

Households and Housing Demand: The Coming Millennial Wave

BY ADAM OZIMEK

The decision to form a new household is one of the most economically important decisions a person makes. This decision—which often coincides with other important life choices such as a new career, marriage, and the pursuit of higher education—ripples through the economy in a variety of ways. A new household means more demand for housing and for consumer durables. It also means a new economic unit that is reflected in and affects important measures of the economy, such as median household income. Yet despite its importance, household formation is poorly measured. There are a variety of data sources. But none is perfect, and each tells a different story about household formation.

This article describes the Moody's Analytics new estimate of U.S. household formation, which combines multiple data sources to accurately capture both long-run and short-run trends. In addition, a new household forecast is described that has been developed using these data. The forecast calls for household formation to improve in the near term because of demographic changes and a stronger labor market.

The millennial boom

Household formation will be one of the most important economic indicators over the next few years. After a sharp fall during the Great Recession, it remains an open question as to how much the household formation rate will recover. This uncertainty hinges in large part on the behavior of the millennial generation, which saw the largest dropoff in householder rates as the economy faltered.

Millennials is the name demographers have given to the generation born between 1980 and 1997.¹ This generation is larger

than the preceding Generation X, which includes those born between 1965 and 1979. Each single year age group of the millennials amounts to around 4.4 million people, compared with about 4.1 million per year for Generation X. The larger size of the millennials is due to an increase in birth rates and immigration during the 1980s and 1990s, as well as the size of their parents' generation, the baby boomers (see Chart 1).

The large size of the millennial generation matters because they are increasingly aging into prime household formation years. In 2015, the 25-year-old cohort—accounting for 4.7 million people—was the largest of the millennial generation. At age 25, the householder rate—loosely equal to the ratio of households to population—is around one-third. By age 33, it is close to one-half. As millennials begin to move into their prime

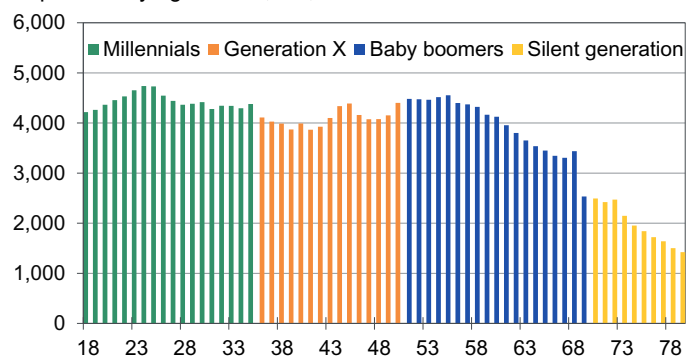
household formation years, they will have an outside impact on total household formation.

Three key terms

This article is organized around three key terms: Households, household formation, and the householder rate. First, a household is defined as a group of people living in a single housing unit together. A housing unit is any house, apartment, mobile home, or even group of rooms that is intended for use as a separate living quarters. This means that the occupants of the housing unit—the

Chart 1: The Millennial Boom

Population by age cohort, ths, 2015



Sources: Census Bureau, Moody's Analytics

¹ Defining a generation is more art than science, and as such there is no universally accepted definition of when the millennial generation starts and when it ends.

household—live separately from any others who reside in the building.² Households can be families, or they can be unrelated people living together as roommates.

Second, household formation is defined simply as the change in the number of households from year to year. Annual household formation is a function of two factors: population growth and the householder rate.

The final term, the householder rate, is equal to the ratio of households to population. It is the inverse of the average number of people per household. As average household size shrinks, the number of households in a given population will rise, and vice versa. Household formation can be broken down further into the householder rate by age group and the population growth by age.

Defining householder rates by age group requires answering the somewhat complicated question of: Who is the householder? For example, the U.S. Census Bureau defines a householder as “the person in whose name the housing unit is rented or owned.”³ This is also sometimes called the household head. The householder rate for each age group is then the number of householders of that age divided by the population of that age group.

The challenge is that other adults in the household can contribute significantly to the household formation decision. For example, if two roommates live together, each may pay half the rent despite the unit being rented in one person’s name. To control for this, a better householder rate measure from Paciorek considers every adult in the household a co-head, unless they are related to the census-designated household head.⁴ Every nonrelated adult in the household is assigned an individual householder rate that is equal to 1 divided by the number of co-heads in the household.

Using the Paciorek approach, a husband and wife are both household heads and con-

tribute one-half to the householder rate; and three unrelated roommates would each be considered household heads and contribute one-third to the householder rate. This approach does not alter the total population householder rate, but it more accurately measures the age-specific householder rates. The last step is estimating the aggregate householder rate for each age group by averaging the individual householder rates for every person in that age group across the entire population.

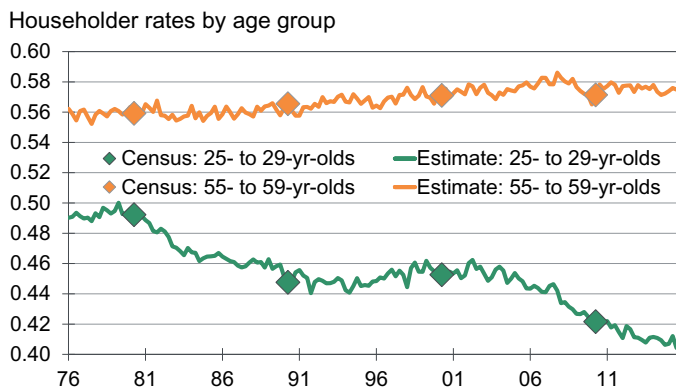
New estimate of household formation

Household formation is an important measure of economic activity. It is a fundamental driver of the demand for housing, among other things. However, tracking household formation is complicated because there is no single best source of data, but rather multiple sources that often disagree significantly. For example, in 2013 household formation was 322,000 according to the American Community Survey and 1.4 million as measured by the Current Population Survey March Supplement. Averaging across multiple years to smooth out volatility does not solve the problem as average annual household formation from 2012 to 2014 was 756,000 according to the ACS, but 1.1 million according to the CPS for the same years.

The most authoritative source for household formation is the decennial census, which is based on a full count of the population. However, the information lacks timeliness since it is only available every 10 years. This drastically limits its usefulness for understanding many trends such as how the business cycle affects household formation.

An ideal measure of household formation would track the decennial census in the long run, be more timely in the short run, and be based on large enough samples to measure age-specific householder rates. To satisfy

Chart 2: Benchmarking Rates to the Census



Sources: Census Bureau, BLS, Moody’s Analytics

these goals, Moody’s Analytics has created a new historical estimate of household formation that combines data from the decennial census, the CPS basic monthly files, and annual census population estimates.

The new historical household formation rates start with five-year age-specific householder rates estimated using microdata on 51 million individuals from the 1980, 1990, 2000 and 2010 censuses. This methodology allows one to understand, for example, the householder rates for 25- to 29-year-olds in each census year.

Next, quarterly estimates of householder rates for the intercensal years between the 10-year censuses are estimated using age-group-specific householder rates from microdata on 49 million individuals from the CPS basic monthly files (see Chart 2).⁵ The large sample sizes in both the decennial census and the CPS allow for the estimation of age-specific householder rates. The use of changes in CPS householder rates is supported by the close correlation between decadal changes in CPS and changes in the decennial census. In short, the decennial census serves as a benchmark for householder rates, with the CPS filling in quarterly changes. Finally, these age-group-specific householder rates are multiplied by annual age-group-specific population estimates from the Census Bureau—quarterized by Moody’s Analytics—to produce the number of households for each age group. The age groups are then summed

2 <https://www.census.gov/popest/about/terms/housing.html>

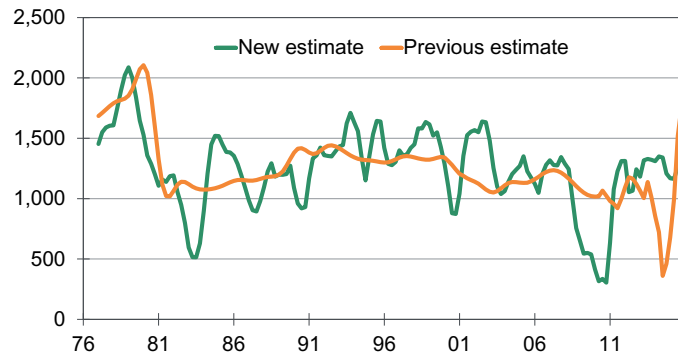
3 <http://www.census.gov/hhes/families/about/>

4 Paciorek, Andrew. “The long and the short of household formation.” *Real Estate Economics* 44.1 (2016): 7-40. For an example of how and why a related adult is not considered a household head, consider a household where the father is the designated head and two adult sons are roommates. In this case, the father is the full household head (householder rate = 1) and the children are not household heads (householder rate = 0).

5 Both decennial census and CPS microdata are from IPUMS extracts from the University of Minnesota Population Center.

Chart 3: New Estimate of Household Formation

Households, change yr ago, ths



Sources: Census Bureau, BLS, Moody's Analytics

to create an estimate of total households, which are the used to calculate the total household formation rate.

In comparison, the previous Moody's Analytics estimate of households for 2010 and earlier was based on householder rates benchmarked to the decennial census. Intercensal years were estimated using an interpolation. Households after 2010 were estimated using an econometric model that related households to the age distribution of the population and income growth. This meant that pre-2010 household formation did not respond to short-run fluctuations, and post-2010 was a projection based on other factors.

Recession and recovery

Three major trends stand out from comparing the new Moody's Analytics estimate of household formation with the estimate currently in use. First, the long-term household formation rate is consistent between the old and new measures (see Chart 3). This is expected, as the decennial census represents the benchmark for both.

Second, the new estimate shows more volatility year to year and therefore better reflects business-cycle based fluctuations. Downturns in household formation can be seen around the recessions in the early 1980s and early 1990s. In addition, the effect of the Great Recession is clear. Household formation in 2007 was more than 1.3 million. Over the next three years, however, household formation averaged only 500,000 per year. The low point occurred in the first half of

2010, when year-to-year household formation was less than 100,000 a year.

The new estimate also suggests that household formation has recovered somewhat, averaging just less than 1.3 million from 2011 to 2015. However, there has yet to

be any significant catch-up growth from the years of weak household formation.

A new forecast

The new historical estimates of household formation help to improve the forecast. An important advantage of the data is that it allows for the estimation of a panel model for five-year age cohorts over time. Utilizing age cohorts allows the effects of independent variables to vary depending on age, which was not possible using only total household formation or the total householder rate as the dependent variable.

For example, the share of each age group that is married is an important determinant of householder rates. However, the effect of marriage differs by age group. Married people in their 20s tend to have higher householder rates than the unmarried, because the alternative to living with a spouse is living at home with parents or living with multiple roommates. In comparison, married people in their 40s tend to have lower householder rates than the unmarried, because the alternative to living with a spouse is more often living alone. Living with parents or a roommate means a low householder rate, while living alone means a high householder rate.

In addition, the effect of the economy on household formation varies by age as well. During an economic downturn, young people are the most likely to reduce their householder rates. One reason is that creating a household often means making fixed investments in durable household goods such as furniture, which makes it easier to

delay household formation than to reverse it. In addition, moving back in with parents is less likely to be an option for older people, for practical and social reasons.

The model

The dependent variable in the model is the householder rate from 1976 to 2015 for each five-year age group from age 15-19 to 60-64, and 65+. Independent variables that have constant effects across age groups include the share of the age group that is non-Hispanic white, non-Hispanic black, and non-Hispanic other race. Independent variables with effects that are allowed to vary by five-year age cohorts include the unemployment gap and the share of the age group that is married. The unemployment gap is estimated by subtracting the Moody's Analytics estimate of the full-employment unemployment rate from the actual unemployment rate.

The model is estimated in first differences, and includes lagged dependent variables and a dummy variable for each age cohort that captures longer-running trends. The R-squared suggests the model explains 39% of the variation in householder rates (see Table 1). As expected, younger groups are more responsive to the business cycle. Also the effect of marriage on the householder rate is positive for younger groups and negative for older groups. The share of the population that is non-Hispanic white has a positive effect on householder rates.

Householder rates were then forecast using the parameters of this model applied to forecasts for demographic change and the unemployment rate gap from 2016 to 2046. The forecast calls for the unemployment rate gap to decline, even to be negative for a few years as the economy exceeds full employment.

Forecasts of each age group by race and ethnicity are estimated using Census Bureau population projections. Marriage rates are expected to hold constant. Marriage rates, however, have been declining over time, which may suggest a continued decline in coming years.

There are upside risks to the forecast as well. Marriage rates for younger households were beginning to level off in the early

2000s, but then dropped again with the onset of the Great Recession. While a continued decline in marriage rates is a possibility, it is equally plausible for some bounce-back in marriage rates as the economy strengthens. Assuming no change balances the forecast risks equally to the upside and downside.

Bounce-back in household formation

The new forecast calls for a bounce-back in household formation over the next few years (see Chart 4). The economy has room to improve as wage and income growth is expected to accelerate. This will help to stabilize householder rates, especially for younger cohorts.

An important driver in the near term is that millennials will increasingly enter their prime household formation years and move out of their parents' homes or houses shared with multiple roommates. Combined with relatively stable householder rates, this will mean even more household formation from young households (see Chart 5).

Another factor driving the householder rate is the aging of baby boomers into their senior years, meaning that a greater share of households will be headed by seniors. The senior households generally do not represent new households being formed, however, as most who will form households will have done so by this age. It simply creates a shift in the composition of households.

In the long run, household formation rates will slow as population growth is expected to slow. Further, the long-term decline of the non-Hispanic white share of the population will weigh on householder rates, as a higher share of the population in this group is associated with greater householder rates

Overall, the long-run trend toward smaller households is expected to continue. Household size fell from 2.8 people per household in 1980 to 2.6 today and will decline further to 2.4 by the end of the forecast horizon in 2046. In comparison, the previous forecast called for a larger average household size of 2.5 by 2046. Equivalently, the long-run aggregate householder rate will continue to rise, and slightly faster than under the previous forecast.

Table 1: Householder Rate Model

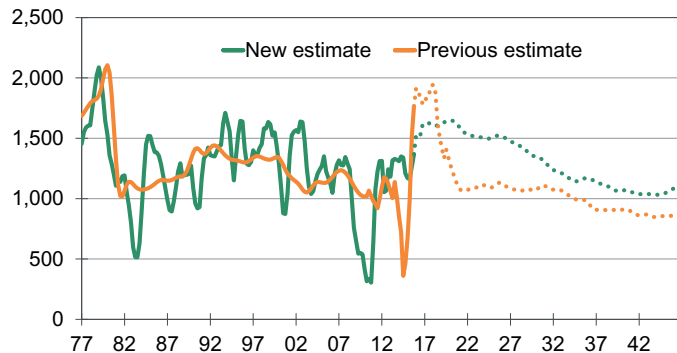
Dependent variable: DLOG(householder rate)
 Method: Pooled least squares
 Sample (adjusted): 1977Q2-2015Q4
 Included observations: 155 after adjustments
 Cross-sections included: 11
 Total pool (balanced) observations: 1705

Variable	Coefficient	Std. error	t-statistic	Prob.
Constant	6.78E-06	2.51E-05	0.270484	0.7868
D(% white non-Hispanic)	0.009065	0.005053	1.79381	0.073
D(% black non-Hispanic)	0.026512	0.014777	1.794086	0.073
D(% other race non-Hispanic)	0.000936	0.010148	0.09225	0.9265
Lagged dependent variable, t-1	0.496428	0.023324	21.28366	0
Lagged dependent variable, t-2	-0.027022	0.02576	-1.04898	0.2943
Lagged dependent variable, t-3	0.136835	0.025702	5.323987	0
Lagged dependent variable, t-4	-0.263907	0.023075	-11.43709	0
D(% married)				
x Age 15 to 19	0.056556	0.031556	1.792261	0.0733
x Age 20 to 24	0.037689	0.011402	3.305555	0.001
x Age 25 to 29	-0.014305	0.010245	-1.396312	0.1628
x Age 30 to 34	-0.029904	0.011188	-2.672761	0.0076
x Age 35 to 39	-0.023412	0.010873	-2.153115	0.0315
x Age 40 to 44	-0.020152	0.010121	-1.991125	0.0466
x Age 45 to 49	-0.035324	0.010212	-3.458922	0.0006
x Age 50 to 54	-0.014706	0.010686	-1.376281	0.1689
x Age 55 to 59	-0.029623	0.010685	-2.772239	0.0056
x Age 60 to 64	-0.024362	0.009794	-2.487461	0.013
x Age 65 and up	-0.032759	0.013157	-2.489932	0.0129
Unemployment gap				
x Age 15 to 19	-0.000127	4.95E-05	-2.558971	0.0106
x Age 20 to 24	-0.000362	5.29E-05	-6.845969	0
x Age 25 to 29	-0.000234	5.08E-05	-4.616635	0
x Age 30 to 34	-0.000136	4.96E-05	-2.736867	0.0063
x Age 35 to 39	-4.06E-05	4.93E-05	-0.825077	0.4094
x Age 40 to 44	-3.04E-05	4.92E-05	-0.617957	0.5367
x Age 45 to 49	-9.11E-05	4.94E-05	-1.841752	0.0657
x Age 50 to 54	-1.82E-05	4.92E-05	-0.369934	0.7115
x Age 55 to 59	-0.000109	4.95E-05	-2.199544	0.028
x Age 60 to 64	2.87E-05	4.93E-05	0.582203	0.5605
x Age 65 and up	-6.10E-05	4.93E-05	-1.238514	0.2157
Fixed effects				
x Age 15 to 19	6.80E-05			
x Age 20 to 24	-8.95E-07			
x Age 25 to 29	-0.000183			
x Age 30 to 34	-0.000101			
x Age 35 to 39	-7.76E-05			
x Age 40 to 44	-1.84E-05			
x Age 45 to 49	3.30E-05			
x Age 50 to 54	1.74E-05			
x Age 55 to 59	0.000138			
x Age 60 to 64	-2.79E-05			
x Age 65 and up	0.000152			

R-squared	0.399063	Mean dependent var	-0.000124
Adjusted R-squared	0.384987	S.D. dependent var	0.001055
S.E. of regression	0.000827	Akaike info criterion	-11.33381
Sum squared resid	0.001139	Schwarz criterion	-11.20615
Log likelihood	9702.069	Hannan-Quinn criter.	-11.28655
F-statistic	28.3506	Durbin-Watson stat	1.91003

Chart 4: An Update to the Household Forecast

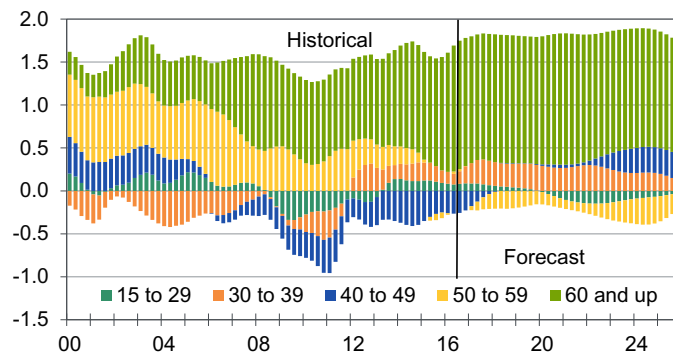
Households, change yr ago, ths



Sources: Census Bureau, BLS, Moody's Analytics

Chart 5: Seniors, Millennials Drive Households

Household formation, mil, change yr ago



Sources: Census Bureau, BLS, Moody's Analytics

Three factors summarize household formations in coming years. First, household formation will rebound as millennials increasingly enter their prime household formation years and the economy strengthens. Second, senior households will make up a greater share of all households as baby boomers age. And third, household formation will slow in the long run alongside declining population growth.

Summary

This analysis shows that the decennial census, CPS, and population estimates can be combined to create a new measure of

household formation that maintains the best features of each individual data source. The new measure shows that household formation has recovered in the wake of the Great Recession, but there has been no surge in household growth that would indicate any catching up from the years of weakness.

The forecast suggests that there is room to improve, and household formation will increase from around 1.3 million households per year to 1.6 million. This will be helped by a stronger economy and the aging of millennials into their prime household formation years. This will translate into

more demand for housing and an increase in consumer spending that should boost GDP growth. This supports the Moody's Analytics forecast for a stronger housing market over the next few years, with single-family and multifamily permits moving upward, and strong growth in personal consumption expenditures.

In the long run, household formation will decline as slower population growth offsets the trend toward fewer people per household. This means fewer new housing units will be needed over the long term than would be the case with more robust population growth.

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