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Descriptive Finding

US baby boomers' homeownership trajectories across the life course: A Sequence Analysis approach

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Abstract

BACKGROUND
Extensive homeownership research examines rates, transitions, and timing, over short and medium time spans. However, little is known about long-term homeownership patterns over the life course.

OBJECTIVE
We document population-level homeownership rates, transitions, and durations over a 26-year time span between ages 25–50 and categorize US baby boomers born between 1945–1964 into discrete trajectories, characterizing their homeownership experiences over the life course. Finally, we examine who is likely to experience each trajectory using key sociodemographic characteristics.

METHODS
Using an analytic sample of 4,246 individuals from the Panel Study of Income Dynamics (PSID), we first examine descriptive homeownership statistics over a long duration. Then, we use Sequence Analysis to categorize the population into homeownership clusters. Finally, we employ multinomial logistic regression to predict cluster membership.

RESULTS
After demonstrating that race and education stratify baby boomer homeownership experiences over the life course, we find that three homeownership trajectories characterize the population: consistent owners (47%), consistent nonowners (25%), and late owners (27%). We further find that race, education, and to a lesser degree gender meaningfully predict one's homeownership trajectory. Being Black is the only characteristic for which consistent nonownership is more likely than consistent ownership. Not attending college is the only other characteristic for which late ownership is not more likely than consistent nonownership.

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CONTRIBUTION
Conceptualizing and measuring homeownership as a life course phenomenon over the long term, our study suggests considerable stability of homeownership with experiences shaped by key sociodemographic characteristics.

1. Introduction

Homeownership is important as the major source of wealth for most middle-class families and is therefore key to patterns of inequality in the United States and elsewhere (Wolff 2016; Fahey, Nolan, and Mâitre 2004). Moreover, homeownership is associated with a wide variety of important individual and family-level outcomes, including residential mobility, access to employment, health, and self-esteem (see Dietz and Haurin 2003). These outcomes manifest at different moments in the life course – from childhood (Haurin, Parcel, and Haurin 2002) to retirement (Mudrazija and Butrica 2017), and may compound over time (DiPrete and Eirich 2006). Therefore, patterns of homeownership over the life course are important.

Researchers often use point-in-time measures by comparing homeownership rates or the odds of ownership by subgroups cross-sectionally (Chakrabarty et al. 2018; Coulter 2017; Galster and Wessel 2019). Acknowledging the limitations of such 'snapshot' approaches, some utilize information across two or more time points, focusing on particular transitions, for instance exits from homeownership (Ren 2020), or first homeownership among young adults (Kurz 2004; Sánchez 2018). Hirschl and Rank's (2010) life table estimates cover ages between 25 and 55, but they focus on specific events (transitions into, out of, and return to homeownership), not continuous patterns over the life course. Though important in their own right, such cross-section and transition analyses overlook long-term homeownership experiences. Two individuals may gain homeownership at a single age, say 27, but may follow different trajectories throughout their lives; one can own consistently until old age, whereas the other can fall in and out of homeownership repeatedly.

Several scholars have investigated homeownership patterns over longer durations. For instance, Albertini and his colleagues (2018) constructed homeownership patterns using the first and most recent homes for respondents aged 50 and older. Using retrospective information, however, they could not examine continuous segments of the life course. Köppe (2017) investigated homeownership status over 18 years from 1991 focusing on homewoners with mortgages. Clark, Deurloo, and Dieleman (2003) examined the longest continuous durations to date as far as we are aware, using 26 PSID waves, but detecting patterns shorter than 20 years. Moreover, they did not investigate how homeownership patterns differ by key sociodemographic factors. Homeownership is conditioned by many social forces including race (Garriga, Ricketts, and Schlagenhauf 2017; Grinstein-Weiss, Key, and Carrillo 2015) and education (Hirschl and Rank 2010) among others. Therefore, attention to the distribution of long-duration homeownership patterns along these characteristics is warranted.

We contribute to the demographic life course literature by describing population-level long-term homeownership patterns utilizing annual measures from 39 waves of the PSID. Unlike past studies that focus on shorter durations, we follow baby boomers between ages 25 and 50 using nationally representative longitudinal data in the United States. We first provide aggregate summaries of homeownership rates by demographic characteristics at each age, as well as measures of transitions and duration, mirroring the homeownership literature, but over a longer time span. Next, we make an important contribution by identifying distinct combinations of timing, duration, and sequence of homeownership over the life course – which we call “homeownership trajectories” – using Sequence Analysis (SA). Finally, we analyze how sociodemographic factors associated with homeownership – particularly gender, race, and education – matter for homeownership trajectories. Since homeownership is a central mechanism for accumulating advantage (Oliver and Shapiro 2006), it is important to understand how key sociodemographic characteristics shape the homeownership experience over the life course.

2. Data and methods

The PSID has been following families and their descendants since 1968 (Pfeffer, Fomby, and Insolera 2020). We study baby boomers born between 1945 and 1964, using all 39 available PSID waves from 1968 to 2015 to identify their homeownership status between ages 25 and 50. The PSID measured whether households owned, rented, or had some other form of tenure. We recoded this annual measure into a binary of ownership and nonownership, applying it to household heads and spouses, treating children and others living in the household as nonowners.

We utilized Sequence Analysis to identify discrete homeownership patterns in the population. SA has been used widely to cluster similar sequences of discrete states, revealing prevalent patterns. For example, past research has used SA to examine the employment sequences of mothers (Killewald and Zhuo 2019), patterns of cohabitation (Di Giulio, Impicciatore, and Sironi 2019), and housing experiences over time (Clark, Deurloo, and Dieleman 2003). In our case, each sequence is comprised of 26 homeownership observations between ages 25–50. In order to group sequences, SA relies on a dissimilarity matrix, or the number (and type) of alterations required for one sequence to transform into another. We calculated this matrix using Dynamic Hamming Distances (DHD), which privilege timing in a sequence (e.g., when a respondent purchased a home) over its order (e.g., first not own, then own), which is more important in a case with only two states (own vs. not own) and a relatively predictable order for a large portion of sequences. Results are also robust to using Optimal Matching as an alternative method for calculating the matrix.

Using a dissimilarity matrix and a target number of clusters into which to divide the sample, the Partitioning Around Medoids (PAM) algorithm demarcates clusters of sequences. PAM starts with the full sample of sequences ("maximizing a global criterion"), rather than starting with one cluster and optimizing differences between it and adjacent clusters ("maximizing a local criterion") (Gabadinho et al. 2011; Studer 2013). We ran PAM with 3–8 sequences in order to classify baby boomers into a holistic but meaningful number of sequences. To choose the optimal number of sequences, we relied on the postestimation Average Silhouette Width weighted (ASWw) (Studer 2013). The ASWw compares the average distance between sequences within the same cluster with distances between the closest sequences of different clusters, allowing comparison of the clustering quality across different numbers of clusters. In order to assess whether the optimal number of clusters, or homeownership trajectories, differs by subgroups, we also ran the analyses separately by gender-race combinations.

With sequences of a fixed length, as in our case, SA results include "missing" as a valid state. In order to identify meaningful trajectories, we therefore purged all missing data. In the initial person-year sample, 27.7% were missing due to attrition, 7.6% due to PSID nonsurvey years, and 6.1% were "true missing" gaps in data. We removed individuals with over half homeownership values missing and used "backward-forward imputation," matching observations to their closest nonmissing value within six years, for individuals with fewer than 13 observations missing. Such longitudinal imputation methods are preferable, and similar in results to multiple imputation (Twisk and de Vente 2002). Regardless, all descriptive findings are robust to using the complete sample and SA findings are robust to using only those with complete homeownership information. Our final sample includes 4,246 individuals containing 110,396 person-year observations.

Beyond its impact on SA, attrition may bias results by forcing more imputation for those more likely to attrite or excluding a greater proportion of such respondents. We used cross-sectional weights that do not account for attrition, which compounds over time posing challenges to panel surveys (Schoeni et al. 2013). Although the share of person-year observations missing due to attrition is not trivial (27.7%), it is likely not large enough to overlook a major homeownership trajectory that existed only among those missing. However, given that homeowners are less likely to attrite than nonowners

(Lemay 2009), interpretation of the relative prevalence of trajectories requires caution. Specifically, our approach may overestimate the prevalence of trajectories that include longer durations of homeownership, while underestimating the prevalence of trajectories with shorter homeownership durations.

After identifying homeownership trajectories through SA, we used multinomial logistic regression to analyze the association between sociodemographic characteristics and the likelihood of belonging to one trajectory over another. We predicted trajectory membership using several variables. Race is an annual household-level PSID measure. Following previous research, we used household heads' race for a considerable portion of the sample with no race values (Becker 2008). Since the original 1968 sample did not have many non-Black non-White respondents, we included only Blacks and Whites. PSID oversampled Black families, so we used 1968 survey weights. We recoded the education variable into a time-invariant measure indicating no college (up to 12 years of education) or college attendance and above (>12 years), using the most recent value for each individual. We differentiated "early baby boomers" born between 1945 and 1954 from "late boomers" born between 1955 and 1964, and operationalized marital status as a binary measure indicating whether an individual was married for ten years or more between ages 25–50 (robust to other durations). Finally, since housing prices differ between areas, we included a binary measure indicating urban living 50% or more of available year-observations. We created a separate category for those missing cases (7.5%) to keep them in the analysis. Table 1 Panel A presents descriptive statistics of independent variables.

We first present homeownership age profiles indicating the proportion who own in our sample at every age between 25 and 50 (see Angelini, Brugiavini, and Weber 2014 for a similar analysis in Europe) – separated by race and by gender. We also provide descriptive measurements of homeownership transitions and durations in Table 1 Panel B. Presenting descriptive homeownership measures by key covariates offers insight into the potential heterogeneity of homeownership trajectories. However, these age profiles and descriptive measures still assume homogenous patterns within each demographic group, which we then address using SA.

Table 1: Descriptive statistics of homeownership measures and independent variables

Panel A.	Percent	
Descriptive statistics for multinomial analysis		
Male	48.9%	
Black	11.3%	
Attended college	55.2%	
Late boomers	50.6%	
Duration of marriage over 10 years	71.0%	
Living in urban area over 50% years*	66.2%	
Panel B.	**Mean**	**95% C.I.**
Not own -> Own homeownership transitions over the life course		
Black	0.83	0.75–0.90
White	0.98	0.93–1.02
Female	0.93	0.89–0.97
Male	0.99	0.91–1.07
Not attended college	0.86	0.80–0.91
Attended college	1.04	1.00–1.09
Duration of ownership status		
Black	8.38	7.41–9.34
White	16.14	15.68–16.60
Female	15.48	14.79–16.18
Male	15.11	14.53–15.69
Not attended college	14.24	13.52–14.96
Attended college	16.12	15.63–16.62

* Missing category excluded
Note: Based on weighted analytic sample of 4,246 individuals.

3. Results

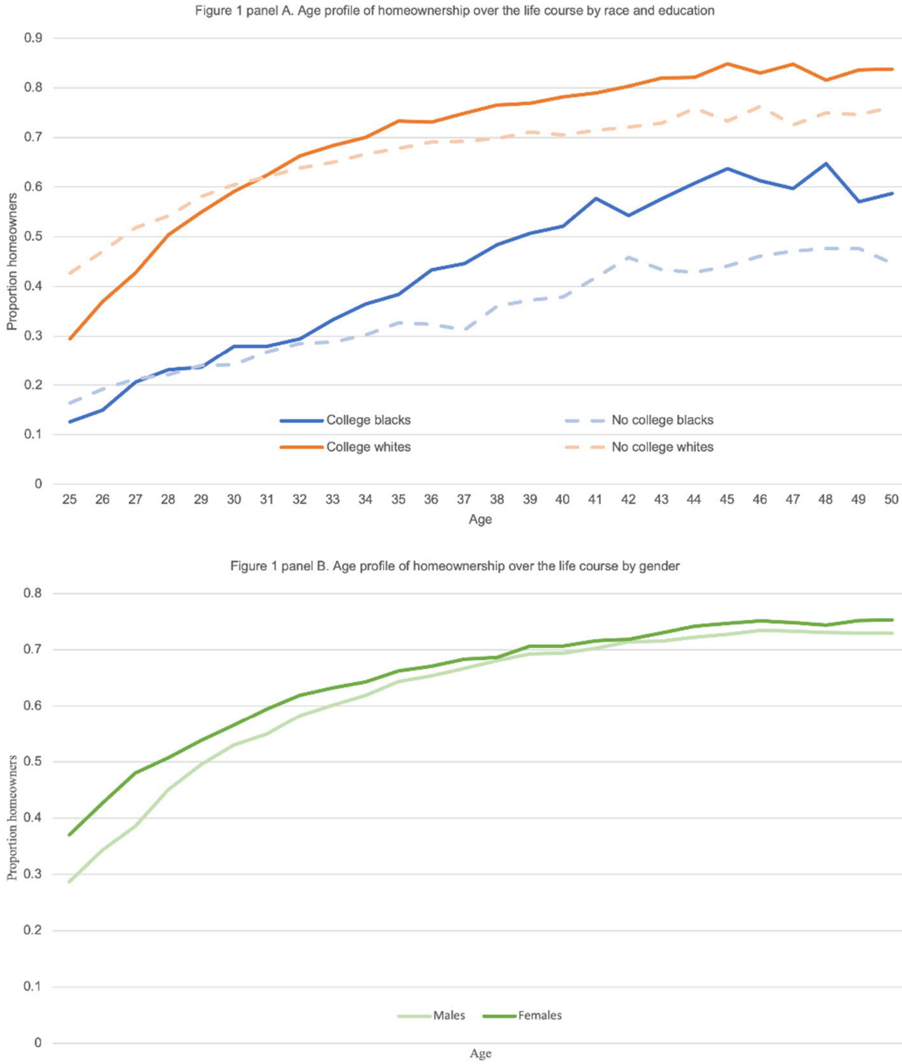
3.1 Age profiles of homeownership

Figure 1 Panel A presents age profiles of homeownership separately for four subgroups by race and education. The proportion of homeowners increases with age for every demographic subgroup. Until around age 30, the college educated show somewhat lower (for Blacks) or substantially lower (for Whites) rates of homeownership than their counterparts without college education. However, the college educated surpass their counterparts by age 31 and maintain higher rates thereafter. Although a positive relationship between education and homeownership is found for a majority of the life course, Blacks show substantially lower rates of homeownership than similarly-educated Whites. Across the life course, Blacks who did not attend college show rates between 26 and 37 percentage points lower than similarly educated Whites. Blacks who attended college, show a 15–35 percentage point disadvantage compared to their White counterparts. Moreover, even Blacks who attended college have lower homeownership rates of between 15–36 percentage points throughout their life course compared with Whites with no college education.

In Figure 1 Panel B, gender does not seem to reveal homeownership age profile differences as dramatic as race. Women's early 8–9 percentage point lead largely narrows by age 35. However, caution is needed when interpreting these differences. The PSID measures homeownership on the household level: household heads and their spouses share the same status. If homeownership were coded for each member separately, we would likely see larger gender differences. These descriptive findings highlight the existence of heterogenous homeownership pathways and the importance of focusing on (at least) race and education as dimensions of stratification in the analyses that follow.

For additional descriptive information, Table 1 Panel B displays the mean count of nonownership to ownership transitions and mean duration of ownership across gender, race, and education over the life course. It reveals that, in addition to higher aggregate homeownership rates, Whites also have more transitions into homeownership compared with Blacks (0.98 vs 0.83) on average, as well as ownership durations around twice as long. Transitions and durations by gender and education also mirror age profiles in Figure 1, where disparities by education exist but not to the extent of those by race, and differences by gender are not substantial.

Figure 1: Age profile of homeownership over the life course



3.2 Sequence Analysis (SA)

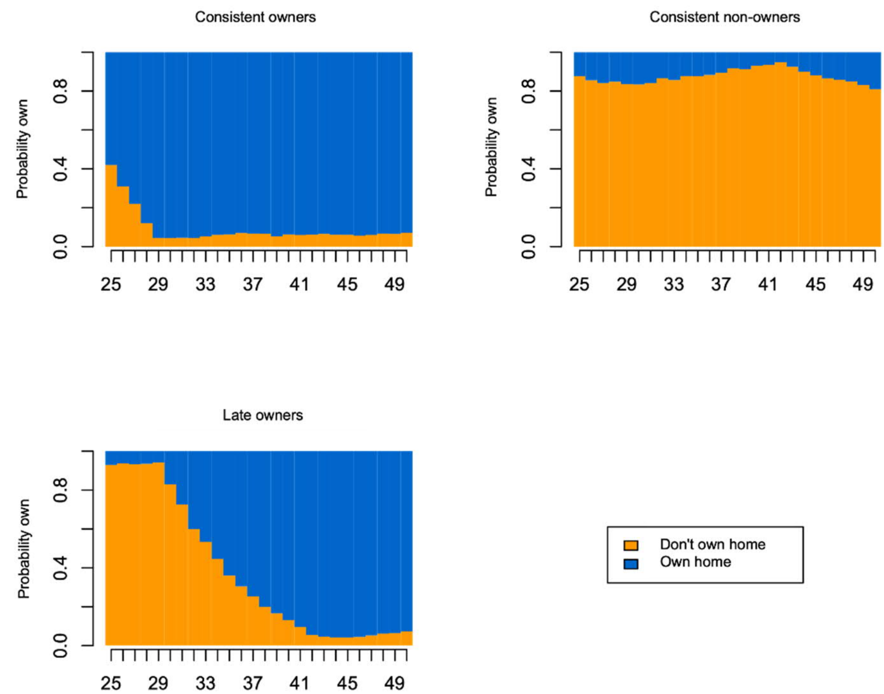
SA helps understand how individuals experience distinct sequences, or homeownership trajectories, over the life course. In order to find the optimal number of clusters using SA, we compared the clustering quality assuming different numbers of sequence clusters, repeating this process separately for every gender-race combination (Table 2). However, according to the ASWw scores, all gender-race subgroups had the same optimal number of clusters as the overall population – three. In other words, whether examining the entire population or different race-gender subgroups, individuals' homeownership trajectories were best described by three distinct patterns. Examining the different subgroup cluster medoids, the "median" sequence in each cluster, revealed that not only were all subgroups best represented by three clusters, but those clusters were practically identical.

Table 2: Sequence Analysis ASWw cluster quality including different subpopulations

		ASWw first place			ASWw runner-up	
		# Clusters	ASWw	R-Squared	# Clusters	ASWw
Entire population	DHD	3	0.516	0.793	4	0.478
	OM	3	0.555	0.844	5	0.507
White men	DHD	3	0.477	0.783	7	0.457
	OM	3	0.495	0.831	5	0.493
White women	DHD	3	0.492	0.747	6	0.481
	OM	3	0.535	0.809	5	0.490
Black men	DHD	3	0.611	0.835	8	0.574
	OM	3	0.622	0.873	5	0.600
Black women	DHD	3	0.63	0.837	6	0.609
	OM	3	0.642	0.874	6	0.61

What are the three homeownership trajectories identified by SA? Figure 2 reveals that US baby boomers between ages 25 to 50 are either "consistent owners," "consistent nonowners," or "late owners." These labels refer to clusters that represent similar but not identical individuals. As such, the SA model presents estimated probabilities of homeownership at each age given one's homeownership trajectory.

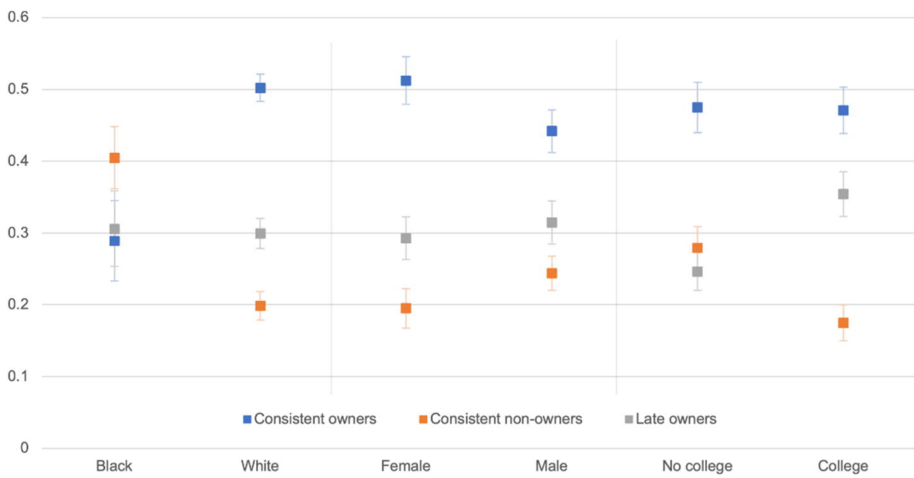
Figure 2: US homeownership trajectories using Sequence Analysis



For the consistent owner trajectory, the probability of homeownership starts around 45% at age 25 and increases dramatically to around 90% by age 33, remaining at that level until age 50. From a relatively young age, in other words, this group consistently owns a home. Using survey weights, we estimate that consistent owners comprise 48% of US baby boomers, making them the largest group. As we discussed above, however, this prevalence should be understood as an upper bound because homeowners were less likely to attrite over time than nonowners. 25% are consistent nonowners, whose estimated probability of homeownership is around 10% consistently (with slight fluctuations). Finally, 27% belong to the late owner trajectory: up to age 30, they have a probability of owning a home similar to consistent nonowners – around 10%. Then, that probability rises incrementally until it reaches around 90%, similarly to the consistent owners, at age 42, remaining high until age 50.

After identifying three trajectories, we turn to answering the question "who is likely to belong to each homeownership trajectory?" using multinomial logistic regression to predict homeownership trajectories with the covariates described above. Instead of presenting statistical tables, we present Figure 3 showing predicted probabilities of belonging to different trajectories based on model results. It demonstrates that, holding all other covariates at their means, the probability of belonging to the consistent ownership trajectory is the highest for every sociodemographic characteristic examined (around 0.50), except for Blacks. Conversely, the probability of belonging to the consistent nonowner trajectory is the lowest for every characteristic examined (around 0.20) except for Blacks, for which it is the most likely category, and those who have not attended college, for whom it is roughly as likely as belonging to the late owning trajectory. Lastly, despite the fact that differences between men and women are estimated conservatively, men's likelihood of belonging to the consistent ownership trajectory appears lower than women's (0.44 vs. 0.51 respectively), and their likelihood of belonging to other trajectories appears correspondingly higher.

Figure 3: Predicted probabilities of belonging to homeownership trajectories, holding covariates at their means



4. Discussion

To address the limitations of existing conceptualizations and measurements of homeownership, we examined baby boomer homeownership over 26 years, measuring rates, transitions, durations, and discrete trajectories over a long time span. We identified three long-term trajectories using Sequence Analysis: consistent owners, late owners who catch up with consistent owners, and consistent nonowners. These findings complement point-in-time analyses as they incorporate complete homeownership experiences over the life course. For instance, studying transitions around labor market entry may overlook substantial heterogeneity that occurs over individuals' 40's, when late owners are still purchasing their first homes. Our results demonstrate the utility of measuring homeownership over the long term with simultaneous consideration of timing, duration, and sequence of homeownership over the life course.

Our findings reveal impressive commonalities in baby boomer homeownership patterns over the long term that may not be apparent in analyses of shorter durations. SA finds that no more than three sequences are required to capture the heterogeneity of baby boomers' long duration homeownership experiences. Two of the three are characterized by tenure consistency and represent 73% of US baby boomers. Our study therefore supports Clark, Deurloo, and Dieleman's (2003) finding that most homeownership careers are rather stable. Only long duration analyses can expose this remarkable tenure stability.

Such long duration studies, however, are limited to those who have completed their homeownership trajectories. The current study focuses on baby boomers because they have reached age 50, allowing the measurement of their homeownership trajectories. Our findings thus only apply to this cohort. In order to estimate whether homeownership trajectories of later cohorts exhibit similar stability, we must wait until they complete their trajectories. Another limitation of identifying tenure-based long-term sequences is not considering other housing dimensions such as home values, quality, and location (see Köppe 2017).

Nonetheless, distinct baby boomer subgroups display important differences in their homeownership trajectories. In line with research on disparities by race (Garriga, Ricketts, and Schlagenhauf 2017; Grinstein-Weiss, Key, and Carrillo 2015), Black baby boomers are more likely to belong to the consistent nonowner and late owner trajectories. A higher likelihood of belonging to the consistent and late owner trajectories among the higher educated also supports existing findings (Hirschl and Rank 2010). But by examining longer durations, our findings add new information where existing research has been largely silent: Blacks on average experience fewer transitions into homeownership overall (Table 1), mirrored by a greater likelihood of consistently not owning a home. Finally, gender shows some evidence of stratifying homeownership experiences. Our findings on rates support studies showing higher homeownership among women at younger ages (Hirschl and Rank 2010). Overall, men are more likely than women to consistently not own whereas women are more likely than men to consistently own. We find these differences despite the conservative measurement of gender differences, as homeownership is measured by household, indicating differences may be substantial.

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