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Housing shortages and the new downturn of residential mobility in the US

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ABSTRACT

Housing shortages following the global financial crisis have been accompanied by a new, sharp downturn in rates of residential mobility, largely among renters. The Great Recession precipitated major, lingering housing disruptions, with local mobility declining by one-third in the US from 2010 to 2019. Slow construction despite employment recovery and burgeoning numbers of young Millennials led to intensified competition for vacancies. That ‘friction of competition’ is posited to delay moves and reduce overall mobility rates. Questions investigated are how urban area declines in renter mobility are related to slower housing construction than job growth, fewer rental vacancy chains released by home buyers, concentrations of young adults, and affordability. Analysis is with the American Community Survey for the 100 largest metropolitan areas in the US. Mobility constriction is a new indicator of declining housing opportunity. Similar outcomes bear investigation in other cities and nations impacted by housing shortages and the shift to renting.

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In the recovery after the Great Recession, a new era of declining residential mobility began in the United States. Although the pace of total geographic mobility had been declining steadily since 1985, most of that reduction was among long-distance movers. After 2010, an accelerated downturn in mobility commenced when the pace of local relocations, within the same county, sharply contracted (Frost, 2020). Given that housing motivations account for two-thirds of reported reasons for local moves, the downturn in residential mobility likely may be linked to one or more aspects of the continuing housing crisis in the post-recession decade.

How residential mobility has fared in the context of sustained housing challenges has not been assessed and is both neglected and under-theorized relative to longer-distance migration (Coulter *et al.*, 2016). In part, the challenge is that multiple

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housing problems are interacting, beginning well before the recession, and effects are not easily separable. Housing shortages have accrued over many years of underproduction, which leads to rising prices and growing affordability problems. These problems have interacted also with demographic changes, especially the large, rising generation of Millennials contesting for homes in urban areas (Moos *et al.*, 2018). The sluggish response of the construction industry has various reputed causes, but it remains unable to meet growing housing demands despite rising prices. Production has never caught up on the backlog of housing needs, whether in the US (Harvard JCHS, 2019; Dietz, 2020), the UK (Scottish Government, 2011, Wilson & Barton, 2020), Canada and Australia (Palm & Whitzman, 2020), or the EU (Pittini *et al.*, 2019).

Emphasis in this paper is on the city-wide (metro-level) opportunities for moving that have been constricted in the housing crisis after the Great Recession, and how closely tied those opportunity changes are with downturns in mobility. New construction by itself supplies only a fraction of the vacancies occupied by movers each year, but it plays an essential multiplier role in generating additional vacancies. This process eludes measurement by traditional vacancy rates that measure units lying empty at a spot in time. To capture better the dynamic process, in this paper we construct a vacancy generation and turnover model to link housing supply to the flow of movers finding housing opportunities, summing these in the aggregate mobility trend.

From a housing supply perspective, the central dynamic in mobility is creation of vacancies when people move out and make units available for others to move in. This endogeneity poses analytical challenges and calls to mind Mulder's (2006) observation that housing and population have a 'two-sided relationship' that makes cause and effect difficult to assess. In our metro-level analysis of movers, and in the physical world of housing, every newly occupied housing unit represents both *supply* (unit previously vacant and available) and *demand* (unit filled by a moving household). New construction initiates vacancy chains, as the new units draw households out of their former units, creating turnover and vacancy opportunities in additional housing units. Also to be considered are the rental vacancy chains that are triggered by home buyers who release their former rental homes.

The question for study is how much the pace of residential mobility may have been depressed by the competition for an undersupply of housing, relative to the burgeoning pace of economic growth in the recovery decade following the Great Recession. The paper first compares the mobility trends of the last three decades, showing how different is the change following the Great Recession. We then review features of the housing crisis that restricted housing opportunities and might limit mobility, developing hypotheses for key links in the process. Combining the large-scale American Community Survey with records of new housing construction and employment growth, we build statistical models to estimate associations between mobility changes and contributing factors. In concluding sections we discuss implications, alternative interpretations, and questions for further research about the mobility downturn.

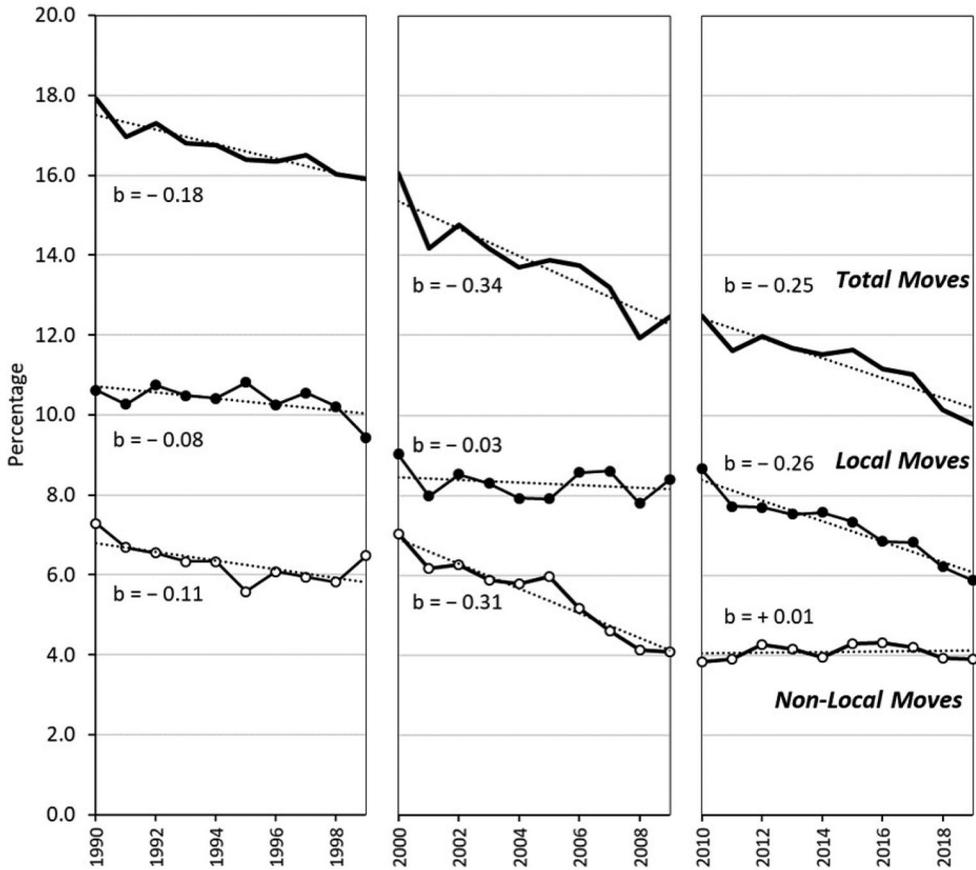


Figure 1. Downward trend in geographic mobility by distance and decade, United States, 1990 to 2019. Sources: US Census Bureau, CPS Historical Migration/Geographic Mobility Table A-1, titled *Annual Geographic Mobility Rates, By Type of Movement: 1948–2019*, publicly accessible at <https://www2.census.gov/programs-surveys/demo/tables/geographic-mobility/time-series/historic/tab-a-1.xls>. Notes: Geographic population mobility rate (%) = total movers/total population 1 year old and over; local mobility rate (%) = same county movers/total population 1 year old and over. The trend lines are calculated uniquely for each 10-year period and distance of move, and the regressions slopes (b) indicate the annual percentage point rate of decline.

1. Background

1.1. A diverging downtrend in mobility

The downturn of local-level, residential mobility in the US in the last decade is unprecedented, and yet largely unrecognized, perhaps because the local trend is camouflaged by the well-known historical decline in overall geographic mobility. Beginning after 1985, the annual rate of moving of *all distances* fell continuously from 20.2% to 9.8% in 2019.¹ However, closer examination reveals major differences by decade and distance of move (Figure 1).

We find these differences demarcate distinct eras of mobility decline. The total mobility rate (top line) is the sum of the local (within county) mobility rate and longer distance movers (non-local).² Within each decade, the pace of change in mobility

is indicated by the slope of the 10-year trendlines. In the 1990s, the total change was -0.184 percentage point per year. Both local and non-local components of geographic mobility declined slowly and total mobility slipped gradually below the 20% norm of the early postwar period.

In the 2000s, virtually all of an accelerated decline was registered among the longer distance movers (-0.310), while the local mobility rate declined very little (-0.035). Roughly half of non-local mobility consists of interstate moves (other categories being 'same state but different county' and a very small share from abroad). This accelerated long-distance decline drew deep concern, spurring a search for underlying causes, focusing especially on employment-driven opportunities (Cooke, 2013; Molloy *et al.*, 2017; Johnson & Schulhofer-Wohl, 2019).

After the Great Recession, we find a striking reversal of mobility trends. Decline of longer distance mobility almost completely abated (-0.008). Instead, local mobility turned sharply downward, from virtually zero change in the 2000s to -0.247 per year after 2010, a decline of 2.5 percentage points or approximately one-third of the prior residential mobility rate (Figure 1).

To date, no research literature on the shrinking local movers has developed comparable to the hunt for causes of declining migration a decade earlier. The most direct study is a research brief that identifies slowing local mobility as the key component in recent declines of geographic mobility, but without substantial explanation (Frost, 2020). There is a dearth of studies on this new downturn.

1.2. Housing crisis after the Great Recession

Housing motivations are the dominant reason given for local-level geographic moves in the US, amounting to 66.5% of reasons for moves in 2018.³ (Economic motivations are most common among long-distance movers, as compared in Figure A, [supplementary material](#).) Accordingly, it is reasonable to suspect the abrupt plunge in local mobility might be related in some fashion to the restricted housing opportunities that followed the Great Recession.

The burgeoning housing problems have many dimensions, including the downturn in homeownership, heightened competition for rental housing, and persistently low construction. The latter led to shortages and rising prices, making 'affordability' a catchall term for the crisis. However, the impacts on residential mobility have yet to be studied.⁴

1.2.1. Homeownership decline and the shift to renting

When the US housing bubble of the mid-2000s began to collapse in 2007, it triggered a global financial crisis and sustained a 12-year decline in homeownership that did not bottom in the US until 2016.⁵ Impacts were most concentrated among younger households, with losses of 10 to 12 percentage points in age groups between 25 and 44 (Haurin, 2016). The foreclosure crisis dissolved 4 million homeowners, with a net 2 million single-family homes switched from owned to rental status between 2006 and 2015 (Immergluck, 2018). While debates continue over how much of the downturn was a permanent change of preferences regarding homeownership and how

likely it is to rebound to prior levels (Acolin *et al.*, 2016; Myers *et al.*, 2020), the rental housing sector had to absorb a shock of added demand. Other countries known as strong ‘homeowner societies’, such as Ireland, UK, and Spain, also experienced this sizable ‘decanting’ of would-be homeowners into the private rental sector, forging a new, young ‘generation rent’ (Byrne, 2020). Growth in housing demand has shifted focus to the rental sector after decades of rising ownership.

1.2.2. A chronic lag of construction

The most lasting impact of the financial crisis in the US was on housing construction, as found in a bleak assessment of the decade: ‘Just as the recent housing downturn was longer and deeper than any other since the Great Depression, the residential construction rebound has also been slower’ (Harvard JCHS, 2019: 1). Even after new construction had reached 1.2 million units in 2018, that level was still lower than any pre-crisis year back to 1982. Household formations had steadily grown each year since 2011, but construction failed to stay ahead: ‘Housing construction has barely kept pace with household growth for an unprecedented eight years [since 2010]’ (Harvard JCHS, 2019: Figure 1).

Normally, growing demand would call for more construction, with rising prices as an incentive, unless there were an excess of vacancies already existing. However, despite continued tight supplies and rising prices, construction has not responded as vigorously as in previous decades for reasons not fully understood.⁶ In fact, many EU countries also face supply shortage and under-investment (Pittini *et al.*, 2019), and a recent assessment documents under-supply especially in the London region and the southeast of England (Wilson & Barton, 2020).

Consequences of low construction for mobility are not favorable. Turnover is known to be greater when there is more construction (Dieleman *et al.*, 2000; Rosen & Smith, 1983), and it is noteworthy that a comparison of OECD nations found that responsiveness of supply to increases in demand was the strongest policy-related determinant of differences in residential mobility rates (Caldera Sánchez & Andrews, 2011). The strong implication is that the pace of new construction increases turnover in existing housing, but this relationship has not been directly estimated. A closer consideration is given the mechanisms next.

1.2.3. Turnover, vacancies and mobility

Vacancies are generated when new units are created or when the occupants move out of an existing unit. Economists have paid the most attention to vacancies and supply of housing, often relying on an abstract, theoretical concept of a ‘natural’ vacancy rate that exists in equilibrium, due to normal frictions of turnover (Gabriel & Nothaft, 2001). They find this natural vacancy rate is not constant and varies across cities, with a higher rate occurring in areas of rapid growth where there is relatively more building ahead of demand and also in areas of higher turnover in the existing housing stock (Rosen & Smith, 1983).

The complement to vacancy generation is the residential mobility process of people filling vacant housing opportunities. In this broader view, vacancies are required for households to move *into* a unit, and yet at the same time mobility generates new

vacancies when households move *out of* a unit. This turnover of the existing housing stock supplies many more times the vacancy opportunities than derived from new construction. For example, in years from 2012 to 2015, an average of roughly 1,050,000 housing units per year in the United States were newly built and occupied (39.5% renters), but in 2015 and 2016 an average of 15.2 million households per year (71.5% renters) moved into a vacant residence, thus supporting 14.5 times as many moves as the newly-built units alone.⁷

Vacancy chains are a key concept that links new construction and larger turnover in the existing stock. First studied in the 1960s and 1970s (Kristof, 1965; Sands & Bower, 1976), the general finding was that each newly-built unit supports three or more mover households on average—the mover into the new unit, a mover into their former unit that was vacated, and a third (or more) mover into that person's vacated former unit. Vacancy chains may be shorter or longer in different contexts, but their length is limited because they are terminated by migrants from out of town, by new household formations, or by any new occupants who do not vacate another local unit that would continue the chain of occupancies. However they are initiated, vacancy chains stimulate turnover and multiply the housing opportunities triggered by new events (Marullo, 1985).

An extension proposed here of the vacancy chain method is the transition from renting to homeownership. First-time homeowners who have newly moved and vacated a former rental unit within the same local area have not only exited from rental competition but also triggered a chain of rental turnovers. From American Housing Survey data, we learn that the majority of recent buyers in 2017 have left behind a rental unit (54.3% of all ages and 69.1% of buyers ages 25–34).⁸ Accordingly, a rising number of owner movers would indicate a greater number of vacancies made available in their former home for other local movers who remain renters. Important for establishing this relationship, this benefit to local renters is not expected to pertain if the home buyers came from outside the metropolitan region. In total, we could expect that new construction and homebuying will both create added rental vacancies and facilitate a higher local rate of renter mobility.

1.2.4. Crisis of affordability

Rents have been escalating in the U.S, with little increase in incomes. Median gross rents in the US rose by 20.6% in real dollars from 2000 to 2018, but median income of renters rose only 0.8%, indicating it was shortage, not a surge of spending capability, that created excess demand driving up rents. As a result, the number of rentals in the former top quartile of prices swelled from 25% to 42% of all rentals, while the number in the bottom quartile was cut in half (Myers and Park, 2019).

Growing affordability problems are commonly named as the crux of the housing crisis in urban areas, but they can be seen as mainly a consequence of inadequate supply. Reduced housing construction not only reduces the supply of new vacancy opportunities, but it produces fewer vacancy chains and leads to housing shortages that cause rents to escalate. With fewer openings available, and greater numbers of competing home seekers, one can imagine how existing tenants are discouraged from moving out of their current units and making them available for potential in-movers.

Real estate economists find that a shortened supply shrinks the time before each vacant unit is rented (Novy-Marx, 2009), and that rapid absorption and shortage of vacancies is what allows landlords to raise rents for any units coming vacant. In this manner, growing shortages allow affordability pressures to intensify city-wide.

In addition, it must be recognized that a small fraction of renters each year are forced, against their choice, to move by eviction or displacement, with greater likelihood among renters of color (Desmond & Shollenberger, 2015). Renters with very low income also face greater precarity in general, and the pressures of high rent burden on individual renters might cause them to completely dissolve their household and move out.

1.2.5. The struggle of young Millennials

Young adults in their 20s and early 30s in the last decade, members of the Millennial generation, encountered much more difficult housing opportunities than did their parents, the Baby Boomers, when they were the same age in the 1970s, clearly demonstrated on multiple dimensions by Mawhorter (2018). Perhaps as a result, the Millennials have been moving much less than earlier generations and are said to account for a substantial portion of the overall decline in moving (Fry, 2017). The great majority are renters and, by their newness in the housing market, they struggle to gain an entry foothold. While the middle-aged have settled into long-term lodging, young adults have much higher rates of annual residential mobility, especially when they are renters.⁹ This high mobility puts young people continuously in competition for vacancies. If construction or turnover generation do not stay ahead of growing demand, the friction of competition could slow the actual pace of mobility.

This *friction of competition* amid housing shortages could lead to lengthier search times, which delays moves, and resulting discouragement over finding suitable replacement housing. That is the key mechanism by which excess competition could constrict mobility. Delayed moves likely spill over from one year to the next, adding to the pentup demand in the next year. Gradually, a portion of postponed moves become simply foregone and the mobility rate cumulatively declines.

The large Millennial generation of young adults (born 1982 to 1998) are central actors in this housing competition because of their historical positioning. This group is substantially larger than the smaller Generation X (born 1965 to 1981) that preceded them into the housing market. Yet most of the Millennials reached independent adulthood only after the 2007 financial crisis, when housing construction collapsed. Although these young adults are typically high propensity movers to rental housing, such a greater concentration of young people also indicates greater aggregate demand for any vacancies. Thus, during the crisis of slow housing production following the Great Recession, many metros came under more intense competition, not only from the supply side (low construction) but also from the demand side, because the large Millennial generation entered the apartment market, many moving to the core areas of large metros in a ‘youthification’ effect (Moos, 2016). The combined shock of employment and construction downturn in the Great Recession stalled normal housing career advancement, including turnover of apartments, early in the

decade (Myers, 2016). A seeming paradox to be addressed is that metros with a heavier concentration of young adults—typically people with higher propensity for mobility to rentals—instead could experience greater slowing of mobility if the friction of competition is great enough.

2. Local mobility and housing data

2.1. *The American Community Survey for mobility research*

We adopt the American Community Survey (ACS) to measure mobility for the reason that it includes a broad swath of housing variables and because its 20-times larger sample size permits detailed analysis of many large cities.¹⁰ The ACS follows the same retrospective mobility definition as the Current Population Survey (CPS) by asking residence of respondents a year earlier. This retrospective perspective can distinguish movers from nonmovers and local movers from longer-distance in-migrants. However, characteristics such as tenure, housing type, and marital status are only observable *after* the move.

Findings from the two surveys, both conducted by the US Census Bureau, are generally very similar, with the main exception that the ACS consistently reports a slightly higher annual rate of residential relocation. A careful comparison found the ACS tracked closer with trends from IRS migration records and the American Housing Survey, while the CPS was lower (Masnick, 2013).

2.2. *Definition of local mobility of renter households in metro areas*

For closer linkage with the housing data we adopt a household base for reporting trends in mobility. Households are numerically equivalent to occupied housing units. Graphic comparison between the national ACS and CPS annual trends in local mobility by renters and owners is supplied in Figure B, [supplementary material](#). We observe that the great decline among renters is what accounts for all of the local mobility decline in either the CPS or ACS. That makes renters' mobility the most important topic to understand in regard to the decline of local level mobility.

In this analysis of mobility in the context of housing supply and demand, we define *local* moves as those occurring within the boundaries of the same metropolitan area rather than within counties, because the metro area better defines the housing market served by workers in the local economy. We identify local household movers in each metropolitan area based on the question asked in the ACS on place of residence one year ago.

2.3. *Data, variable definitions and model specification*

Research is designed as an aggregated metropolitan-level analysis, estimating the association of changes in mobility rates with changing contextual factors that may restrict housing availability. Although our models are observational and cannot test causality, we conceptualize variables by their temporal sequence: (1) legacy conditions prior to the observation period; (2) employment growth that is the key driver; (3) housing

construction that serves growing demand; (4) new homebuyers that trigger rental vacancy chains; and (5) renters moving locally. Control variables are demographic compositional measures in 2012.

Units of observation are the 100 most populous metropolitan areas in the US, which are specified according to the geographic definitions used in the 2010 census (Table E, [supplementary material](#)). Data are drawn from the 1-year ACS data, organized in the Integrated Public Use Microdata Samples (IPUMS) (Ruggles *et al.*, 2020). Additional data for the same metro definitions are drawn from employment growth estimates by the Bureau of Labor Statistics and from housing building permit records collected by the Census Bureau's Survey of Construction (Table 1).

Analysis centers on the local renter mobility rate within the metro, defined as within-metro renter movers as a proportion of the renter segment of these resident households (excluding in-migrants). Secondarily, we also estimate total local mobility as all mover households in proportion to all resident households (excluding in-migrants). Exact denominators for independent and dependent variables are specified in Table 1.

The dependent variable to be estimated is the net change in the local renter or household mobility rate between 2012 and 2018, selecting this time frame to begin after the initial rebound from the deep impacts of the Great Recession. Emphasis on the difference over time has the advantage of implicitly controlling for other unobserved features of metro areas and their populations. The differential model to be estimated is expressed as:

$$\begin{aligned} \Delta Y_{m,2012-2018} &= (Y_{m,2018} - Y_{m,2012}) \\ &= \alpha_0 + \beta V_m + \gamma B_m + \delta T_m + \theta L_m + \mu D_m + \varepsilon_m \end{aligned}$$

where $\Delta Y_{m,2012-2018}$ is the net change in renter (or household) mobility rate, expressed as the percentage point change between 2012 and 2018 in metropolitan area m ; V_m is a set of renter and owner vacancy rates in 2012 and 2018, offered as alternative descriptors of vacancy conditions; B_m is a vector of covariates that represent relative balance of new housing and job growth; T_m is a set of turnover and vacancy chains; L_m is a vector of legacy conditions in 2012, measured prior to the beginning of our estimation period; D_m is a set of demographic compositional factors, serving as controls for concentrations with differential moving propensities; ε_m is an error term.

Definition of variables used in the model and their descriptive statistics are provided in Table 1. Our focus is on what *metropolitan factors* shape the change in the *aggregate pace* of mobility in an area, rather than a focus on individual characteristics shaping *who* moves or *how* they choose among housing types. A deliberate feature of the model is to *not* explain differences in behaviors and outcomes based on the price of housing (which itself is a product of the housing shortages we aim to measure). Nor do we seek to introduce income of individual housing consumers, because that is a sorting mechanism that informs who gets what housing. We are examining how changes in the relative supply and demand may depress overall mobility rates in metro areas.

Table 1. Definition and descriptive statistics of variables.

Variable	Definition	Mean	SD	Median	Min.	Max.
Dependent						
Change in local renter household mobility rate	Percentage point change from 2012 to 2018 in local renter household mobility rate as % of locally-resident renter households in a metro area	-4.910	3.893	-4.573	-19.769	5.140
Independent						
<i>2012 vacancy status</i>						
Rental vacancy 2012	For-rent vacant units as % of the sum of for-rent vacant units and renter-occupied units in a metro area in 2012	6.944	2.291	6.784	2.243	15.179
Homeowner vacancy 2012	For-sale vacant units as % of the sum of for-sale vacant units and owner-occupied units in a metro area in 2012	1.922	0.670	1.806	0.588	3.876
<i>2012 to 2018 vacancy change</i>						
Rental vacancy change 2012 to 2018	Percentage point change from 2012 to 2018 in rental vacancy rate	-0.759	1.978	-0.843	-6.578	4.667
Homeowner vacancy change 2012 to 2018	Percentage point change from 2012 to 2018 in homeowner vacancy rate	-0.439	0.591	-0.446	-1.701	0.857
<i>Relative balance of new housing and job growth</i>						
Job growth	Growth rate of number of jobs between 2012 and 2018 in a metro area as % of number in 2012 (not annualized)	10.418	6.557	9.461	-4.863	28.070
SF permit growth	Summed annual single-family (SF) building permits from 2010 through 2015 (2-year lag applied) in a metro area as % of base year 2012 households (not annualized)	3.382	2.103	2.873	0.729	9.471
MF permit growth	Summed annual multifamily (MF) building permits from 2010 through 2015 (2-year lag applied) in a metro area as % of base year 2012 households (not annualized)	1.625	1.233	1.356	0.034	7.170

(continued)

Table 1. Continued.

Variable	Definition	Mean	SD	Median	Min.	Max.
<i>Turnover and vacancy chains</i>						
Local homebuying change	Percentage point change from 2012 to 2018 in local owner household mobility rate as % of all households in a metro area	0.722	0.661	0.780	−1.043	2.646
Non-local homebuying change	Same for non-local (from outside metro area) owner mover	0.353	0.321	0.305	−0.304	1.595
Non-local renting change	Same for non-local (from outside metro area) renter mover	−0.001	0.603	−0.007	−1.465	1.434
<i>Legacy conditions in 2012</i>						
Total population 2012 (Millions)	Count of total population in 2012 (in millions)	2.067	2.689	1.122	0.444	19.778
Age 20–24 share of population 20 + 2012	Age 20–24 population as % of the age 20+ population in a metro area in 2012	9.782	1.595	9.608	6.411	19.866
Age 25–39 share of population 20 + 2012	Age 25–39 population as % of the age 20+ population in a metro area in 2012	27.093	3.508	27.689	16.934	37.135
Age 40–59 share of population 20 + 2012	Age 40–59 population as % of the age 20+ population in a metro area in 2012	37.211	2.030	37.634	27.634	41.648
Married share of age 25–39 population 2012	Married population as % of the age 25–39 population in a metro area in 2012	47.994	5.616	47.433	37.464	72.641
People of color share of age 25–39 population 2012	Population other than non-Hispanic white as % of the age 25–39 population in a metro area in 2012	40.591	17.818	37.320	7.390	94.940
Median HH income 2012 (thousand dollars in 2018\$)	Median household income in 2012 (in thousand dollars inflation-adjusted to 2018\$)	57.670	10.717	54.696	36.967	98.433
30%+ rent burden 2012	Renter households who pay more than 30 percent of income for rent as % of the total renter households in a metro area in 2012	49.819	4.258	49.118	41.795	60.182
<i>2012 to 2018 demographic and socioeconomic changes</i>						
Change in age 25–39 share of population	Percentage point change from 2012 to 2018 in age 25–39 share of the age 20+ population	0.630	1.077	0.748	−3.632	2.918
Change in married share of age 25–39 population	Percentage point change from 2012 to 2018 in married share of the age 25–39 population	−2.306	2.840	−2.783	−11.319	4.808

(continued)

Table 1. Continued.

Variable	Definition	Mean	SD	Median	Min.	Max.
Change in people of color share of age 25–39 Population	Percentage point change from 2012 to 2018 in people of color share of the age 25–39 population	2.092	1.769	1.979	–2.751	6.338
Growth rate of median HH income (2018\$)	Growth rate of median household income (inflation-adjusted to 2018\$) between 2012 and 2018 in a metro area	10.575	6.433	10.041	–2.315	33.241
30%+ rent burden 2018	Renter households who pay more than 30 percent of income for rent as % of the total renter households in a metro area in 2018	47.720	4.439	46.767	37.209	61.239

Notes: Job growth is based on Bureau of Labor Statistics (BLS)'s employment data while permit growth is based on Census Bureau's Building Permits Survey (BPS). Other variables are based on ACS IPUMS microdata.

2.4. Hypotheses to be tested

The overarching thesis is that the housing crisis during the recovery decade following the Great Recession has restricted opportunities for residential mobility relative to growing demand, and the resulting friction of competition delays moves or discourages searching for replacement housing, with the end result that aggregate mobility trends downward. These aggregate consequences of the housing crisis for local mobility have not been tested and require specific hypotheses for multiple aspects .

2.4.1. Vacancies, job growth and housing construction

A common presumption is that the level of housing **vacancies** prevailing in 2012 indicates a reservoir of available housing that can support subsequent housing mobility. The initial vacancy rate and its changes through 2018 also should indicate the 'tightness' of local housing markets and how easily households can relocate. The following hypotheses are offered:

H1(a): The vacancy rate in 2012 is expected to have a positive association with the subsequent trend in local residential mobility.

H1(b): Metro areas where rental and homeowner vacancy rates have declined by greater degree from 2012 to 2018 (grown "tighter") are expected to have greater declines in mobility.

H1(c): The expected effect for renter mobility should be more strongly linked to the rental vacancy rate than the homeowner rate.

Main factors in balancing supply and demand we have posited are the rates of **job growth** and **new construction**. This pairing is our primary measure to reflect housing shortages, with job growth indicating potential increase in overall demand, while greater permitting of new construction indicates the offsetting effect of supply response. We posit a stronger association with mobility coming through apartment

construction, which serves renters who have much higher propensity to move, than through single-family home construction, which serves mainly homeowners.

H2(a): Greater job growth indicates housing markets are increasing the competition for homes, thus associated negatively with metro average mobility.

H2(b): Greater permitting of units in apartment construction indicates greater supply for renters relative to the growing competition, thus associated positively with aggregate renter or household mobility.

H2(c): A similar, but much weaker effect is expected from the permitting of single-family units.

2.4.2. Turnover and vacancy chains

Additional supply effects on household mobility are created through **turnover** in the existing stock that generates opportunities for movers. The transition by some homebuyers from renting initiates a **rental vacancy chain**, depending on the local/nonlocal origins of the buyer, as explained earlier.

H3(a): A growing number of mover owners who originated locally indicates a greater supply of local rental vacancies through chains of turnover in the existing stock, which suggests a positive association with the trend of renters' mobility.

H3(b): Local movers who originate from outside the metro area (whether owners or renters) will create no vacancy chains to benefit local renters and therefore their growing number is expected to have no effect on the rate of local renters' mobility.

2.4.3. Demographic factors in growing demand

More than just job growth can build demand. The force of the Millennial generation growing into early adulthood¹¹ is especially important, as discussed earlier. For this analysis we compare a fixed age group that has high propensity for both mobility and renting. By 2018 the **age group of 25 to 39** accounted for 47.0% of all renter movers, even though its share of adult population was only 28.6%. (Graphic comparison of age group shares is supplied in Figure C, [supplementary material](#), for US and sum of the 100 metros.) Rental demand would be intensified, all other things equal, in metros with a greater share of population in the 25–39 age group, and each metro's young adult concentration visible in 2012 is very persistent through the decade.¹² Holding supply constant, the result of the greater friction of competition would be to depress the future trend in mobility in a metro.

H4: Given that higher concentration of young adults in a metro intensifies rental competition, metros with a higher share of population ages 25–39 in 2012 are expected to experience greater reduction in mobility trend from 2012 to 2018. In contrast, concentrations in other ages are not expected to raise competition and depress mobility.

2.4.4. Affordability

A prominent feature of the housing crisis is high cost-burden relative to incomes, the problem of **affordability**. Some individuals might wish to move to lower-cost accommodations, or be forced out by inability to pay the rent, but in the aggregate, metros with greater prevalence of high cost-burdens would offer fewer opportunities for

escaping high burdens. In such high-burden metros households could be discouraged from risking a move from their current shelter, and this could depress the aggregate mobility rate.

H5: Controlling for factors of supply and demand that undergird affordability problems, we expect that residence in metros with greater prevalence of high cost-burden should carry negative association with the aggregate rental mobility trend.

3. Findings

The downturn in the renter mobility rate is represented by percentage-point changes estimated between 2012 and 2018 in the mobility rate of locally-originated movers in the 100 largest metros in the US. Regression estimates using OLS techniques are presented in five models of the observed associations with the dependent variable, first for renter mobility, our primary focus (Table 2), and also for total household movers (Table A, [supplementary material](#)).

3.1. Vacancy rates as sole predictor

Vacancy rates are commonly used indicators of supply conditions and we address them first. Model 1 estimates the mobility trend solely by use of vacancy rates for renters and owners in 2012 and the changes to 2018. Overall, Model 1 affords a very poor fit with the mobility trend and has little explanatory power, as indicated by the R-square of 0.03. Once supply and demand factors are included in the additional models, the vacancy rates and their changes fail to exhibit any significant association with the renter mobility trend. A similar poor fit for vacancy rates is obtained when the overall household mobility trend is estimated (Table A, [supplementary material](#)). Hypothesis 1 is rejected.

3.2. Employment and housing growth

Our preferred alternative to measuring housing shortage impacts on mobility trends is by introducing employment and housing construction, measured as the percentage increase over the period 2012 to 2018. Construction is indicated by building permits recorded two years prior, entered separately for units in multifamily structures (apartments) and single-family units (Model 2). Greater job growth carries negative association, as expected (Hypothesis 2a), because it signifies growing demand and more competition for housing. Conversely, greater construction of apartments bears a strongly positive association with renter mobility, as expected (H2b). No significant association is found with single-family construction, as expected (H2c). These effects of new construction and job growth are shown in the standardized estimates to be among the strongest predictors of mobility trend (Table B, [supplementary material](#)). Overall, Model 2, with R-square 0.171, adds 13.9% explanation of variation in mobility decline, five times as much as the simple vacancy rate model. Very similar findings obtain for the all-households mobility model (Model 2 of Table A, [supplementary material](#)). Because they include homeowners, mobility rates are much

Table 2. Regression estimates of change in local renter mobility rate, 2012 to 2018.

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
	Coef.	Sig.								
2012 vacancy status										
Rental vacancy 2012	0.169		0.114		0.097		-0.013		0.060	
Homeowner vacancy 2012	-1.748	*	-1.087		-1.141		-1.257		-1.245	
2012 to 2018 vacancy change										
Rental vacancy change 2012 to 2018	0.402	+	0.202		0.169		0.111		0.149	
Homeowner vacancy change 2012 to 2018	-1.759		-2.215	*	-1.185		-1.705		-1.654	
Relative balance of new housing and job growth										
Job growth 2012 to 2018			-0.258	**	-0.211	*	-0.188	*	-0.216	*
SF permit growth 2012 to 2018			-0.301		-0.442		-0.453		-0.418	
MF permit growth 2012 to 2018			1.073	**	0.949	*	1.377	**	1.266	**
Turnover and vacancy chains										
Local homebuying change					1.863	**	1.720	**	1.778	**
Non-local homebuying change					1.539		1.706		1.478	
Non-local renting change					0.971		0.436		0.333	
Legacy conditions in 2012										
Total population 2012 (millions)							0.031		0.020	
Age 20–24 share of population 20+ 2012							0.643	+	0.585	+
Age 25–39 share of population 20+ 2012							-0.671	***	-0.715	***
Age 40–59 share of population 20+ 2012							0.135		0.177	
Married share of age 25–39 population 2012							0.116		0.217	+
People of color share of age 25–39 population 2012							0.069	*	0.086	*
Median HH income 2012 (thousand dollars in 2018\$)							0.010		0.003	
30%+ rent burden 2012							-0.260	*	-0.279	+
2012 to 2018 demographic and socioeconomic changes										
Change in age 25–39 share of population									0.008	
Change in married share of age 25–39 population									0.266	
Change in people of color share of age 25–39 population									-0.101	
Growth rate of median HH income (2018\$)									0.070	
30%+ rent burden 2018									0.083	
Constant	-3.191	*	-2.467		-3.521	*	7.144		-0.733	
Adj. R-squared	0.032		0.171		0.291		0.364		0.371	
Number of Obs.	100		100		100		100		100	

Notes: + = $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors were used to account for heteroskedasticity.

lower for all households than renters alone and the mean decline is about one-fifth as great as for renters alone (Table 1). Accordingly, the coefficients are also substantially smaller.

3.3. Home buyers and rental vacancy chains

Mobility is also enhanced by opportunities opened in existing housing. Homebuyers frequently leave behind rental units when they move, which can trigger rental vacancy chains. Estimates in Model 3 find increases in the locally initiated owner movers carry a significant association (positive) with changes in the renter mobility trend, as expected (H3a). Homebuyers from out of metro bear no significant association, also as expected (H3b). The model R-square is increased to 0.291, adding 12.0% more explanation of the variation in the renter mobility trend. All hypotheses are strongly supported.

Note: the all-households mobility model (comprising both renter and owner movers) is over-identified when home buying is included as an explanatory variable in Models 3, 4 and 5, and thus those are not reported in Table A, [supplementary material](#).

3.4. Demographic factors increasing competition

Young-adult ages swelled by the Millennial generation were identified above as potential contributors to increased competition and downturn in renter mobility (H4). Model 4 introduces a set of measures for demographic composition, including key age groups, the share married, and the share comprised of people of color,¹³ as well as the total population size of the metro. These measures describe legacy conditions in metros observed in 2012 at the beginning of the study interval, and they are supplemented in Model 5 with a set of corresponding changes over the interval (none of which are significant). As a whole, Model 4 adds appreciably to the explanation of the rental mobility trend, increasing the R-square to 0.364.

The demographic factor with the most prominent impact is the young adult concentration, as expected (H4). A population share ages 25 to 39 that is 1.0 percentage point larger is associated with a more negative rental mobility trend, specifically, -0.671 greater *decline* in the rental mobility rate. Net of all other factors, the share of adult population concentrated in ages 25 to 39 contributes 10.3% to the explanation of variation in mobility decline.¹⁴ The aggregate depressant effect on mobility of the young adult concentration is very substantial, given that one standard deviation of that concentration is 3.51 (Table 1), suggesting young adult metros could have mobility declines over two percentage points greater than the average decline of -4.91 .

This seeming paradox that more young adults, typically high-propensity renter movers, could lead to *lower* aggregate mobility was noted earlier and deserves unpacking. Metros' rental mobility rate was positively correlated ($r = 0.439$, panel a of Figure D, [supplementary material](#)) with their young adult population share in 2012, but that correlation began to break down by 2018 ($r = 0.220$, panel b). It is not the *level* of renter mobility that is negatively related to the young adult share, rather the metros' *trend* in mobility from 2012 to 2018 ($r = -0.237$, panel c). The metros with the highest young adult share declined the most in their renter mobility. For example, the youth magnet of Austin, Texas, has a 2012 young adult share of 34.5% and renter mobility decline of -7.85 , while an older metro, Pittsburgh, Pennsylvania, has a share of 23.4% and mobility decline of -2.26 .¹⁵

3.5. Affordability

A final hypothesis is that lack of affordability in metros, indicated by prevailing high cost-burdens, could depress local mobility rates. Models 4 and 5 introduce the standard rent burden indicator, the share of renters in a metro paying more than 30% of income on housing. The significant negative coefficient for 2012 cost burden in Model 4 (-0.260) is consistent with our expectations (H5) that affordability constraints in metro areas could discourage turnover by out-movers. Net of all other factors, prevailing affordability contributes 3.9% to the explanation of variation in mobility decline.¹⁶

4. Discussion

Deeper consideration is needed about the procedures used for discovery, as well as inferences and key assumptions. Fruitful directions for further research are also discussed.

4.1. Mobility as a vacancy process

Residential mobility connects people and housing in a circular process, with households acting interdependently within the same year as both producers and consumers of vacancies, all of which makes it challenging to determine causation. However, the sharp downturn in local mobility, combined with the rapid post-2010 changes in housing, economy, and population, provide unique opportunity for investigating the linkages. Strategy adopted here is guided by a logical conceptual model (if not formally causal) of sequential actions of vacancy creation and occupancy, and through that interpreting estimated associations between factors. The base of the model is employment growth and permits for new construction during the 6-year study interval, while most other variables are set at their initial year conditions. The major exception is layering on the growth in homebuying over the interval, which subtracts some potential renter movers but stimulates even more vacancies to support other rental moves.

We have theorized that residential mobility is centered in a temporal process of turnover. The failure of standard vacancy rates to correlate with the mobility trend (H1 rejected) reflects a temporal mismatch in units of observation: vacancy rates are measured at a spot in time, while aggregate mobility rates capture moves (and vacancies filled) over the past year, and the mobility *trend* reflects changes in the flow of vacancies filled over time. The relations are also reciprocal: If fewer vacancies are available for movers to occupy, fewer households will turnover their current homes for others to move into. Establishing a logical order is essential for interpretation: units must be built before they can be occupied for the first time, which enables vacancy chains to start. However, the vast majority of moves occur in the existing stock and in that sector out-moves must occur before in-moves. Any shortfall of supply to meet growing needs could disrupt expected turnover in existing units.

4.2. Supply as vacancy generation

The concept of 'housing shortage' is difficult to define or measure, because it depends on both supply and demand, requiring *two blades of the scissors*. The recent decade has witnessed both abnormally slow increases in supply and swelling increases in demand focused on rental housing. But new 'supply' extends to more than just construction. Observed in the middle of the last decade, 14 out of 15 movers in the US landed in existing units that had been turned over by previous occupants, as we noted earlier, yet the 1 out of 15 moves landing in newly-built units were essential for facilitating at least a portion of the other moves through vacancy chains of turnover (H2). The estimations found that new construction, and offsetting employment growth, together accounted for 13.9% of variation in the renter mobility trend.

Turnover can be increased by more than just new construction. In the case of renters' mobility, the estimations showed that the rate of newly moved homeowners also was important (adding another 12.0% to explanation of variance). We presume that roughly half left behind a vacant rental unit¹⁷ and, if the homebuyers originated in the local metro, they launched a new, local rental vacancy chain. Underscoring expectations from theory (H3), homebuyers or renters from out of town did not evidence this supply benefit.

Affordability problems create an opposite force in metros, suppressing mobility by reducing vacancy generation through slower turnover of units. Evidence is the expected (H5) finding of a negative association between the mobility trend and prevalence of higher rent-burdens in metros. This negative effect, surviving controls for supply shortages and demographic changes, suggests that renters may be discouraged by the market outlook from giving up their current unit and seeking different shelter. A possible countervailing effect is that renters with higher rent burdens have occupancies that are more precarious, thus increasing their odds of moving out. However, that threat to individual tenants (increasing mobility) appears to be swamped by the broader negative effects of affordability on out-movers who see only higher costs in alternatives available in the market at large. This reluctance to risk turnover not only directly curtails mobility by the outmoving tenant but also indirectly blocks in-movers by discouraging turnover to create vacancies for would-be replacements to follow.

Still an alternative view might be that it is the in-mover who is blocked initially by the affordability hurdle, and it might be said that this negated mobility is what creates the negative association with prevailing rent burden. Although that might be true of an individual mover, another mover with higher payment capability simply will occupy instead or the landlord will lower the asking rent. In the aggregate, what is blocked is creation of the vacancy in the first place, invoking our principle above: out-movers must occur before in-movers. Two or more moves may be lost as a result: the first tenant who does not move out, the replacement in-mover, and possibly others. In essence, metros with higher incidence of excessive rent burden suffer from *foregone* vacancy chains.

4.3. Mobility impeded by friction of competition

The second blade of the scissors for housing shortage is provided by growth in demand, indicated in our analysis by the rate of employment growth and also by demographic change. When growth of demand approaches the volume of available vacancies, there is surely increasing competition among prospective movers. We have posited that the resulting ‘friction of competition’ leads to delay and discouragement among prospective movers. As excess demand spills over one year to the next, the cumulative result is foregone moves and a downward trending mobility rate.

In this paper we have only the first clues of evidence in support of these suppositions. We see the negative effect of employment growth on the mobility trend, the negative effect of affordability (high rent burden), and the positive effect of homebuying (loosening rental competition). The negative effect of a high share of young adults is especially revealing, because this would ordinarily signal higher potential mobility, but it also signals greater competition for rentals in a city, hence greater delay unless supply increases commensurately.

4.4. Questions deserving further research

The foregoing conclusions are based largely on inference. Key assumptions are made about movers’ desires and viewpoints. The foremost need is for direct investigation about people’s aspirations to move, their feelings of delay or postponement, and their discouragement. How conscious are urban actors of these sentiments and what causes do they blame? And what harms do they fear as a result of the friction of competition? For lack of interview or survey data we cannot know how renter households actually feel about this mobility constriction and slowing of their mobility adjustment.

Continued research is also needed about the downturn in mobility and housing achievements among the Millennials (Moos *et al.*, 2018; Myers, 2016). Is this a new lifestyle preference (Moos, 2016), a generational inequity (Mawhorter, 2018), or a temporary spatial pause (Lee, 2020)? What of the role of evictions or displacement in forcing higher than expected mobility rates? How has the trend of mobility by young adults fared in particular cities of inquiry, or in different nations?

More generally, the method framing of the present study with the American Community Survey has opened a new window on dynamics of residential mobility, emphasizing the competitive supply and demand context in which individuals seek new residences. Multi-level models could well incorporate these macro conditions while investigating individual housing choices. Specific improvements and extensions are needed in the metro-level model as well. Can suitable instruments be devised to test for causality underlying the estimated associations? Further inquiry is especially needed with regard to the homeownership transition that is so poorly understood in the recovery period following the Great Recession.

The process of turnover and vacancy chains knits together the housing market and deserves more scrutiny, including the rental chains stemming from new homebuyers.

If ‘vacancy shortage’ is the problem, what are the ways more can be stimulated? How unequally is the mobility slowdown distributed across race or income groups, and how might vacancy opportunities be shared more fairly?

5. Conclusion

This study finds a new era of residential mobility in the US began in the wake of the Great Recession. The unexpected, sharp mobility decline at the local level underscores the call for renewed research attention to local mobility, as opposed to migration, and need for retheorizing (Coulter *et al.*, 2016). Unlike longer distance movers, who are predominantly employment driven, local movers express housing motivations. The natural question is how might the new downturn in mobility be entwined in the post-recession housing crisis?

Analysis has not unraveled specific causal threads in the circular process, but theory and logic guide interpretation. Our findings underscore, not surprisingly, a strong role of diminished housing construction, but also a strong role of reduced homeownership transition for triggering fewer rental vacancy chains. These two supply factors appear to constrict the flow of vacancies available to support renters’ local mobility. In essence, the interpretation is this was a crisis of ‘vacancy shortage’ that suppressed mobility.

Mobility decline also was associated with demographic shifts caused by the large Millennial generation in prime ages for moving. Our inference is that this magnified rental demand and combined with supply limitations to increase the ‘friction of competition’. We surmise that this friction prolonged the search process and led to delays, discouragement and foregone moves. Metros with a heavier concentration of young adults in their late 20s and 30s ended up with greater mobility declines.

A declining number of vacancy chains amid growing demand further reduces incentives for turnover in the existing stock. Once commenced, the cumulative effect is for local housing markets to spiral toward ‘gridlock’ where many fewer people can find an opening to move. Mobility constriction deserves new recognition as another facet of the broad housing crisis that has diminished housing well-being.

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