, yet the small share of STAR units mimics younger metros. Demand is strong and rising.

Definitions on back

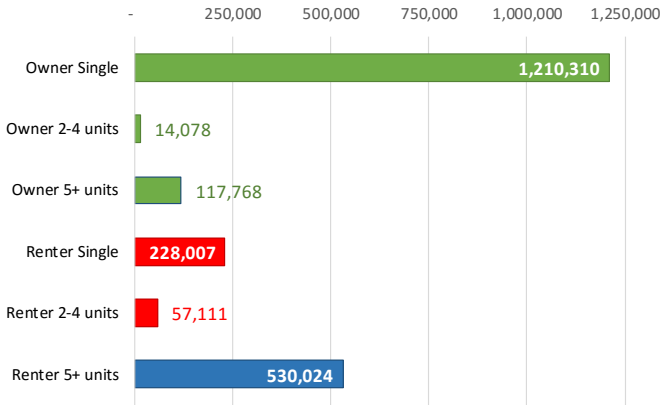
DEMAND RANKING	AFFORD-ABILITY	MF SUPPLY RESTRICTIONS	STAR* SHARE
13	159	2.7	19%



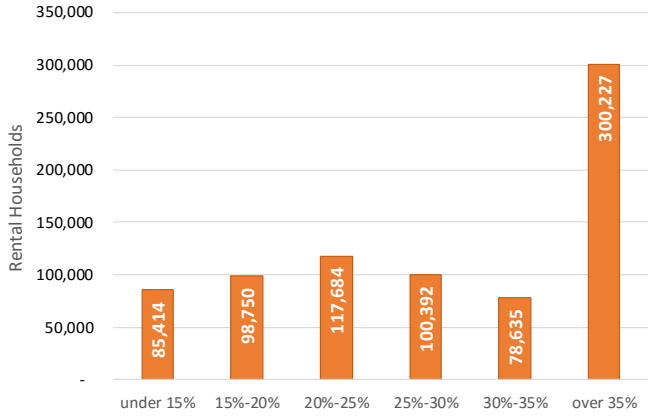
Rental Households by Income



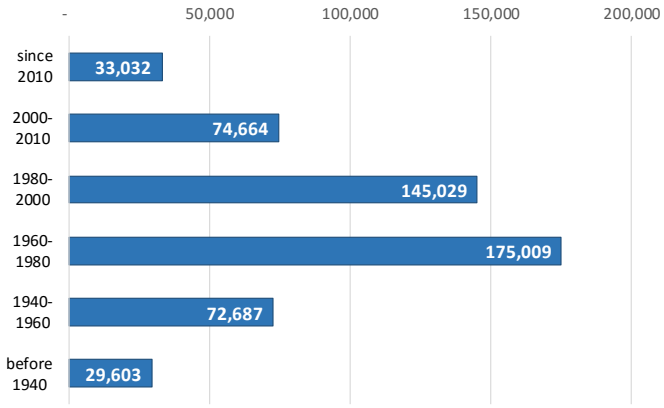
Housing Stock by Tenure & Type



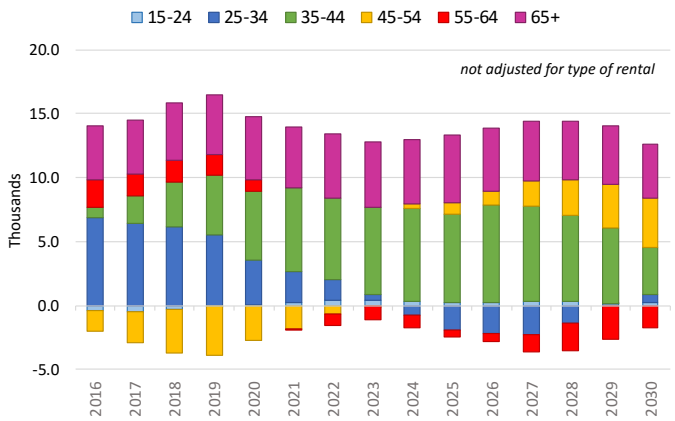
Rent as a Percent of Household Income



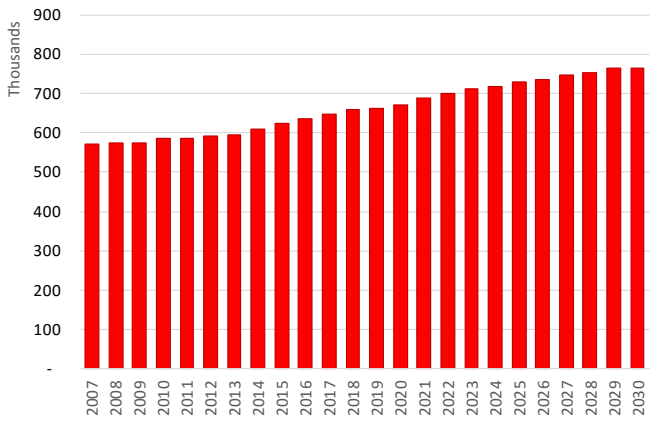
5+ Unit Rental Stock by Year Built



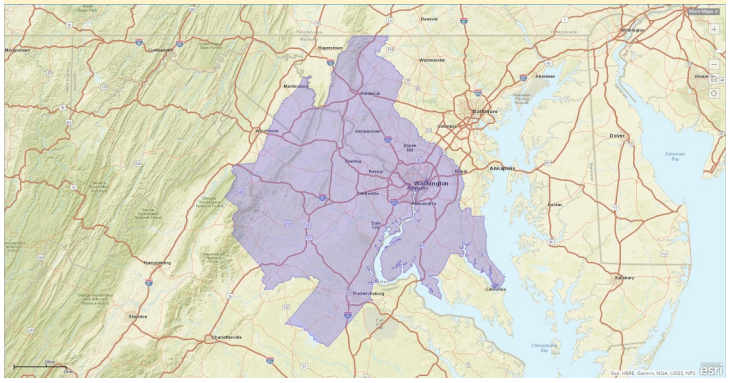
New Rental Households by Age Cohort



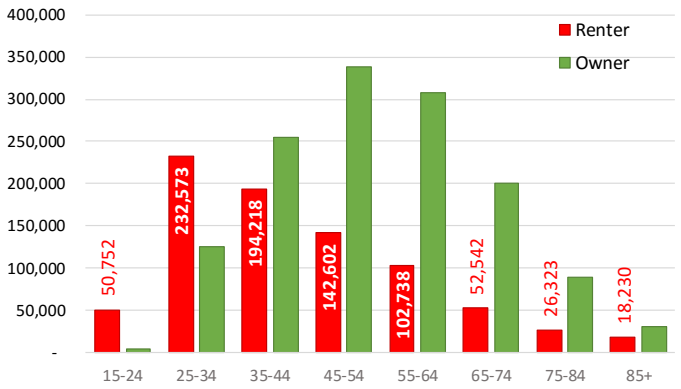
5+ Unit Apartment Demand Forecast



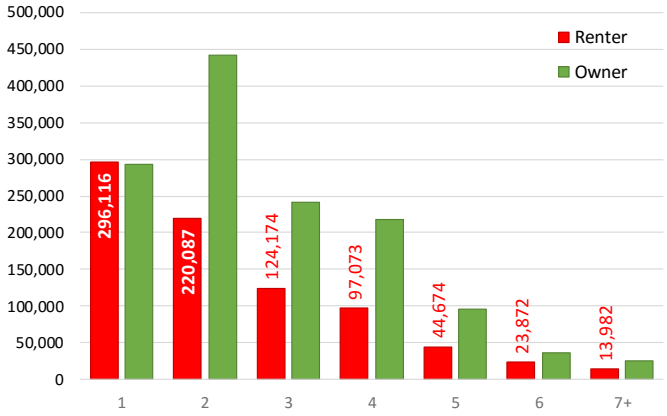
WASHINGTON, DC page 2



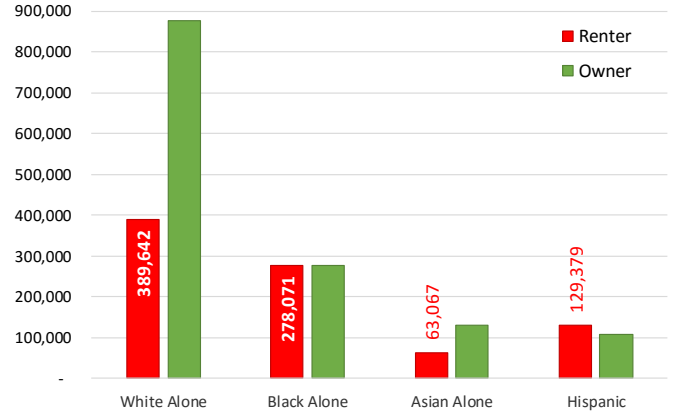
Households by Age Cohort



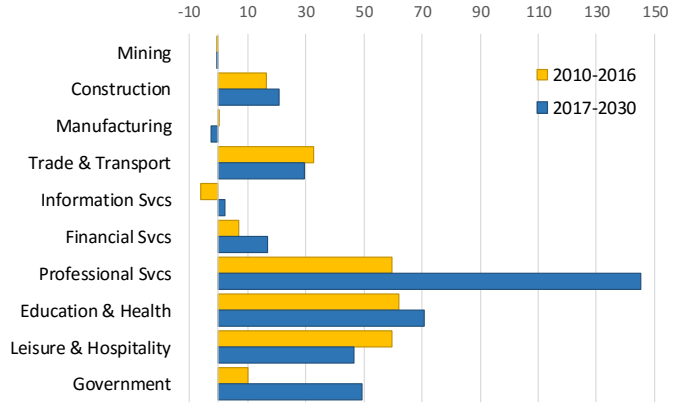
Households by Occupants



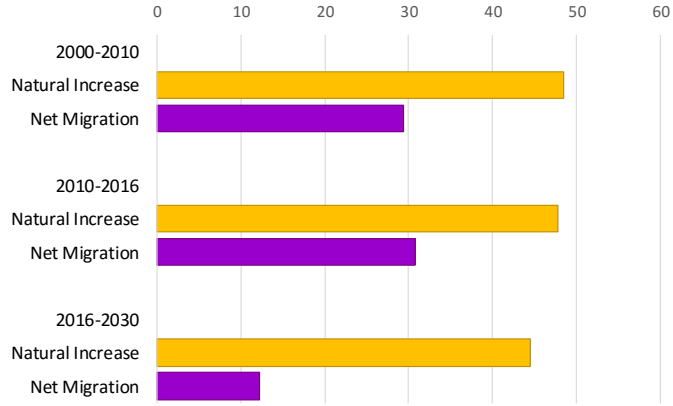
Households by Ethnicity and Origin



Employment Growth by Sector ('000s)



Avg Annual Population Change (000's)



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Appendix 5: Methodology

Metro Market Demand Methodology

The metro market demand models begin with the forecast number of households from Moody's Economy.com base-case forecast. Because the national model was based on an HAS derived household forecast, the metro market household forecasts are adjusted by the difference in the HAS and Moody's Economy.com forecast each year. The HAS national forecast is similar to the Moody's forecast through 2018 then grows slightly slower, representing the impact of expected slower household formations during recessions which are modeled to occur towards the end of each decade through 2030. The resulting HAS national household forecast is 2.8% lower than the Moody's national forecast by 2030. Thus, metro markets are adjusted for the difference between the two national forecasts each year (e.g. -2.8% for 2030).

Like the national model, the metro area model defines the renter households by adjusting the number of households by one minus the home ownership rate for each year and subtracts out the homeless rate. The metro market home ownership rate is specified by the equivalent metropolitan area home ownership rate as provided by the U.S. Census Bureau. The model uses the statewide homeless rate as similar data was not available at the metropolitan area level. While homeless rates surely vary by metropolitan area, this homeless adjustment is quite small, with a median rate of 0.12% of population. Actual data were collected for 2009 and 2011 to 2015. The forecast did not assume a change in the homeless rate from the 2015 figure.

The U.S. Census Bureau provides a quarterly estimate of home ownership rates for select metropolitan areas. The survey's methodology can result in wide swings in estimates of home ownership rates from quarter to quarter. Thus, an annual average of quarterly home ownership rates was used to observe the historic trend in home ownership for each metro area. Forecast metro market home ownership rates were estimated based on demographic trends.

To estimate historical renter households, the rentership rate for each age cohort for each metro market was multiplied by the households for that age cohort. Renter households were derived by dividing the population growth by age cohort by the headship rate by age cohort. For forecast renter households, for each age cohort, the incremental annual population growth was divided by an estimate of population per household (headship rate) for that age cohort to get incremental households for that year. Households were then split into international in-migration households and domestic growth households by multiplying the incremental household by the average percent of growth from 2010 to 2015 created by international in-migration. International rental households were then estimated by multiplying the rentership rate for international in-migrants for that age cohort. Similarly, new domestic rental households were estimated by multiplying the rentership rate for each age cohort by the new domestic households for that age cohort. Total renter households for each year equal the previous year total renter households plus the incremental total international in-migrating renter households by age cohort plus the incremental total domestic households by age cohort for that year.

The forecast home ownership rate for each year is estimated by dividing the rental households by the total households for that year. Home ownership rates from the metro model were slightly higher when aggregated than trends suggested by the national model. Thus, annual home ownership rates were adjusted downwards by 0.09% per year so that the metro area home ownership rate trends in aggregate were more like the national trend. Actual home ownership rates were used from 2005 to 2016. The 2017 home ownership rate was estimated by multiplying the 2016 actual rate by the modeled change from 2016 to 2017, and so on.

Forecast rental households were then adjusted for three factors to forecast demand for the institutional rental market, or those properties with 5 or more units. First, an estimate of the amount of total rental stock attributed to properties with 5 or more units (5+) was estimated by reviewing several sources of data, including the U.S. Census, CoStar® and CBRE® Econometrics. This factor ranged from 33% to 65% with a median of 46%. Second, some markets have significantly older multifamily stock than other markets, indicating that those markets will need more new stock to offset obsolete aging

stock. However, it is difficult to tell how much of the stock has already been updated in each market. Thus, we made only a slight adjustment upward for markets with older stock. The amount of stock built after 1980 was calculated for each market and ranged from 21% to 81% with a median of 56%. An aging factor was developed by dividing the U.S. average percent of the market built after 1980 (49%) by the metro area average built after 1980. The national model assumed 0.5% of stock would need to be replaced each year due to obsolescence. For each metro market, this 0.5% was multiplied by the aging factor; i.e. markets with stock that is older than the U.S. are assumed to need slightly more stock per year to replace obsolete buildings. The model also assumes that enough demand will be needed in each market to keep vacancy at a similar rate as the long-term average for that market. As the total market inventory increases in size, the current vacant units will become a smaller amount of the total and thus vacancy would decline, excluding the impact of actual new supply. Thus, demand was also adjusted for a long-term vacancy factor. Because of unusual fluctuations occurring in the housing market from 2000-2016 due to the Great Financial Crisis, the average vacancy from 1990-1999 was used as the long-term vacancy factor. This figure was more representative of long-term trends for most markets. The model assumes that enough units will need to be produced each year to maintain vacancy rates at a similar level and thus the demand for each year is increased by this vacancy factor.

Actual occupied units were used for 2007 to 2016 based on HAS estimates derived from multiple sources. The forecast applied the 2016-2017 growth rate from the modeled figures from 2017 to 2016 to the 2016 actual estimate to get the 2017 estimate and so on.

State Demand Methodology

The methodology to forecast multifamily demand for the states followed a similar methodology as the metropolitan areas. Demand for the states was further adjusted so that the state forecasts add up to the national forecast both historically and on a forecast basis. This was done by prorating the proportion of demand for each state as compared to the total forecast for all the states to the U.S. forecast demand.

Metro Market Overviews Methodology

5+ Unit Apartment Demand Forecast is developed by the Hoyt Advisory Services (HAS) team and represents the number of rental apartment units in buildings with five or more units (defined as multifamily units throughout) and those multifamily units that will be needed to meet demand going forward.

Historical figures for the years 2007 to 2016 are based on estimates of existing multifamily 5+ total inventory as developed by the HAS team from several sources including the U.S. Census, CoStar® and CBRE® Econometrics®.

Forecasts are based on demographic, economic and capital market trends and consider aging and domestic and international immigration trends specific to that metropolitan area as well as housing affordability and ownership trends, among other factors. Actual units could be lower than this level in areas with geographic and political restrictions. In this case, upward pressure could develop on rental rates. Actual units could also be larger than forecast demand in markets where construction exceeds demand.

5+ Unit Rental Stock by Year Built tracks the number of units in buildings with five or more units by year built. Note that this graph is specific to only the 5+ unit sector of the rental market and thus will have lower numbers than other graphs such as the adjacent “Rent as a Percent of Household Income” graph which includes all sizes of rental units. The 5+ Unit share of the total rental stock can be seen in the graph above it titled “Housing Stock by Tenure and Type”.

Affordability is the Housing Affordability Index as reported by Moody’s Economy.com for the fourth quarter of 2016. It provides a general indication of affordability of single-family owned housing in a metropolitan area. Higher ratios indicate that housing is more affordable and vice-versa. The index is the ratio of median family income to the minimum income to qualify for purchase of a single-family home at the median existing home resale price under standard mortgage underwriting as of the time of the index, then multiplied by 100 to convert to a 100-point index (e.g., an index of 100 indicates that the median family income equals the qualifying

income). Of the metropolitan areas in this report, this index ranges from 69.4 (San Jose) to 290.7 (Cleveland) with an average of 178.0.

Demand Ranking is the relative rank among the 50 multifamily metro markets in this study of the HAS forecasted multifamily housing demand for rental stock with 5 or more units based two growth factors: 1) the average percentage growth in demand from 2017 to 2030 and 2) the absolute growth in demand from 2017 to 2030. The rankings range from 1 (Dallas-Ft. Worth) to 50 (Cleveland). Note that percentage growth rankings tend to favor smaller metropolitan markets while absolute growth rankings tend to favor larger metropolitan markets. Thus, the index ranks based on a blend of both percentage growth and absolute number of new renters. See the tables in Appendix 5 for separate rankings by percentage growth and total growth.

Employment Growth by Sector graphs are based on employment projections for metropolitan statistical areas as provided by Moody's Analytics® for major North American Industry Classification codes (NAICS). For example, the category "Information" includes a broad array of services including newspapers, software publishers, motion pictures, radio, TV, data processing, internet publishing and similar services. A description of NAICS codes can be found here: https://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2012. The term "Education" as mentioned in the text boxes of the metropolitan overviews in this report refers to the Education & Health Services NAICS category and could be more health oriented than education oriented depending on the metro area.

MF Supply Restrictions (Multifamily Supply Restrictions Index) is an HAS composite of methodology using the Wharton Residential Land Use Restrictions Index and the Lacroix developable land index. This index represents the difficulty of creating new supply which may vary from the amount of new supply delivered as high growth metro markets may also experience higher supply growth despite the difficulty of approving new projects. The result of higher supply restrictions may be longer approval and development time-lines adding to the development risks and higher construction costs which lead to less affordable rental markets. Of the markets in this study, this index ranges from 19.5 Honolulu to -6.0 (New Orleans) with an average of 2.0. Higher indices represent markets with more stringent regulatory environments in regards to new housing supply.

The Wharton Residential Land Use Restrictions Index is based on data and a nationwide survey of local land use regulations including process and approvals, rules, and outcomes. The index includes eleven sub-indices measuring the stringency of the local regulatory environment, including local political pressure, local project approval, local assembly, supply restrictions, density restrictions, open space, exactions, and approval delay. The Lacroix index was developed by Sumner La Croix, Ph.D. at the Economic Research Organization at the University of Hawaii and measures the developable area within a 50-kilometer radii from a central city. Factors such as oceans, wetlands, lakes, rivers and other bodies of water as well as areas with a slope above 15% are defined as undevelopable. The Multifamily Supply Restrictions Index is the sum of each sub index for the metro market divided by the average for that sub index for all the metro markets in this study.

STAR Share is that share of metro rental housing stock with five or more units HAS qualified as Second-Tier Affordable Rentals or those non-institutional sites of typically lower unit count, lower quality and greater age, a critical and ongoing multifamily supply component. Using CoStar® ratings of 1 to 5 for sites of five units or more, STAR units are those with lower CoStar® ratings of 1 to 2. Costar® ratings are based on several criteria including building structure and systems, amenities, site and landscaping, and certifications such as LEED and Green Globes. Properties rated 2 have functional architectural design and systems, below average finishes and one to no additional amenities. They have minimal to no landscaping and exterior spaces, and are unlikely to hold green or energy efficient certifications. Properties rated 1 may require significant renovation and are possibly functionally obsolete. STAR facilities are likely to serve lower income populations which are a significant part of the population base in some metro areas, and may represent, in some areas, potential investment targets for upgrading to higher quality properties. The STAR share ranges from 61% (Los Angeles) to 17% (Austin) with a metro market average of 36% for markets included in this study.

Sources

Demographic data was drawn from several U.S. Census Bureau surveys, including the 2015 American Community Survey (ACS) which was the most recent ACS survey at the time of this report. Economic and demographic trend and forecast data was drawn from Moody's Analytics® supplemented by other sources including U.S. Census Bureau, Federal Reserve and other forecast surveys such as the Wall Street Journal Economic Forecasting Survey and the Federal Reserve Bank of Philadelphia Survey of Professional Forecasters. Property market data was derived from several sources including the U.S. Census Bureau, CoStar® Realty Information, CBRE® Econometrics and ESRI®.

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This report was prepared for the National Multifamily Housing Council and the National Apartment Association by Hoyt Advisory Services, Dinn Focused Marketing, Inc. and Whitegate Real Estate Advisors, LLC.

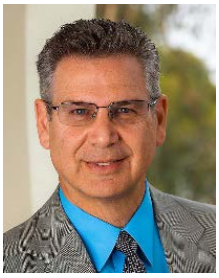
Hoyt Advisory Services (HAS) is subsidiary of the Homer Hoyt Institute (HHI), an independent, non-profit research and educational foundation established in 1967 to improve the quality of public and private real estate decisions by expanding and disseminating the real estate body of knowledge, stimulating innovation in the discipline of real estate and land economics, building bridges among academia, industry, and government, and developing innovative approaches to the solution of real estate problems.

Research supported by HHI must meet the highest standards of scholarship, and it must further the improvement of decision making in the real estate industry. That is, it must combine rigor with relevance. HAS is able to engage PhDs from leading universities along with practitioners with proven, appropriate real estate expertise for the project, in this case partnering with Dinn Focused Marketing, Inc. and Whitegate Real Estate Advisors.

Dinn Focused Marketing, Inc. provides clients a detailed and directional picture of the underlying market place trends now and going forward for any national housing or mix-use real estate development challenge. Clientele are a select cadre of land developers, homebuilders, lending institutions, portfolio managers, municipal leadership and national housing organizations.

Whitegate Real Estate Advisors, LLC provides real estate consulting services in the areas of investment analysis, portfolio structuring, capital formation strategies, market analysis, econometric modeling and forecasting, reporting and asset management.

Authors for this paper each have more than 25 years of experience in the real estate industry, and are frequent speakers and publishers in both academic and practitioner journals and meetings:



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Michael Dinn leads Dinn Focused Marketing, Inc. (DFM) Throughout his career, Michael has taken a market-centric stance in land acquisition, land brokerage, residential development, residential design and marketing campaigns. For over 16 years leading DFM, he has combined these experiences into a skill set that provides clients a detailed and directional picture of the underlying market place trends now and going forward for any national housing or mix-use real estate development challenge. His Clientele are a select cadre of land developers, homebuilders, lending institutions, portfolio managers, municipal leadership and national housing organizations, each with a unique market position, access or capacity to affect their residential market. The mix is public and private, lender and sponsor, landowner and sales management. His work provides scaled assessments of metro housing markets amid great change, targeting a mix of housing assets from failing master planned communities to select multifamily apartment portfolios.

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Reasonable efforts have been made to ensure that the data contained in this study reflect accurate and reliable information and are based on information that to our knowledge was current as of the date of this report. This study is based on estimates, assumptions, and other information developed from independent research efforts, models and general industry knowledge. No responsibility is assumed for inaccuracies in reporting by any data source used in preparing or presenting this study. This report represents a view of reasonable expectations as of the time the report was written, but such information, estimates, or opinions are not offered as predictions or assurances that particular results or events will occur. Actual results may vary from those described in this report, and the variations may be material. Therefore, no warranty or representation is made that any of the data, projected forecasts or results contained in this study will be achieved.