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### Unravelling the unequal geography of declining young adult homeownership in the Netherlands

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# Unravelling the unequal geography of declining young adult homeownership in the Netherlands

Cody Hochstenbach & Rowan Arundel

## Abstract

*Across countries, the position of young adults on the housing market has worsened over the past decade. Young adults' decreasing access to homeownership has garnered particular attention. Most studies analyzing young adults' housing market entry focus on micro-level determinants or national-level patterns and trends. This paper adds an important perspective by focusing on spatial variations within a single country, unravelling pronounced inter-municipal differences. Our case is the Netherlands, where we use full-population register data for the 2011-2018 period to analyse spatial patterns and trends using a range of quantitative and spatial methods. Our findings highlight a notable decrease in owner-occupancy among young adults in the Netherlands over the period. This decrease is strongest among households in their late twenties, but extends to those in their early forties. Spatial analyses reveal both geographic commonalities and clear divergences. Declining young homeownership was found across 87% of municipalities, suggesting a common experience. Analyses also reveal stark spatial disparities, with the strongest decreases in the most urbanized regions, particularly large cities. Finally, using advanced spatial regression modelling we explore municipal characteristics, revealing how local housing and population factors may explain pronounced differences in changing young adult homeownership entry. The analyses particularly emphasize links between housing unaffordability and 'pull factors' driving higher housing market pressure as determinants of worsening homeownership opportunities for young adults.*

*Keywords: housing market, homeownership, young adults, generation rent, exclusion, spatial inequality*

## Introduction

Across countries, the position of young adults on the housing market has worsened over the last decade. This is evidenced in various ways such as increasing housing cost burdens, a rise in precarious housing arrangements, and a prolonged dependence on the parental home. Above all, young adults' decreasing access to homeownership has garnered particular attention (Lennartz et al. 2016; Flynn 2020; Arundel & Ronald, 2020). This has given rise, for example, to the predominantly Anglo-Saxon narrative of the formation of a "generation rent" (McKee et al. 2017). Young adults' decreasing entry into homeownership has been analyzed from various angles. A range of studies from various countries focus on the micro-level determinants of entry into homeownership. These studies highlight how increasing labour-market precarity impedes young adults' ability to buy (Arundel & Lennartz 2019; Bayrakdar et al. 2019), and also emphasize the increasing relevance of the intergenerational transmission of inequality (Öst 2012; Coulter 2017; Hochstenbach 2018; Van Ham et al. 2014). Other studies focus on cross-country variations in young adult homeownership rates and changes therein (Filandri & Bertolini 2016; Lennartz et al.

2016; Flynn 2020). These studies typically emphasize differences in welfare regime, housing system and cultural meanings of homeownership (Schwartz & Seabrooke 2008; Fernandez & Aalbers 2016). They cite labour market restructuring, stricter mortgage lending criteria post Global Financial Crisis (GFC), and increasing generational disparities in explaining decreasing young adult homeownership (Forrest & Hirayama 2018; Arundel & Doling 2017).

This paper adds another important perspective by focusing on spatial variations in young adult homeownership within a single country. More specifically, we unravel inter-municipal differences in young adults' changing access to homeownership. Such a perspective is largely absent, but is of crucial importance in understanding tenure dynamics. National perspectives belie the stark variations that exist within these contexts. Recent house-price increases have been particularly steep in cities (Inchauste et al. 2018), while many peripheral regions struggle with both population and economic decline. These intensifying spatial divisions (Hochstenbach & Arundel 2020) may have a particularly strong impact on young adults, as they concentrate increasingly in those urban locations where housing affordability is most under pressure (Moos et al. 2019).

Surprisingly, we do not yet know to what extent such inter-municipal differences in young homeownership access exist – essentially whether declining homeownership among young adults is a widespread phenomenon or strongly spatially contingent – nor do we know which local characteristics are associated with changes in access. This paper addresses this knowledge gap by answering the following questions:

How have young adults' homeownership rates changed over time and to what extent are these trends spatially differentiated? Which local characteristics are associated with the strongest regional changes in homeownership attainment?

To answer these questions, we draw on the case of the Netherlands, making use of full-population register data for the 2011-2018 period allowing us to analyse spatial differentiation in homeownership across the entire country. We focus on municipal-level variations in patterns and trends. The Netherlands is a salient case, as it represents a highly financialized debt-driven housing market, but where post-GFC measures have imposed some restrictions on mortgage-credit access particularly for starters on the housing market (Tu et al. 2018). Furthermore, in previous studies we have demonstrated a clear intensification of housing market spatial polarization across the country in housing value appreciation with implications for access to homeownership (Arundel & Hochstenbach 2019; Hochstenbach & Arundel 2020). Our analyses here focus on changes

between 2011 and 2018 representing two relevant time points that capture a housing bust and boom period, respectively. Fundamentally, within this time period, the housing position of young adults has worsened across many countries including the Netherlands (Eurostat, 2018; Arundel & Ronald, 2020).

The next section will first develop a theoretical framework to understand patterns of changing homeownership access among young adults. We then outline our data and methods before moving to the results of our empirical analyses. We round off with key conclusions and a discussion of their wider relevance.

## **Theory**

### **Promoting homeownership**

This paper builds on recent literatures that have brought attention to the worsening fortunes of young adults on the housing market, particularly their decreasing ability to buy a home. It is situated within a broader context where many governments have vigorously promoted homeownership as the superior housing tenure for decades. Owning one's home is increasingly considered a marker of class attainment and social status (Ronald, 2008). It is associated with feelings of security and control over one's life (Tyndall & Christie-Mizell 2016). Homeownership furthermore allows for the accumulation of housing wealth, which may augment income, function as an insurance, or future pension provision and thus substitute part of the welfare state (Doling & Ronald 2010; Ansell 2014). Nonetheless, perceived and actual advantages of homeownership are not natural, but must be understood as largely the consequence of tenure-specific policies and reflecting socialized preferential attitudes towards owner occupation (Rowlands & Gurney 2000; Ronald 2008).

Governments stimulated homeownership, among other means, through fiscal subsidization and the expansion of mortgage markets (Crouch 2009; Aalbers 2016; Kohl 2018; García-Lamarca & Kaika 2016). This allowed more and more households to buy, including a broader spectrum of lower to middle-income households and younger adults. Over the second half of the last century, most Western countries transitioned from majority renter to majority owner societies (Doling & Ford, 2007) – and the expectation was that more and more people would continue to be able to buy.

From the mid-2000s onwards, but especially following the 2008 financial crisis, this began to change. In countries such as the United States and the United Kingdom, overall homeownership rates saw substantial declines from their mid-2000s peak. In the Netherlands, overall

homeownership rates have not declined since the GFC but rather stabilized after decades of growth (Aalbers et al. 2020). A common trend across countries is that homeownership has particularly decreased among younger adults (Lennartz et al. 2016; Flynn 2020).

### **Social inequality**

One key reason why homeownership rates have particularly decreased among young adults pertains to their socio-economic situation. Notwithstanding substantial within-group variations, young adults' collective labour-market position has weakened in comparison to other age groups. Their wages have stagnated or even declined (Bell & Blanchflower 2011; Hills et al. 2013) and levels of labour-market security have been eroded (Biegert 2014; Arundel & Doling 2017). Growing shares of young adults are likely to be in temporary, part-time, or insecure (self) employment (Eurostat, 2018). Younger adults are thus increasingly likely to remain labour-market 'outsiders,' with this representing an important negative predictor in acquiring a mortgage or attaining homeownership (Fischer & Gervais 2011; Arundel & Lennartz 2019; Dotti Sani & Acciai 2019). These dynamics of intergenerational inequality are also complimented by strong *intra*-generational differences, with further evidence of increasing housing inequalities *among* young (Coulter 2017; Bayrakdar et al. 2019; Arundel, 2017).

Conversely, older generations are more often 'insiders' on the labour market – characterized by more stable, full-time and better paid employment – translating to stronger housing-market positions (Arundel & Lennartz, 2019). In addition, many of them benefited from more favourable housing-market conditions in the past facilitating access to homeownership, and subsequently were able to capitalize on house-price increases. These factors have enabled many older adults to accumulate substantial housing wealth which they can mobilize when moving or purchasing a secondary property, outbidding starters on the housing market (Neuteboom & Brounen 2011; Forrest & Hirayama 2018). Thus, an overall picture emerges of increasing intergenerational inequalities, with young adults on the losing end.

Changing life-course trajectories also factor into decreasing ownership rates. Life-course trajectories, especially in young adult life, have become more individualized and variegated – a trend that is related to the expansion of higher-education participation. Commonly captured by the umbrella concept of the second demographic transition (Van de Kaa 1987) or notions of an extended period of 'emerging adulthood' (Arnett 2006), young adults on average stay single longer, partner and marry later and postpone childbearing. Changing life-course trajectories have important implications for residential trajectories. Marrying later, for example, is associated with

lower homeownership (Fischer & Gervais 2011), while delayed adulthood transitions are associated with more parental co-residence, rental and shared-housing situations (Arundel & Ronald, 2016).

### **Housing-market transformations**

Another explanation for decreasing homeownership levels among young adults can be found in longer-term, structural housing-market transformations. Over the last decades, house price increases have far outpaced income growth across most countries (Knoll et al. 2017; Aalbers 2016). Higher house prices represent a barrier for entry into owner-occupancy for starter households, while benefiting current owners (Ermisch 1999). For a long time, this was offset by making it easier for households to acquire larger mortgages due to the relaxation of regulations. Indeed, at the macro-level, more liquid mortgage markets are associated with higher levels of young adult homeownership (Flynn 2020). This created a reinforcing feedback cycle as larger loans drove house price increases, necessitating further mortgage-market expansion in order to maintain access at higher price levels (Fernandez & Aalbers 2016; Ryan-Collins 2018).

Following the GFC, most governments put a (partial) halt to this trend, restricting access to mortgage credit in order to reduce the type of debt risk and subprime mortgage lending that had triggered the crisis. Restrictions have included the lowering of maximum mortgages (i.e. loan-to-value and loan-to-income) and the imposition of stricter employment criteria (i.e. permanent labour contract). These measures, however, did not lead to structurally lower house prices as real-estate investments by households and firms with access to substantial private capital have become increasingly important in driving price increases (Aalbers et al. 2020). In addition, housing supply is struggling to keep up with burgeoning demand, contributing to further competition and price appreciation (Nijskens et al. 2019).

Another important housing-market transformation that has taken place across many countries, including the Netherlands, is the policy-induced erosion of de-commodified social-rental alternatives (Malpass 2004; Van Gent & Hochstenbach 2020). While on the one hand this pushes households towards owner-occupancy, on the other hand, it forces those unable to buy to reside increasingly often in expensive or precarious rental arrangements. High rent burdens in turn reduce the ability of households to save money for a down payment, impeding access to homeownership in the longer run. To give an example: young adults (up to the age of 35) renting in the Dutch private sector spent on average around 45% of their net income on rent in 2018 (Statistics Netherlands 2019).

### **Spatially uneven developments**

In this paper we add to the narrative above by unravelling how decreasing access to homeownership among young adults plays out across space. This is an increasingly important task, as spatial inequalities appear to be on the rise in many contexts. In a recent paper, Hochstenbach and Arundel (2020) show processes of spatial housing-market polarization at the national, regional and urban level in the Netherlands. That is, house prices have recently exploded in some locations, typically within major urban centres, while stagnating or even declining in real terms in other more peripheral areas. The increasing levels of residential segregation between rich and poor populations found in many urban regions of Europe and North America (Reardon & Bischoff 2011; Tammaru et al. 2016) further suggest housing-market polarization.

These trends imply that the housing-market experiences of young adults may also be increasingly divergent across space. We propose that spatially divergent trends may be understood through four key narratives: 1) the relative affordability of owner-occupied housing, 2) competition from other potential buyers, 3) pull factors that attract (certain) young adults and 4) the local supply of owner-occupied housing. While these factors can be conceptually separated, they are of course fundamentally intertwined.

First, we expect to find the strongest decreases in young adult homeownership rates in those regions where the decline in housing affordability, particularly relative to income, has been most pronounced. There is some evidence for this: a German study found strong regional variations in overall homeownership attainment with intra-national variations in price-to-income ratios explaining spatial differentiation in overall owner-occupancy rates (Lerbs & Oberst 2014). A recent study of England and Wales focusing specifically on young adults found them significantly less likely to become homeowners in regions with higher house prices (Coulter 2017). Conversely, a paper from the US analyzing spatial variations in changing homeownership rates among young adults throughout the 1990s found house-price increases to be positively associated with increasing young adult homeownership (Myers et al. 2005). The authors suggest here that positive investment prospects may outweigh decreasing affordability. However, in the current post-crisis environment of decreased access to mortgage credit and labour-market precarity, we would expect affordability constraints to be central to limiting homeownership access and outweigh potential increased investment appeal.

Second, and relatedly, we expect competition from other prospective buyers to be negatively associated with young adult homeownership entry. Indeed, recent Dutch data suggest that both

current owners and buy-to-let landlords increasingly crowd out younger first-time buyers (DNB, 2018; also Hochstenbach & Ronald 2020). Some Dutch studies further suggest that young adults struggle most to realize their preference for homeownership in high-demand markets as a consequence of this competition (Neuteboom & Brounen 2011; De Groot et al. 2013).

Third, we expect municipal pull factors to increasingly drive and concentrate young adults' demand for housing. These are often urban pull factors. A large body of literature demonstrates larger cities increasingly attract and retain young adults, with the presence of higher education, stronger labour market prospects, and a wide range of amenities being crucial (Ley 1996; Florida 2008; Glaeser 2011; Moos et al 2019). On the one hand, these factors especially attract highly-educated and higher-income young adults (Venhorst et al. 2011) which may be associated with higher young adult homeownership. On the other hand, the increasing concentration of people and capital within these urban centres intensifies housing market pressure, undermining access particularly for younger adults. Of course, this is interrelated to the two above factors of affordability and housing market competition. Additionally, such cities typically also attract many young adults that are in a transitory life phase and thus not (yet) choosing or able to buy.

Fourth, and finally, the ability of young adults to buy is dependent on the supply of owner-occupied housing (Myers et al. 2005). This does not always align with the housing market pressures discussed above in relation to major urban centres. While homeownership rates are typically below-average in larger cities, their local governments have also commonly been particularly vigorous in expanding homeownership. This is the case in the Netherlands, where since the late 1990s, homeownership growth in major cities like Amsterdam or Rotterdam has far outpaced national-level trends (Hochstenbach 2017).

## **Data and methods**

### **Data**

To investigate spatial variations in young adults' changing homeownership rates in the Netherlands, this paper draws on the System of Social-statistical Datasets (SSD) from Statistics Netherlands. The SSD contains non-public individual-level register data for the full population registered in the Netherlands, drawing on multiple sources (e.g. tax and municipal registers).

We first constructed a dataset at the household level, because it is at this level where homeownership is registered and, more substantively, where resources are bundled in housing market entry. When defining household age (and other essentially individual-level characteristics),

we base this on the household main earner. Households with missing tenure information, without adult members, with ten or more adult members, registered at institutions or defined as student households are excluded from our dataset. Our dataset contains two data points, 2011 and 2018 (both reflecting the situation on January 1<sup>st</sup>), which have been chosen for consistency and comparability of data. In 2011, we draw on 7,126,812 households, in 2018 on 7,547,357 households. We use tax registers to define if someone is an owner-occupier. Unfortunately, we cannot distinguish between social and private rental in our data.

Because this paper focuses on regional variations in young adults' homeownership rates, we aggregated household-level data to spatial units. We have opted for municipalities, given that smaller-level units, such as neighbourhoods, would be too small for capturing where households act on the housing market. Municipalities provide a spatially delimited housing market that reflects local housing and population characteristics. At the same time, using different spatial modelling methods, we capture regional effects and spatial spill-overs. For all our analyses, we use the stable 2011 municipal categorization which counts a total of 418 municipalities. Six municipalities had to be excluded from the analyses because they didn't meet the privacy requirements of a minimum of ten observations (i.e. households) on each variable. Most municipal-level variables were aggregated from the household-level data in the SSD, but supplemented by data from the publicly available aggregate dataset *Core Figures ("Kerncijfers")* from Statistics Netherlands. We draw on the 2011 dataset, corresponding to our selected municipal classification and starting point of our analyses.

## Methods

We use different methods to investigate spatial variations in young adult homeownership. First, we descriptively compare 2011 and 2018 homeownership rates across age and age groups. We use three broad age categories of young (18 to 39)<sup>1</sup>, middle (40 to 64) and old households (65+), based on the age of the main earner in the household. Second, we subsequently run these descriptive analyses according to urban density levels and separately for the four largest Dutch cities (Amsterdam, Rotterdam, Den Haag and Utrecht). Third, we use Geographic Information Systems (GIS) to map out homeownership rates and changes at the municipal level. We developed a

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<sup>1</sup> We have also run the same analyses using a stricter 18 to 34 categorization, returning similar though slightly more pronounced results.

cartogram map of the Netherlands, distorting municipality size proportional to the number of households<sup>2</sup> to visualize more accurately the relative importance of local housing markets.

Fourth, we apply spatial regression modelling, to estimate the relationships between various municipal-level independent variables and the dependent variable of changing young adult homeownership. We undertake a multi-step process that investigates spatial effects in the data and determines the appropriate modelling approach to correct for these. Through GIS software, we begin with applying a Geographically Weighted Regression (GWR) to investigate optimal spatial distance weighting. This is determined through an iterative GWR that varies spatial windows to identify the best fit model that minimizes the Akaike Information Criterion (AIC). We subsequently use the spatial modelling software GeoDa to run our spatial regression modelling. Spatial weights in GeoDa are generated based on the optimal distance weighting identified through the GWR. First, an OLS regression model was run to explore general – non-spatial – relationships and including additional diagnostics to identify spatial dependence. These diagnostics confirmed a need to run a spatial regression model as well as identifying a Spatial Error Model (SEM) – rather than a Spatial Lag Model – as most appropriate<sup>3</sup> with our data (Anselin & Rey, 2017). By means of Maximum Likelihood estimation, a Spatial Error Model corrects for spatial correlation among the error terms based on the distance weighting provided (see Anselin & Bera 1998). Several additional tests were performed to assess for multicollinearity, non-normality and heteroscedasticity. Some adjustments were made to correct for these through using standardized variables and logarithmic transformations on variables displaying skewed distributions. Our eventual spatial regression applies an SEM with an optimal distance band threshold identified at 113.4 km. While this may seem large in the case of the Netherlands, the model in fact applies an inverse distance weighting that decreases influence with distance up to the band threshold. Additionally, previous research has pointed to wide spatial dispersion of ripple effects across the Dutch housing market (Teye et al. 2017). While some spatial dependency remains in the final SEM (see appendix), the applied spatial error correction resulted in a substantial reduction in spatial autocorrelation as comparing Moran's I diagnostic of residuals from the OLS and the SEM regressions.

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<sup>2</sup> Municipalities are distorted based on total number of households in 2011 using the Gastner-Newman diffusion algorithm (Gastner & Newman, 2004). These are subsequently binned into a hexagonal lattice for simplification of interpretation.

<sup>3</sup> Performing spatial diagnostics through the GeoDa software, allowed a comparison between a Lagrange-Multiplier (LM) value for a spatial error versus a spatial lag model. While both LM values were significant, a subsequent robust-LM test was only significant for the error correction, thus indicating the Spatial Error Model to be the most appropriate (see Anselin & Rey 2017).

## Variables

Our key dependent variable is the change in homeownership rates among young adults between 2011 and 2018 at the municipal level. In our descriptive analyses, we use two different measures: (1) a simple percentage point change over time, and (2) a measure of relative change in homeownership rates based on the 2018 share divided by the 2011 share (2011 = 100). We do so to account for the fact that the magnitude of change should also consider the starting level. To give an example: a five percentage-point decrease in homeownership is relatively more substantial if homeownership initially stood at 30 percent, than if it stood at 60 percent. In our multivariate analyses, we concentrate on this measure of relative change.

Table 1 presents an overview of the variables included in our multivariate models and their descriptive statistics.<sup>4</sup> We group these variables according to the four explanatory narratives identified in the theoretical framework. In capturing affordability factors, we calculate a housing affordability measure as the ratio between mean registered house values (*WOZ*) compared to young adults' mean gross household income. For reasons of data availability, we have to rely on municipal house values instead of actual sale prices, which has two draw backs: first, rental properties also get a value assigned, which tends to skew lower than for owner-occupied units leading to an underestimation of price ratios. Second, house values exhibit a time lag of one to two years. In our data, this means the post-2013 housing boom isn't fully captured. For the purpose of our analyses, these limitations aren't problematic as they are consistent across space but they need to be considered in interpretation. We include both the affordability ratio in 2011 and the change in this ratio over the 2011-2018 period.

For the competition, or “crowding out,” narrative we use several variables. The change in the share of middle-aged (between 40 and 65) homeowner households is a key indicator for competition from other demographic groups. This age group is selected as representing households with the strongest economic capacity, as well as more active on the housing market than those over 65. We also include the change in gross household income as an indicator for competition for young adults from increasing higher income populations, as we already use young adults' income in our affordability measure. Additionally, change in the total number of households is looked at as a general indicator for increasing or decreasing demand pressures. Finally, we similarly expect a decline in average household size to add to demand.

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<sup>4</sup> We present here the statistics before standardization, to enhance interpretability.

We subsequently include several variables to capture municipal pull factors that could drive housing market pressure. We use a dummy variable to identify university cities. The Netherlands hosts 13 universities across 12 cities. To identify opportunity-rich labour markets we measure the number of jobs relative to the number of households. Address density, measured as the number of addresses per square kilometer, is a proxy for urbanity and the presence of amenities. Especially for younger adults this is identified as a pull factor. The measures of presence of young adult households and changes therein are included to reflect revealed preferences.

The supply of owner-occupied units is captured through looking at the overall 2011 homeownership percentage, as well as a measure of the absolute change in homeowner households over the period. While we do not have direct measures of dwelling supply where these are not (yet) inhabited, our measure of revealed household tenure trends captures changes in the share of owner-occupied dwellings in the municipality as an indicator of supply. Additionally, we include a measure of the initial share of smaller dwellings (under 100 square metres) available for 2012<sup>5</sup> as the prevalence of smaller units would be the most relevant stock for young starter households.

## Results

### Homeownership developments by age

For decades, Dutch owner-occupancy rates rapidly increased, stimulated by pro-homeownership policies. In the post-GFC environment, however, this grinded to a halt and homeownership rates stagnated. In 2011, 58.3% of all households in our dataset owned their house, while this stood at a slightly lower 58.2% in 2018. There was still an absolute increase from 4.15 million to 4.39 million home-owning households over this period.

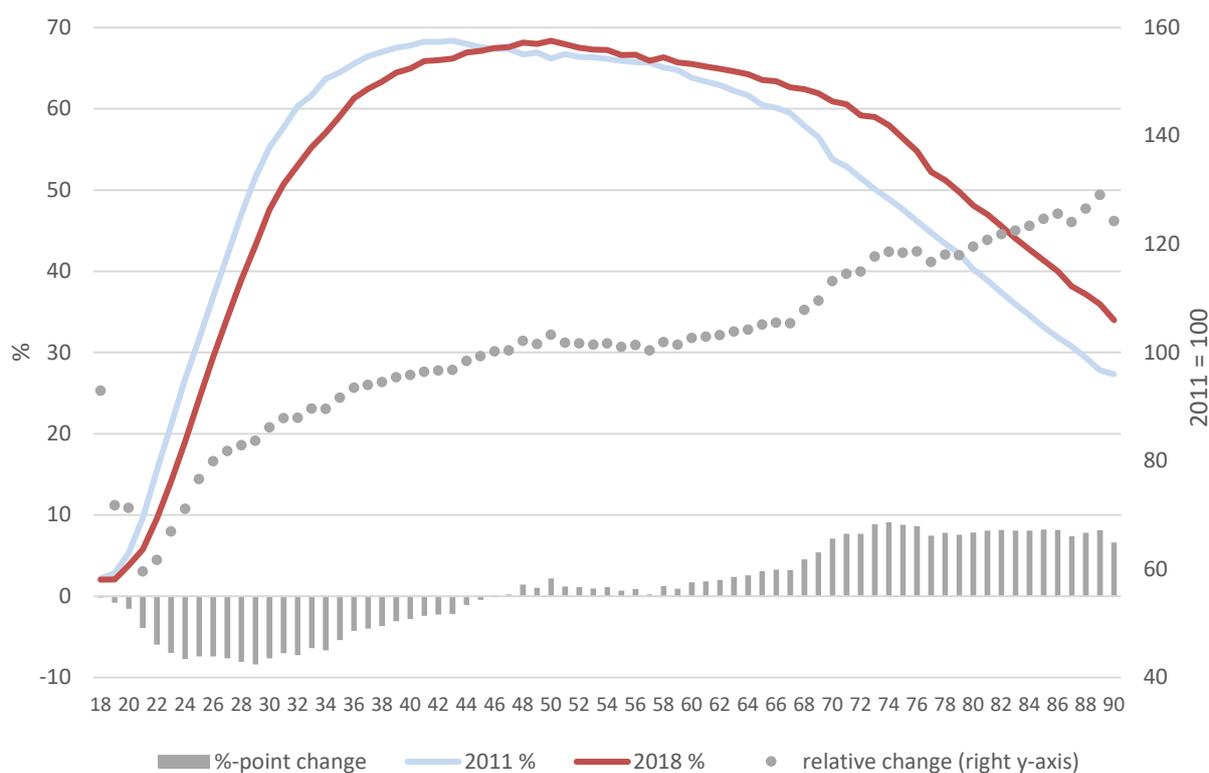
This overall stagnation, however, obscures a clear divergence in trends in terms of age, as is apparent in Figure 1. Nationally, for all households up to the age of 44 (based on the main earner's age) homeownership rates decreased. The decrease was steepest among those households in the mid-twenties to early-thirties age groups. In 2011, some 51.5% of households headed by a 29-year-old owned their home, while this was only the case for 43.2% in 2018 – an 8.4 percentage-point decrease. The strongest *relative* decreases in homeownership (comparing 2018 shares to 2011 shares, where 2011=100) concentrate among those in their early twenties with values gradually increasing with age.

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<sup>5</sup> These data are only available from 2012. Despite the one-year discrepancy from other 2011 measures, the aggregate municipal value is unlikely to have changed to any relevant degree.

Among households where the main earner is between the mid-forties to mid-sixties, we instead see a trend of slightly increasing homeownership. For those 65 or older, the picture is one of strong increases, although total rates remain below average. Lower rates among these older cohorts largely reflect the legacy of lower homeownership and broader access to stable social housing in the Netherlands. We thus see a clear cohort effect, where an older generation of renters – more commonly in the social sector – is gradually replaced by an older generation of owners. Conversely, new generations of young households are increasingly often renters – likely in the private sector – signaling their mounting difficulties to buy.

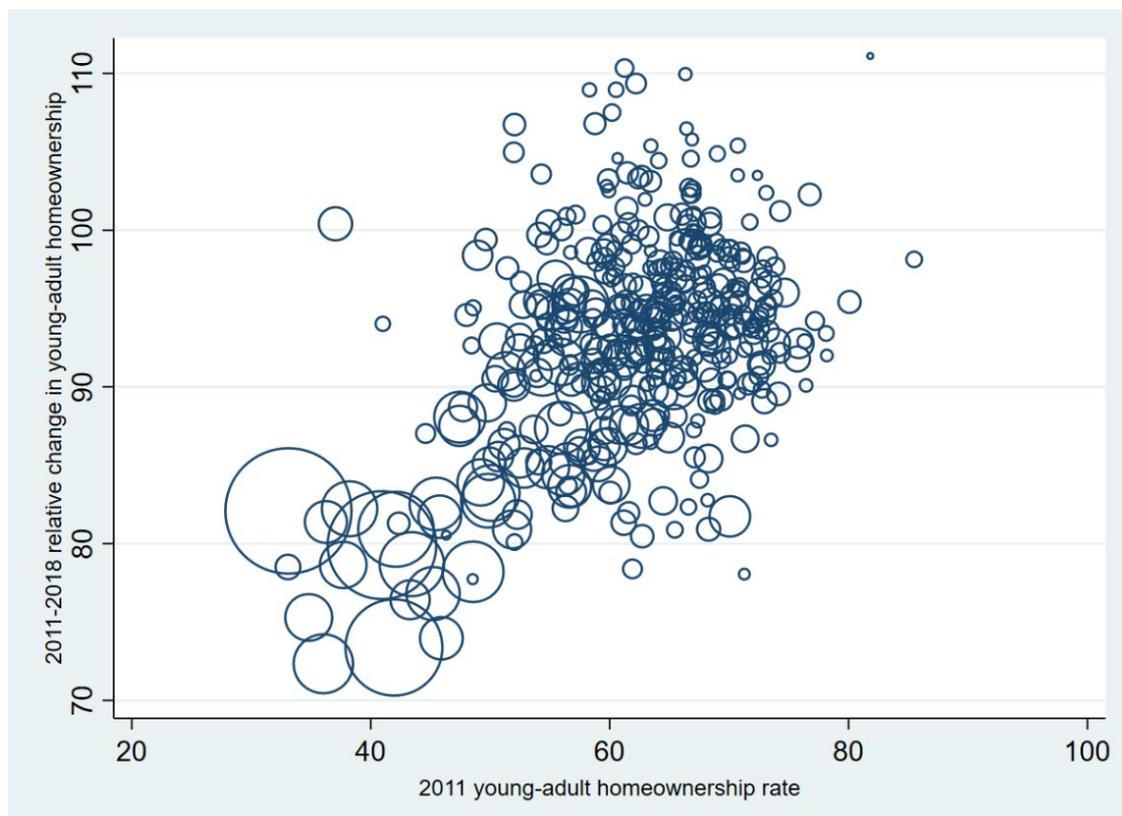
**Figure 1. Homeownership rates in the Netherlands by age in 2011 and 2018, and change.**



### The geography of changing homeownership

These overall decreases in young adult homeownership between 2011 and 2018 show substantial regional variations. Plotting 2011 homeownership rates among young adult households against subsequent (2011-2018) changes shows that municipalities with the lowest baseline rates by and large also recorded the strongest relative decreases overall (Figure 2). Furthermore, these are typically the largest municipalities in terms of household numbers.

**Figure 2. Scatter diagram of 2011 young adult homeownership rates and relative 2011-2018 change (2011=100). Each circle represents a municipality, with the circle size weighted according to household population (2011). Correlation coefficient: 0.4064,  $p < 0.001$ .**



**Table 2. Homeownership rates in the Netherlands across age groups and areas in 2011 and 2018, and change.**

Notes: (1) relative percentage point changes are calculated by dividing percentage point changes by 2011 shares (\*100), (2) urbanization is based on Statistics Netherlands classification using address density per km<sup>2</sup>: Highly urbanized = >2500, Urbanized = 1500-2500, High density suburban = 1000-1500, Low density suburban = 500-1000, Rural = <500.

	2011 %				2018 %				% -point change				Relative change (2011=100)			
	18-39	40-64	65+	Total	18-39	40-64	65+	Total	18-39	40-64	65+	Total	18-39	40-64	65+	Total
Amsterdam	33.1	32.2	16.9	30.0	27.2	37.3	23.4	30.8	-5.9	5.1	6.5	0.8	82.1	115.9	138.5	102.7
Rotterdam	40.9	41.0	18.1	36.1	32.7	45.3	25.7	36.6	-8.2	4.3	7.6	0.5	79.9	110.4	142.0	101.4
Den Haag	41.9	51.8	34.2	45.0	30.8	52.6	42.3	43.5	-11.2	0.8	8.1	-1.6	73.4	101.6	123.6	96.5
Utrecht	42.1	55.2	34.1	46.1	34.1	58.6	41.0	45.0	-8.0	3.4	7.0	-1.1	80.9	106.2	106.2	97.6
Other highly urbanized	44.8	58.8	36.3	49.3	35.7	60.1	45.2	48.7	-9.0	1.3	9.0	-0.6	79.8	102.3	102.3	98.7
Highly urbanized	40.2	47.2	27.9	41.0	31.9	50.2	35.8	40.7	-8.3	3.0	7.9	-0.3	79.3	106.4	128.3	99.3
Urbanized	52.1	63.8	41.3	55.4	45.5	64.8	49.8	55.7	-6.6	1.0	8.5	0.3	87.3	101.6	120.7	100.6
High density suburban	60.3	71.1	52.3	63.8	54.7	71.0	58.9	63.8	-5.6	0.0	6.5	0.0	90.8	100.0	112.4	100.0
Low density suburban	64.6	75.4	58.2	68.5	60.6	74.9	63.2	68.4	-4.0	-0.4	5.0	-0.1	93.7	99.4	108.6	99.8
Rural	66.6	78.1	62.1	71.4	63.6	77.5	67.1	71.6	-3.0	-0.6	5.0	0.1	95.5	99.4	108.1	100.2
The Netherlands	53.3	66.1	47.6	58.3	46.7	66.6	54.6	58.2	-6.6	0.5	7.0	-0.1	87.6	100.7	114.7	99.9

Table 2 further unravels these spatially divergent trends in homeownership access across age categories for different urbanization levels of municipalities and for the four largest municipalities. Looking at the national total, homeownership rates went down from 53.3% to 46.7% for younger households, slightly increased from 66.1% to 66.6% for the middle age group (aged 40 to 64), and substantially rose from 47.6% to 54.6% among older households.

In the four major cities, young adult homeownership rates also showed a strong decline, particularly in Den Haag (-11.2 percentage points), Rotterdam (-8.2) and Utrecht (-8.0). Amsterdam at first sight seems to be an exception, as young adult ownership rates decreased by 5.9 percentage points, in fact below the national trend.

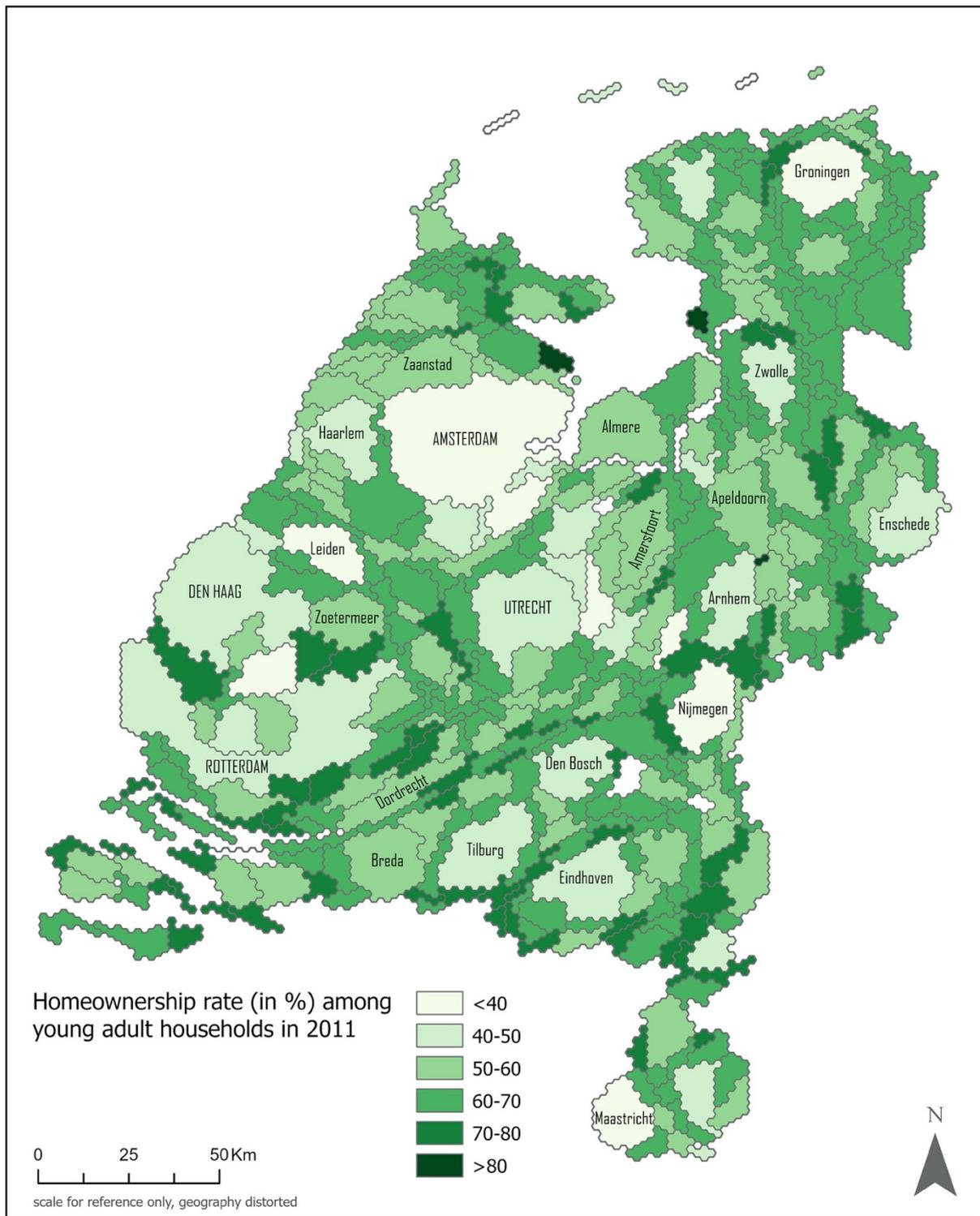
Measures of relative change take into account that similar percentage point changes are more substantive at lower initial 2011 rates. Looking at Amsterdam, for example, the fact that young adult homeownership decreased by less than the national average (-5.9 percentage points) belies its comparatively low baseline of 33.1%. This translates to a relative 2018 measure of 82.1, indicating a relative decrease that is stronger than the national average.

When looking at urbanization levels, we see a relatively consistent trend where the strongest decreases in young adult homeownership rates can be found in the most urbanized municipalities – also representing the country's larger cities. In highly-urbanized municipalities, young adult homeownership rates decreased by 8.3 percentage points. These are also the locations where 2011 homeownership shares were already the lowest. Such dynamics point to an important trend in rising spatial polarization with disparities in young adult homeownership attainment increasing between higher and lower density areas.

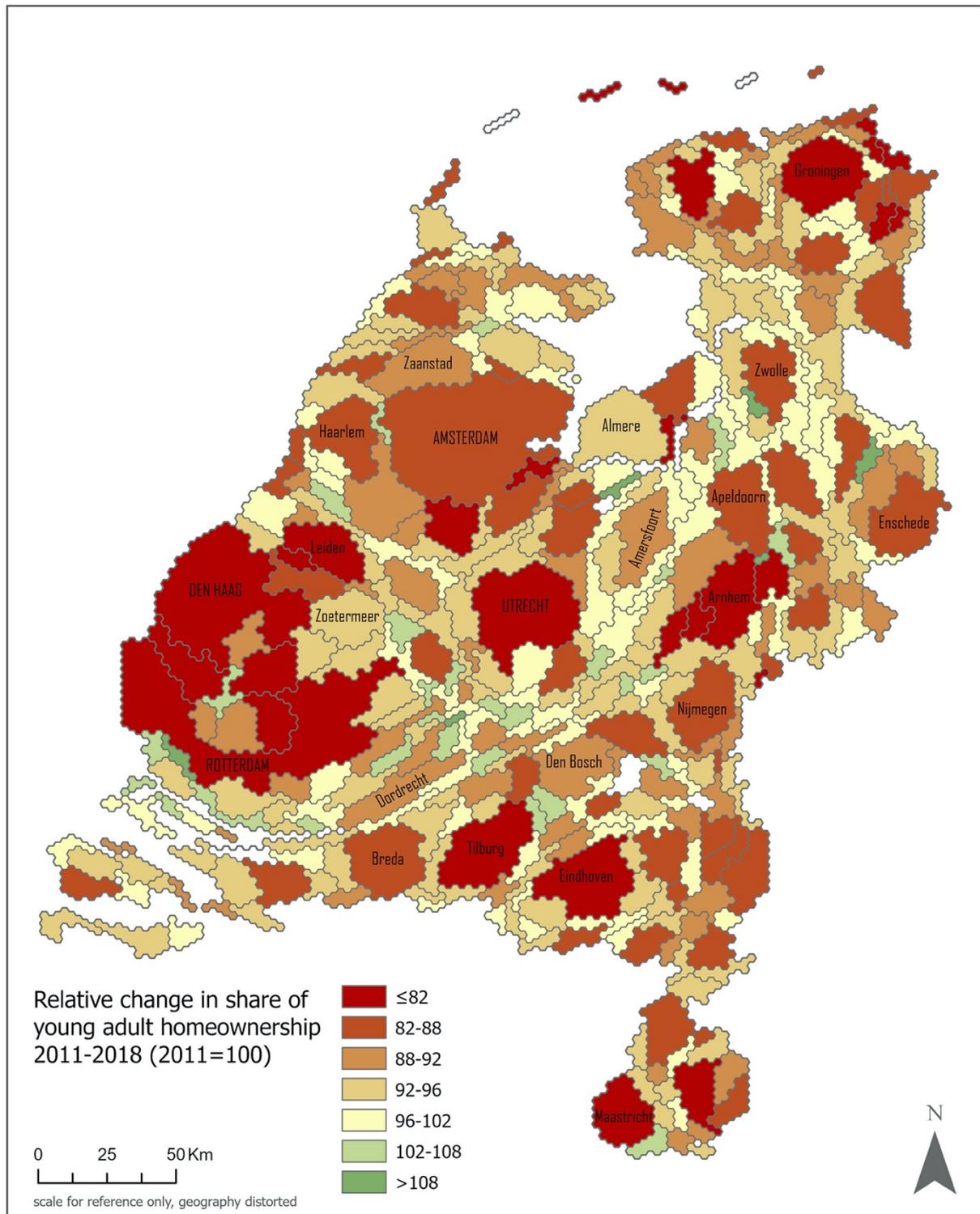
These spatially divergent patterns are further detailed in Figures 3 and 4. As noted, the maps are presented as cartograms – that are distorted proportional to the number of households to visually account for differences in population. Figure 3 first maps 2011 homeownership rates per municipality. The map reveals a consistent pattern of lower young adult homeownership rates in larger municipalities. Among the ten municipalities with the lowest rates are the two largest cities Amsterdam and Rotterdam, as well as several university cities such as Wageningen, Maastricht, Groningen, Delft, Leiden and Nijmegen. On the other end of the spectrum, the highest young adult homeownership rate can be found in Urk (midway between Almere and Groningen on the map), a low-density village municipality where some 85% of young adult households owned their home in 2011.

Figure 4 subsequently maps changes in young adult homeownership rates at the municipal level. Again, relative changes are presented for 2018 compared to 2011. First, the map shows that in the vast majority of municipalities, homeownership rates among young adults declined between 2011 and 2018. This was the case in 360 out of 412 municipalities, or 87% of all municipalities and including 95% of young adult households. Second, while at first glance it may seem difficult to discern a specific geography from these patterns, the map underscores that the strongest decreases are almost all found in large and medium-sized cities. The strongest relative decreases can be found in Groningen, Den Haag, Leeuwarden, Maastricht and Amstelveen. Groningen and Maastricht are popular student cities, Leeuwarden is a medium-sized regional center and Amstelveen is an affluent medium-sized city bordering Amsterdam.

**Figure 3. Young adult homeownership rates in 2011 at the municipal level. Map is a cartogram distorted based on number of households per municipality.**



**Figure 4. Relative change in young adult homeownership rates between 2011 and 2018 at the municipal level. Map is a cartogram distorted based on number of households per municipality.**



### **Bivariate correlations**

We further unravel spatial trends in young adult homeownership rates by linking these to municipal characteristics. As a first step, we carry out bivariate correlations of our main variables, i.e. the selection of measures related to our four narratives of spatially divergent homeownership access as outlined in the theoretical section (Table 3). Some caution is warranted here, as these bivariate correlations can only establish statistical associations which then entail further scrutiny using regression modelling that also takes into account spatial dependencies.

We find, interestingly, that higher price-to-income ratio, representing greater *un*affordability, are positively associated with young adult homeownership trends. This means that more expensive municipalities (in 2011) have seen a relatively weak subsequent decrease in young adult homeownership, or even an increase. However, crucially, an increasing ratio (towards more unaffordability) is negatively associated with homeownership entry. This does suggest that decreasing affordability hampers young adults' ability to buy.

Likewise, an increase in mid-age homeownership households is negatively associated with young adult homeownership trends suggesting potential competition/crowding-out dynamics in terms of different age populations. In terms of income, on the other hand, the positive correlation does not point to a similar income competition effect with younger households.

Looking at potential pull factors, we see that university presence, expansive labour markets, higher density levels and higher initial shares of young adults are all negatively correlated with the change in young adult homeownership. These are all variables associated with (larger) cities. These correlations point to the expected association between locations of concentrated housing demand undermining access for younger adults.

Finally, looking at measures related to supply, we find some contradictory correlations. High overall homeownership rates in 2011 are indeed positively associated with subsequent homeownership trends for young adults, whereas absolute change in owner-occupied dwellings is unexpectedly negatively associated with young adult homeownership trends. This implies that municipalities that saw the greatest increase in owner-occupied households are also those where young households are relatively less able (or willing) to buy, potentially associated with crowding-out dynamics. While the negative correlation for the share of smaller dwellings seems to contradict the expectation of this stock being most appropriate for younger starter households, its concentration in urban and relatively more expensive housing markets would explain the negative bivariate relationship.

**Table 3. Bivariate correlations of independent variables with the dependent variable: relative change in young adult homeownership 2011-2018.**

Note: all variables are standardized, except the university city and Randstad region dummies.

<b>Housing affordability</b>		
Ratio of average house value to young adult (18-39) gross income 2011 (standardized)	0.229	***
Change in ratio of average house value to young adult (18-39) gross income 2011-2018 (standardized)	-0.459	***
<b>Competition (crowding-out)</b>		
Percentage-point change in mid aged homeowner households 2011-2018 (standardized)	-0.186	***
Percent change mean gross household income (standardized)	0.206	***
Percent change in total households 2011-2018 (natural log, standardized)	0.058	
Change in mean household size 2011-2018 (standardized)	0.059	
<b>Municipal pull factors</b>		
University in city (1=yes, 0=no)	-0.367	***
Mean number of jobs per households 2011 (standardized)	-0.271	***
Percent young households (18-39) 2011 (standardized)	-0.418	***
Percentage-point change in young households (18-39) 2011-2018 (standardized)	0.033	
Address density 2011 (natural log, standardized)	-0.372	***
<b>Supply</b>		
Percent homeowner households 2011 (standardized)	0.450	***
Change in absolute number of homeowner households 2011-2018 (standardized)	-0.242	***
Percent of dwellings under 100 m2 in 2012 (standardized)	-0.319	***
<b>Controls</b>		
Percent native Dutch 2011 (standardized)	0.450	***
Percentage-point change in native Dutch 2011-2018 (standardized)	0.371	***
Total number of households 2011 (natural log, standardized)	-0.477	***
Mean gross household income 2011 (standardized)	0.397	***

\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ 

### Spatial regression modelling

Our next step was to apply spatial regression modelling to unravel multivariate relationships. As explained above, we opted for a Spatial Error Model (SEM) using Maximum Likelihood estimation and an inverse distance weighting up to a threshold of 113.4 kilometres (Table 4). The regression points to an explanatory power of roughly 54% (pseudo  $R$ -squared).

Looking at housing affordability measures, we see in the full regression model that both the ratio of house value to young adult income in 2011 and the change in this ratio over 2011-2018 are negatively associated with trends in young adult homeownership. In other words, controlling for other factors, housing markets that were already more unaffordable and those that saw worsening

affordability are significantly associated with greater declines in young homeownership. This is a clear indication that housing unaffordability relates to declining young adult homeownership. Affordability differences across municipalities are thus central to promoting geographic divides in housing market opportunities for young adults.

In terms of our second focus on factors driving competition dynamics, the results do not clearly support assumed relationships. In our multivariate analyses, competition from mid-aged households, trends in total households and mean household size do not indicate any significant associations. On the other hand, increasing mean household income remains significantly positively associated with a stronger relative increase in young adult homeownership. This counters the expected competition effect of growing shares of higher income households crowding out starter and younger households. One explanation may be that these results instead reflect gentrifying areas that are also likely to be those where young home-buying adults disproportionately move into.

The results on municipal pull factors largely reveal the expected relationships. However, while bivariate correlations were almost all significant, only the presence of a university and address density remain significant in our spatial regression model. This likely follows from the fact that many of these variables – despite not being flagged for problematic multicollinearity – capture somewhat similar contexts of (increasingly unaffordable) larger urban centres.

Nevertheless, significant negative coefficients for university presence and density levels do suggest that – independent of decreasing affordability and mounting competition – young adults struggle more in higher-density and knowledge centres. The findings thus broadly support an expected association between municipal pull factors and more limited young adult homeownership entry. At the same time, these factors may also point to higher shares of young adults in transitional phases in these urban areas either not able or choosing not (yet) to enter homeownership.

Our final explanatory narrative looks at the effect of local homeownership supply. While we expected that contexts having higher initial homeownership shares would provide greater leeway for homeownership entry, when controlling for all other measures, our findings in fact point to a negative association. Both change in the absolute number of homeowners and the stock of smaller dwellings do not appear significant. The regression results thus imply that improved homeownership supply factors are not as clearly relevant to better access for young adults as other key dimensions, such as housing affordability.

**Table 4. Spatial Error Model (SEM) – Maximum Likelihood Estimation.**

Dependent Variable:	Relative change in young homeownership share 2011-2018, where 2011=100			
Spatial Weight:	113.4 km (inverse distance weighted)			
Number of Observations:	412			
Pseudo R-squared:	0.541			
Log likelihood:	-1205.12			
Akaike info criterion:	2448.23			
Schwarz criterion:	2524.63			
<b>Variables (at the municipal level)</b>	<b>Coefficient</b>	<b>Std.Err.</b>	<b>z-value</b>	<b>p</b>
<b>Housing affordability</b>				
Ratio of average house value (WOZ) to young adult (18-39) gross income 2011 (standardized)	-2.572 ***	0.443	-5.808	0.000
Change in ratio of average house value (WOZ) to young adult (18-39) gross income 2011-2018 (standardized)	-2.558 ***	0.450	-5.684	0.000
<b>Competition (crowding-out)</b>				
Percentage-point change in mid aged homeowner households 2011-2018 (standardized)	-0.389	0.404	-0.961	0.337
Percent change mean gross household income (standardized)	1.456 ***	0.310	4.695	0.000
Percent change in total households 2011-2018 (natural log, standardized)	0.377	0.249	1.513	0.130
Change in mean household size 2011-2018 (standardized)	0.423	0.315	1.344	0.179
<b>Municipal pull factors</b>				
University in city	-5.900 **	1.724	-3.421	0.001
Number of jobs per households 2011 (standardized)	-0.330	0.296	-1.114	0.265
Percent young households (18-39) 2011 (standardized)	-0.132	0.438	-0.300	0.764
Percentage-point change in young households (18-39) 2011-2018 (natural log, standardized)	0.210	0.244	0.860	0.390
Address density 2011 (natural log, standardized)	-1.013 *	0.458	-2.213	0.027
<b>Supply</b>				
Percent homeowner households 2011 (standardized)	-1.744 **	0.561	-3.111	0.002
Change in absolute number of homeowner households 2011-2018 (standardized)	0.108	0.318	0.340	0.734
Percent of dwellings under 100 m <sup>2</sup> in 2012 (standardized)	-0.023	0.393	-0.058	0.954
<b>Controls</b>				
Percent native Dutch 2011 (standardized)	1.835 ***	0.410	4.479	0.000
Percentage-point change in native Dutch 2011-2018 (standardized)	1.422 ***	0.316	4.502	0.000
Number of households 2011 (natural log, standardized)	-0.463	0.383	-1.210	0.226
Mean gross household income 2011 (standardized)	2.631 ***	0.400	6.578	0.000
Constant	90.96 ***	2.976	30.56	0.000
Lambda	0.924 ***	0.052	17.83	0.000

\*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$

## Conclusion

The worsening fortunes of young adults on the housing market have garnered substantial scholarly attention. A key indicator is their decreasing ability to buy a house and enter owner-occupancy. In this paper we have presented fine-grained analyses of changes in young adult homeownership rates across the Netherlands, and their divided geography. From these analyses we can derive three main conclusions that advance academic knowledge on the topic.

First, our findings highlight a notable decrease in owner-occupancy among young adults in the Netherlands between 2011 and 2018. We find consistent decreases for all households up to their early forties, suggesting a broad trend. Yet, we can also pinpoint that the most substantial decreases in homeownership were among those in their late twenties and early thirties. Among these households, homeownership rates went down by some 7 or 8 percentage points. Conversely, homeownership rates particularly increased among those in their sixties or older. These patterns and trends are in line with, and contribute to, a wave of recent studies highlighting increasing generational fractures in homeownership access (Forrest & Hirayama 2018; Lennartz et al. 2016; McKee et al. 2017; Flynn 2020; Arundel 2017). While not the direct focus of this study, these developments are mirrored by an increasing dependence of young adults on private rental housing. In this tenure, average rent burdens are particularly high among young adults, and have rapidly increased in recent years (Hochstenbach & Ronald 2020). Furthermore, a growing share of young tenants in the Dutch context faces housing insecurity, following the introduction of short-term leases in 2016 (Huisman 2020). Finally, an increasing number of young adults extend their stay in the parental home (Lennartz et al. 2016).

Second, this study adds a novel spatial perspective to the analysis of young adults' entry into homeownership. While most studies are limited to national level patterns and trends, this study centres on municipal-level spatial variations. Findings reveal both key spatial commonalities and divergences. On the one hand, young adult homeownership rates decreased between 2011 and 2018 in the vast majority of municipalities: including across 87% of municipalities – home to 95% of young adult households. This common experience highlights that young adults' struggles on the housing market are far from restricted to the 'hottest' markets, but are widespread across most of the country. However, despite this common trend, our analyses also reveal stark spatial disparities in the degree of decline. Importantly, we indeed show that decreases in young adults' homeownership rates are strongest in more urbanized regions, specifically the largest cities where price increases have been steep and competition for housing fierce (Hochstenbach & Arundel 2020). Moreover, the data points to young adult homeownership entry having relatively decreased the most in cities where young homeownership rates were the lowest, indicating a trend towards increasing spatial inequality in homeownership opportunities for young households.

Third, our paper underscores the utility of advanced spatial modelling techniques to understand how housing-market trends play out across space. Multivariate analyses of municipal-level factors across four explanatory narratives provided exploratory findings of municipal-level drivers of spatial divergences. These analyses confirm local housing affordability conditions to be central in determining young adults' worsening homeownership prospects. Independent of decreasing affordability, we also find evidence of relatively strong decreases in young adult homeownership in more urbanized municipalities and those with a university presence. Together, these findings point to high-pressure housing markets that attract a concentration of population and capital becoming more difficult for young homeownership entry. This points to a particular housing market disadvantage for young adults precisely in those municipalities that may offer the most (economic) opportunities. Such dynamics imply a potential crucial interaction of multiple dimensions of socio-economic inequality, where prospects across labour, housing and educational trajectories over the life-course may be strongly spatially differentiated.

Our findings underscore the importance of studying housing-market transformations and their implications at more fine-grained scales than the national level. This results in both common and divergent experiences across space. Here, we have provided an initial investigation into explanatory factors of spatial divergence in young adult homeownership opportunities, with the hope of spurring further in-depth and multi-scalar investigation into drivers of intra-national divides in homeownership access. Surprisingly, such spatial housing-market analyses have received scant attention. Housing research tends to focus on the national level or cross-national variations, while there is also a wealth of sociological and geographical studies focusing on individual-level determinants of housing position. A greater sensitivity to meso-level variations could fruitfully inform future research agendas, particularly in how these structure growing inequalities across populations and space.

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### **Data Availability Statement**

This paper draws on author calculations of non-public micro-data from the Systems of Social-statistical datasets (SSD) from Statistics Netherlands (CBS). Derived data supporting the findings of this study are available from the authors on request.

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# Appendix

