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RESEARCH ARTICLE

The age dimensions of urban socio-spatial change

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Abstract

Contemporary societal transformations are marked by particular age dynamics and shifting fault lines between generations. Growing socio-economic divides between young and old have been singled out as a key concern, for example, on the housing market. However, age is not very often explicitly integrated into analyses of urban socio-spatial inequality. This paper makes an effort to do so, drawing on the case study of Amsterdam (the Netherlands). Results highlight how age factors into urban socio-spatial change. First, by placing age centre stage, it shows how aggregate urban upgrading comes about. Some age groups—those in their midthirties and over sixty—drive urban upgrading, whereas the 50-to-60 age group has become poorer, dampening upgrading. Second, geographies of affluence and poverty differ substantially between age groups. Whereas affluent elderly concentrate in the most privileged areas, and increasingly so, younger generations move to neighbourhoods lower on the urban hierarchy. Third, at any one point, multiple generations are involved in driving neighbourhood gentrification. Affluent elderly drive further gentrification in already affluent areas, whereas younger adults do so in lower status neighbourhoods.

KEYWORDS

age, Amsterdam, gentrification, life course, segregation, urban inequality

1 | INTRODUCTION

Urban research has a long history of studying patterns of socio-spatial inequality such as residential segregation. These studies, for instance, point to strong and persistent racial disparities in residential arrangements and neighbourhood outcomes (Massey & Denton, 1993; Wilson, 1987). More recently, in the face of increasing economic inequality (Piketty, 2014), studies have shown that spatial separation between rich and poor is on the rise in cities across Europe and the United States (Reardon & Bischoff, 2011; Tammaru, Marciniak, Van Ham, & Musterd, 2016; Watson, 2009). Ample attention has also gone out to questions of how the racial and class maps of cities are reconfigured over time, for example, due to gentrification or neighbourhood decline. Relatedly, housing research has long looked into who is and who is not able to access certain types of housing,

particularly owner occupancy, pointing out the mutually constitutive relationship between social class and housing position (Rex & Moore, 1967). In recent years, growing disparities between young and old have been singled out as a key concern on the housing market, as the former group struggles to find secure housing and get on the housing ladder (Forrest & Hirayama, 2015; McKee, 2012). However, the role of these age disparities and dynamics has received very little attention in analyses of wider socio-spatial change.

Age dynamics play an important role in contemporary societal and socio-spatial transformations. Many larger Western cities have seen a notable and continuing increase in the share of young adults, particularly of those with a high education (Buzar, Ogden, & Hall, 2005; Ley, 1996; Moos, 2016). These trends have been crucial in driving change within cities: Although gentrification is first and foremost a process of class change (Lees, Slater, & Wyly, 2008), it is most often also a

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process of *young* people moving into central urban locations during a transitory life phase prior to settling down (Ley, 1996; Rose, 1984). Likewise, regional population decline is associated with selective outmigration of the young and upwardly mobile, and the aging of a lower income population left behind (Elshof, van Wissen, & Mulder, 2014; Martinez-Fernandez, Audirac, Fol, & Cunningham-Sabot, 2012). Fault lines within and between generations, and changes therein, may thus be key in explaining overall socio-spatial divides.

This paper therefore sets out to explicitly introduce “age,” and age-related changes, into wider analyses of socio-spatial inequality. It unravels the extent to which aggregate socio-economic changes at both the urban and neighbourhood level are produced by populations of different ages. That is, some age groups may contribute more to total socio-economic change than other groups. Still other age groups may dampen or counterbalance overall socio-economic change (e.g., when overall patterns point to upgrading, whereas downgrading may be dominant among particular age groups). The influence of age groups may also vary across urban space, as patterns of up or downgrading may be driven by different age groups in different locations.

This paper presents a study of the municipality of Amsterdam, the Dutch capital and the nation's largest city with over 800,000 inhabitants. Amsterdam is a booming city characterised by gentrification that has spread across most of the central city and rapidly rising house prices (see Hochstenbach, 2017a). Despite housing marketisation, Amsterdam remains a city with a relatively large de-commodified social-rental housing stock (around 45% of the housing stock), shielding incumbent tenants from market forces. The paper draws on register data from Statistics Netherlands covering the entire population for the period 2004–2015. Using spatial and temporal analyses, this paper highlights how and where different age groups influence socio-spatial inequalities, and changes therein over time.

2 | LITERATURE REVIEW

2.1 | Age and residential trajectories

Residential location is closely related to age and life-course position, as well as income and class. It is well established that life-course events trigger residential moves. Households attempt to recalibrate their housing situation to changing needs and desires, and to changes in their own socio-economic position (Clark & Huang, 2003; Musterd, Van Gent, Das, & Latten, 2016). Major life events like leaving home, coupling, and having children often lead to relocation to a different type of residential environment (Brown & Moore, 1970; Geist & McManus, 2008). Such moves may be between different municipalities or regions (e.g., urbanisation or suburbanisation), but also within municipalities—between neighbourhoods offering different locational qualities (e.g., good schools or other amenities). The result is a fine-grained geography of age and life course, with a mosaic of neighbourhoods fulfilling specific roles for households of different ages (Damhuis, Van Gent, Hochstenbach, & Musterd, 2019; Timms, 1971). Age and life-course dynamics are therefore implicated in the production and reproduction of uneven population distributions and socio-spatial inequalities (Bailey, 2009).

The residential trajectories of young adults are particularly important in understanding urban change. In many Western countries, young adults often move to the city after leaving home, for education or employment reasons. This propels major interregional population redistributions (Faggian, McCann, & Sheppard, 2007; Fielding, 1992; Imeraj, Willaert, Finney, & Gadeyne, 2017; Smith & Sage, 2014). Especially young adults from affluent backgrounds and those *en route* to the middle class try their fortunes in the city, assuring these cities of a steady influx of upwardly mobile newcomers (Smith, 2005). As university participation has expanded over the last decades, ever more young adults flock to the city.

Although residence in the city remains temporary for many, trends are that young adults stay longer. They prolong a transitory life phase prior to settling down—part of a second demographic transition marked by an increase in single living and a postponement of marriage and childrearing (Lesthaeghe, 2010). For many young adults, this transitory life phase is distinctly urban (Buzar et al., 2005; Van Criekingen, 2010): They postpone their move out of the city or may even choose not to move away altogether (Boterman, 2012; Bridge, 2003).

For previous generations of young middle-class adults that opted for central-city living, the choice to do so often constituted a rebellious act, and an embrace of progressive values (Ley, 1996). It meant a rejection of dominant societal and patriarchal expectations of middle-class suburban life and the male-breadwinner nuclear family (Wilson, 1991). As university participation has continued to expand, labour markets have further clustered in cities and gentrification has become an urban mainstay; this has been subject to change. Now, living in the city has in many ways become standard and expected among young middle-class adults in western countries. They may, for example, have parents who were gentrifiers themselves and now promote similar residential trajectories (Hochstenbach & Boterman, 2017, 2018).

2.2 | Age and urban change

Subsequent effects on cities are notable. Young middle-class adults have been key in many cities' return to demographic growth (Buzar et al., 2005; Kabisch & Haase, 2011; Rérat, 2012; Storper & Manville, 2006). Their presence has especially increased in neighbourhoods that combine proximity to education, amenities, and cultural life with the availability of affordable, often small, rental apartments (Moos, 2016). There are close ties to urban class change here as well. From a demand-side perspective, young upwardly mobile adults are key agents in gentrification, especially incipient forms (Ley, 1996; Rose, 1984).

Class and age also intersect in the case of family households. The mass suburbanisation that took place across cities of the global north during much of the 20th century (and still today) was driven by middle-class families with children able to afford more spacious homes and a suburban lifestyle (Rossi, 1955). Lower class, often migrant, families remained confined to the cheaper, lower quality, and smaller housing found in North American and European cities (Musterd, 2005; Wilson, 1987). For various reasons, a growing number of middle-class households remain in the city after having children (Boterman, 2012; Lilius, 2019)—a structural trend that was temporarily amplified by the global financial crisis as the housing-market downturn led to lower residential mobility rates. As these families are often dual

earners able to mobilise ample financial resources, they are important agents of urban upgrading. Specific forms of family gentrification subsequently emerge in specific locations that offer relatively spacious housing, safety, and proximity to good schools (Boterman, 2012; Butler, Hamnett, & Ramsden, 2013; Butler & Robson, 2003).

Older generations are less often considered in urban change. If at all, they are often depicted as being on the losing side of gentrification: Gentrification may uproot old communities and dissolve neighbourhood networks, contributing to displacement pressures (Newman & Wyly, 2006). These assumptions particularly apply to blue-collar elderly, who are often thought of as being displaced or replaced by younger and more affluent groups (Hamnett, 2003). When strong tenant protection is in place, as is the case in Dutch cities, low-income groups may be able to remain in their neighbourhood into old age, slowing down population turnover and neighbourhood change (Hochstenbach & Van Gent, 2015).

On the other end of the spectrum, affluent elderly may contribute to specific forms of urban upgrading. For example, postempty nesting or retirement, they may turn to urban living. By and large, home-owning elderly have been relatively successful in accumulating wealth across European countries (Wind, 2017), which they can put to use to acquire property in up-market areas. New high-end developments may seek to cater to the preferences of such affluent elderly (Rose & Villeneuve, 2006). Affluent elderly may also invest in second homes—for leisure, their children, or speculative purposes (Arundel, 2017; Hochstenbach, 2018; Paris, 2009). The presence of aging gentrifiers may further necessitate younger generations of gentrifiers to look elsewhere. Consequently, gentrification may move to new spaces as young adults are unable to enter mature gentrification neighbourhoods already occupied by wealthier older generation.

2.3 | Changing generational divides

Links between age, class, and socio-economic position are not static as divides both between and within age groups change. Recently, much attention has gone toward growing inequalities between old and young at country levels. Wealth concentrates among older age groups, as the rate of return on capital has surpassed that on labour (Piketty, 2014). In addition, especially since the onset of the 2008 global financial crisis, young adults in many countries appear on the losing side of labour-market changes. Studies of European countries and the United States show young adults are, more so than others, confronted with decreased access to employment, stagnant wages, and contract precarity (Bell & Blanchflower, 2011; Hills, Cunliffe, Gambaro, & Obolenskaya, 2013).

Housing plays a central role in wealth concentration and exacerbating intergenerational inequalities. In countries like the Netherlands, access to secure and affordable rental housing has become more restricted, following the erosion of social-rental sectors (Hochstenbach, 2017b). Owner occupation has drifted out of reach for growing portions of the population due to long-term house-price increases, and the post-global financial crisis tightening of mortgage lending criteria. This has aggravated housing inequality, not only between rich and poor but also between insiders and outsiders. Insider-outsider divides frequently run along generational lines:

Especially younger adults struggle to buy a house or find secure independent housing (Clapham, Mackie, Orford, Thomas, & Buckle, 2014; Druta, Limpens, Pinkster, & Ronald, 2018; Forrest & Hirayama, 2015; McKee, 2012). Consequently, younger adults are barred from accumulating the housing wealth that can help them advance on the housing market (Arundel & Hochstenbach, 2018). Many older generations of owner-occupiers have, in contrast, benefited from long-term house price gains, which enabled them to accumulate substantial housing wealth (Wind, 2017). Using this wealth, they are able to outcompete and crowd out younger households from house purchases (Neuteboom & Brounen, 2011; Ronald & Kadi, 2017). Of course, they may also assist their children in purchasing a house—contributing to the intergenerational reproduction of inequality (Helderman & Mulder, 2007). The spatial dimensions of growing age divides are rarely considered, but it is to be expected that older age groups will increasingly mobilise their (housing) wealth to buy into expensive areas, outcompeting younger households.

The above has discussed how the social geography of cities is shaped by the intersection between age and class, notwithstanding the important influence of other key variables such as ethnicity and gender. This study seeks to add to this literature in three main ways. First, the current literature gives little insight into the extent to which contemporary trends of urban change are produced or alternatively mitigated by different age groups. Although some studies have investigated the social geography of, and residential segregation between different age groups (Winkler & Klaas, 2012; Sabater, Graham, & Finney, 2017; see also Hagestad & Uhlenberg, 2006), they rarely consider how age shapes socio-spatial divides between income groups. Second, and relatedly, it is unknown to what extent various age groups may be the key agents of change in different neighbourhoods, and how this adds up to aggregate urban change. For example, the potential coexistence of different age-specific forms of gentrification (e.g., studentification and family gentrification) may help explain the process' expansion—adding to explanations focusing on the role of capital and the state (Hackworth & Smith, 2001).

Third, and most fundamentally, studies highlight growing divides between old and young, with the latter on the losing side. It is unknown though how these divides unfold in specific urban contexts. Cities may deviate from nationwide trends, as they are confronted with specific patterns of population aging and selective residential mobility. This may include the aging of a relatively poor incumbent population, as previous decades have seen the suburbanisation of middle-class households, and the selective influx of affluent or soon-to-be affluent young adults. Alternatively, cities may also see an increase in affluent older households, while young adults may especially struggle to advance on the housing market in high-demand urban contexts.

3 | CONTEXT: AMSTERDAM HOUSING POLICY

Housing policy is central in producing and reproducing urban and socio-spatial inequality (Desmond, 2016; Tach & Emory, 2017). Likewise, age divides, both within cities and within housing markets, are influenced by both urban and housing policies. There is a wide variety in housing systems, shaping spatial inequalities in various ways

(Tamaru et al., 2016). Broadly speaking, more liberal and market-oriented housing systems are generally associated with higher levels of segregation, accommodating more affluent households' tendency to cluster among peers (Musterd et al., 2016). This may also lead to greater spatial divides between age groups.

Turning to Amsterdam, we find that the city still hosts a comparatively large social-rental sector (45% of the total stock) despite ongoing housing liberalisation. Marked by comparatively low rents, limited rent increases, and strong tenant rights, the social-rental stock protects insiders. Housing outsiders face exclusion from the tenure due to long waiting lists and low numbers of new allocations due to residential immobility and social-housing sales (Hochstenbach, 2017b). The imposition of stricter maximum income criteria in 2011 has furthermore led to the exclusion of middle-income households from entering the tenure. Consequently, the population of the city's social-rental stock is rapidly aging (Musterd, 2014): Insiders in the social-rental stock stay put whereas particularly young adults face mounting difficulties getting in. Its residents are also increasingly often on a low income, marking the tenure's gradual residualisation (Sociaal en Cultureel Planbureau, 2017).

The private rental sector, some 25% of the total stock in 2015, used to function as an important "landing spot" for a wide range of newcomers to the city due to typically low rent levels and the absence of waiting lists. Steep rent increases render the tenure increasingly inaccessible and unaffordable. After decades of decline, the Amsterdam private rental market has returned to growth post-2008, as a result of newly built developments and buy-to-let investments (Aalbers, Bosma, Fernandez, & Hochstenbach, 2018). The current expansion of private rent may help some young adults, if they are able and willing to shoulder high rent burdens.

The Amsterdam owner-occupied market has doubled in relative size between 2000 and 2015: from 15% to 30% of the total stock (Hochstenbach, 2017b). The expansion of homeownership and mortgage credit enabled growing shares of the Amsterdam population to buy. Yet following the global financial crisis, mortgage lending practices have become more restricted—rendering owner occupancy less accessible overall. Rapid house price increases from 2013 onwards have furthermore exacerbated unaffordability, thus accelerating exclusion. Particularly first-time buyers and those moving from lower demand areas find themselves unable to buy into the Amsterdam market (ING, 2018).

4 | DATA AND METHODS

This paper draws on data from the System of social-statistical datasets from Statistics Netherlands. These data are composed of records including municipal and tax registers. The paper focuses specifically on Amsterdam for the time period 2004–2015. This period is chosen for reasons of data availability but also because it includes a pre-2008 economic boom, a subsequent bust, and a boom of unprecedented intensity from 2013 onwards.

All analyses in this paper are conducted at the household level, because this is where economic and other resources are bundled. Household age is determined on the basis of the oldest member. Households younger than 25 are excluded from the analyses because many of

them are students, for whom income does not align with class or housing-market position. Households in institutions are also left out of the analyses. Household socio-economic position is determined on the basis of equivalised net household income.¹ The analyses have also been conducted using gross household income, returning similar results. Income quintile groups relative to the entire Dutch population (of households aged 25 or older) are constructed for 2004 and 2015 separately. Households in the bottom quintile (q1) belong to the 20% poorest in the country. For the sake of simplicity and readability, we refer to these households as low income, or poor. Households in the top quintile are referred to as high income.² Income data are missing for 3% of households in 2004 and 2.2% in 2015; these households are left out of the analyses. The final dataset contains a total of 362,094 households living in Amsterdam in 2004 and 398,251 living there in 2015.

First, this paper looks at the changing presence of these different income and age groups in the city over time. It also looks at the combination of income and age in order to get a sense of which age groups are responsible for driving or dampening socio-economic population change. Second, this paper looks at the specific geographies of age and income. To measure and visualise neighbourhood outcomes, this paper uses households' residence address on January 1 of each year. Neighbourhoods follow the classification of Statistics Netherlands, typically delineated by major infrastructure or natural boundaries. In 2015, a total of 428 Amsterdam neighbourhoods where at least 10 households aged 25 or older were identified. These neighbourhoods on average housed 930 households, with the biggest one being home to 3,188 households. Population distributions and changes over the 2004–2015 period are unravelled through geographic information system analyses.

Neighbourhoods are subsequently categorised into decile groups based on (a) average 2016 real-estate values and (b) 2006–2016 percentage change in these values. The first typology gives insight into the city's most and least expensive areas (neighbourhoods in the top decile are among the 10% most expensive of the city). The second typology categorises neighbourhood-level changes in house values. Strong increases serve as a proxy for gentrification. Here, neighbourhoods in the top decile belong to the 10% that saw the strongest increases in house values. Both classifications (2016 house values and 2006–2016 changes) are based on neighbourhood averages of dwelling-level values (Dutch: WOZ). Dwelling-level house values are determined by the Dutch land registry agency (*Kadaster*) and are available in the SSD. All dwellings, rental units included, get a value assigned (see Arundel & Hochstenbach, 2018, for a more elaborate methodological explanation).

Finally, the paper concludes with an analysis of inequalities in wealth possessions and homeownership rates between households of different ages. Household wealth is derived from tax registers and includes all types of wealth (including housing wealth) minus outstanding debts (notably mortgage debt). Homeownership rates are derived

¹Statistics Netherlands equivalises net household incomes based on differences in household composition and size (see Statistics Netherlands, 2008, for exact methodology).

²The equivalised income of households in the bottom quintile is less than 13,000 euros in 2004 and 16,000 euros in 2015; households' equivalised income in the top quintile is above 27,000 euros in 2004 and 32,000 euros in 2015 (rounded figures).

from the land registry agency. Wealth and tenure analyses are only analysed for 2015, as comparable data are not available for 2004.

5 | RESULTS

5.1 | Population composition change

Amsterdam is home to relatively many households in their thirties, despite a 4.6 percentage point decrease between 2004 and 2015 (Table 1). The share of young adult households (25 < 30) and households aged 50 or older increased. In terms of direction of change, similar trends exist for the Netherlands overall. Important differences also exist though: The share of 65+ households is considerably larger in the Netherlands, and the increase stronger. The share of households in their thirties is substantially lower in the Netherlands overall.

In terms of income, the share of top-quintile households in Amsterdam increased by 2.5 percentage points, to 21.6% of the total household population. All other income groups decreased in relative size. The city furthermore has a polarised income structure as both the bottom and top groups are overrepresented. Because the quintile groups are based on nationwide income distributions, the five quintiles for the Netherlands overall are perfectly equal in size. To summarise, these patterns and trends reflect that Amsterdam is a relatively young and gentrifying city.

Combining household age with income position, Figure 1 (top panel) gives the share of top-quintile households in 2004 and 2015, and percentage point changes between these years. The bottom panel does the same for households in the bottom quintile. Percentages are calculated *within* age groups. To aid interpretation, the top panel shows that in 2015, 31% of all 35-year-old households belonged to the top income quintile, whereas this was only 25% in 2004—a six

percentage point difference. The bottom panel shows that for this same age group, the percentage in the poorest quintile stood at 25% in 2015, down from 29% in 2004. To be sure, this figure does not follow population cohorts over time but compares age groups in different years.

The share and distribution of high-income households in Amsterdam have strongly shifted (Figure 1). In 2004, there was a double peak with the share of high-income households highest among households in their midthirties and those in their midfifties. By 2015, this share is clearly highest among residents in their midthirties. These changes are the result of diverging trends. The share of high-income residents increased for all up to the age of 50. Then, for groups between the age of 51 and 61, the share decreased—running counter to overall urban trends. The share of high-income groups increased among older households.

The share of low-income households is highest among households in their twenties, relating to the fact that many of them only recently entered the labour market whereas some may still be studying. Furthermore, in the wake of the global financial crisis, those labour-market entrants are particularly struggling. In terms of change, the share of bottom quintile households increased for those aged between 47 and 65. Among households in their thirties and early forties, the share of low incomes decreased. Shares of low-income households are clearly lowest among those postretirement age. Amsterdam's socioeconomic change is thus very age specific.

5.2 | Mapping the geography of income and age

The question is how these various “age-income” groups sort into urban space—and specifically to what extent they reside in neighbourhoods of high status, or in gentrifying neighbourhoods. Figure 2 maps neighbourhood deciles of average house values (top

TABLE 1 Age and income composition of the Amsterdam and Dutch household population in 2004 and 2015

Household groups	Amsterdam			The Netherlands		
	2004	2015	pp	2004	2015	pp
Age groups						
25 < 30	10.7	11.8	1.1	7.1	6.8	-0.3
30 < 40	26.7	22.1	-4.6	20.7	15.3	-5.4
40 < 50	22.0	20.2	-1.8	21.3	19.7	-1.6
50 < 60	17.1	19.1	1.9	19.7	20.4	0.7
60 < 65	5.8	7.6	1.9	7.5	9.0	1.5
65+	17.7	19.2	1.5	23.7	28.8	5.0
Income						
q1 (bottom 20%)	31.0	30.6	-0.4	20.0	20.0	0.0
q2	17.4	16.4	-1.0	20.0	20.0	0.0
q3	16.5	15.5	-1.0	20.0	20.0	0.0
q4	15.9	15.9	0.0	20.0	20.0	0.0
q5 (top 20%)	19.5	21.6	2.5	20.0	20.0	0.0
Total	100	100	0	100	100	0
Total N	362,094	398,251	35,956	6,585,480	7,183,585	598,105

Note. Age groups are based on age of the oldest household member; income groups are nationwide quintiles of equivalised household income. “pp” refers to percentage point change between 2004 and 2015. Data: SSD, own calculations.

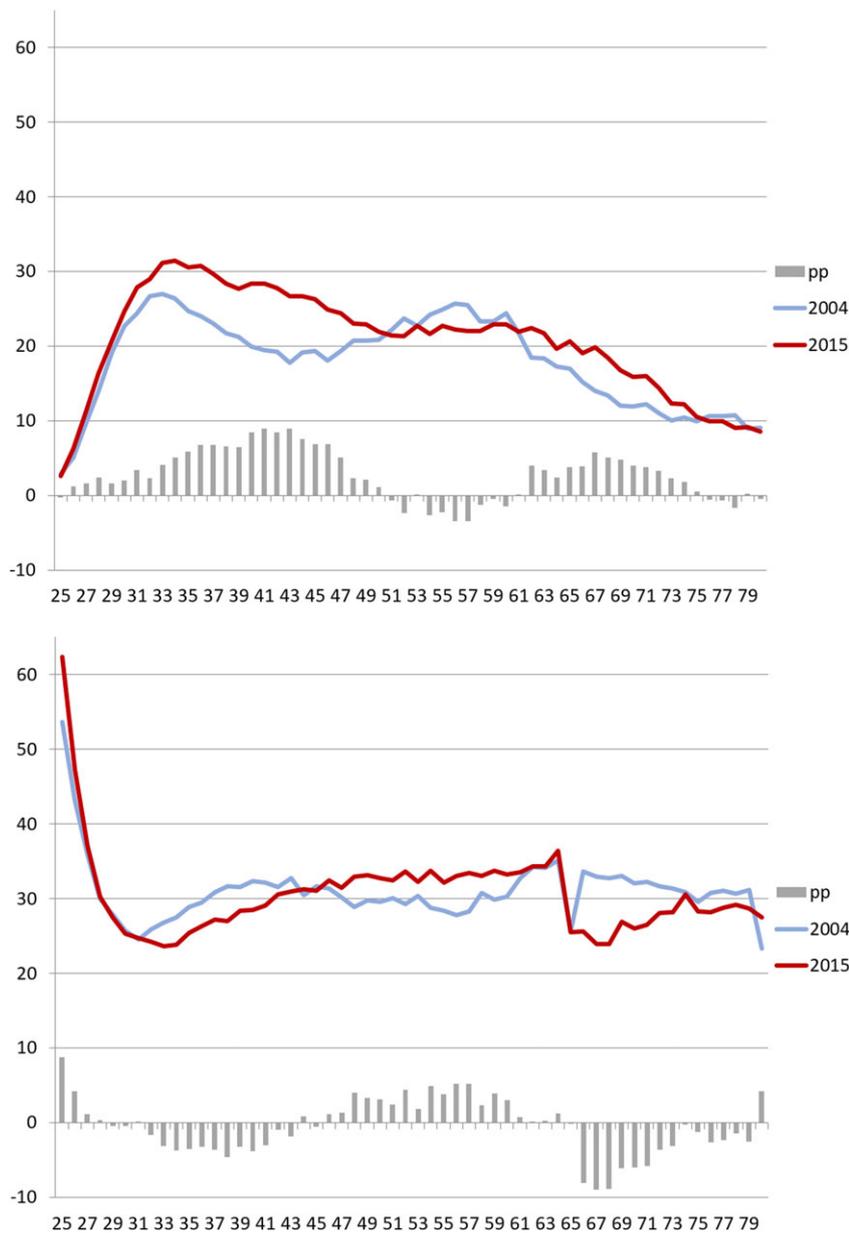


FIGURE 1 Within age group shares of high-income (top panel) and low-income (bottom panel) households by household age in 2004 and 2015, and percentage point change. Data: SSD, own calculations. Notes: Households over 80 not visualised. High-income households belong to the top income quintile; low-income households to the bottom income quintile

panel), and 2006–2016 changes in house values (bottom panel). These deciles are used in subsequent analyses. Although house-price appreciation is only one element of gentrification and wider neighbourhood change, the resulting spatial patterns for Amsterdam are similar to those found in other studies on income change (Hochstenbach & Van Gent, 2015), tenure restructuring (Hochstenbach, 2017b), selective Instagram usage (Boy & Uitermark, 2017), and haute cuisine in the city (Boterman, 2018).

The highest house values can be found in the historic inner-city Canal Belt,³ and the elite Old South borough (top panel). The most inexpensive neighbourhoods are predominantly located in the postwar urban periphery in the north, south-east, and west of the city. A clear centre-periphery divide exists regarding house-value change (bottom panel), with prices in central-city neighbourhoods rapidly increasing.

Price increases are strongest in the city's gentrification hot spots in the city's inner west and inner east.

The spatial distribution of high-income and low-income groups over the city roughly reflects house-value patterns (Figure 3): High-income households dominate the city's elite areas, whereas low-income households are overrepresented in the city's peripheral boroughs. Shares of high-income households in many of Amsterdam's gentrification hot spots are still around the city average, reflecting their current mixed-income population structure.

Geographies of affluence (and poverty) differ substantially along the lines of age. Figure 4 presents maps of the share of high-income households of different age groups per neighbourhood.⁴ Because percentages relative to the neighbourhoods' total household population

³All specific names of neighbourhoods or areas in Amsterdam mentioned in this paper are labelled in Figure 2.

⁴For reasons of space, age-specific maps for the bottom income quintile are not presented. Overall, geographies of poverty roughly mirror those of affluence (also see Figure 3), although spatial patterns are not as pronounced.

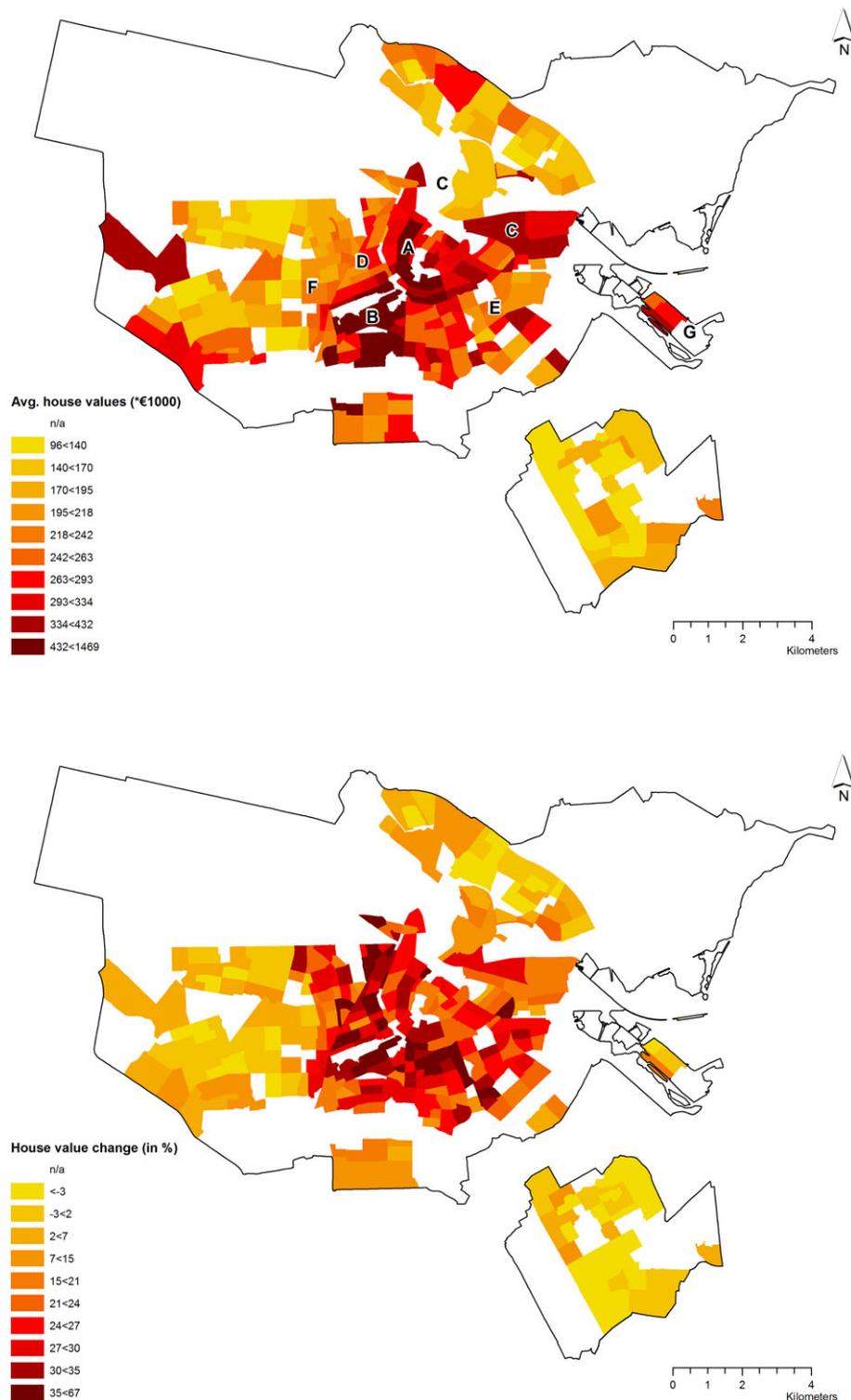


FIGURE 2 Average 2016 house values (top panel) and 2006–2016 house-value change (bottom panel). Data: SSD, own calculations. Source: Arundel and Hochstenbach (2018). Labels: A, Canal Belt; B, Old South; C, waterfront; D, inner west; E, inner east; F, western ring road; G, IJburg

are mapped, spatial patterns can be considered the outcome of the interaction between age and income.

Concentrations of high-income households in their thirties mainly exist in gentrifying neighbourhoods in the inner east, south, and west of the city (top panel). Recently built developments, for example, along the western ring road and the waterfront also show concentrations. They typically eschew the urban periphery, leading to clear centre-

periphery divides. These spatial patterns are substantially different from overarching geographies of affluence: The city's elite areas do not host particularly high concentrations of affluent households in their thirties.

Again, very different patterns exist for high-income households in their forties (second panel from top). These groups mainly concentrate in the newly built developments in IJburg and along the waterfront.

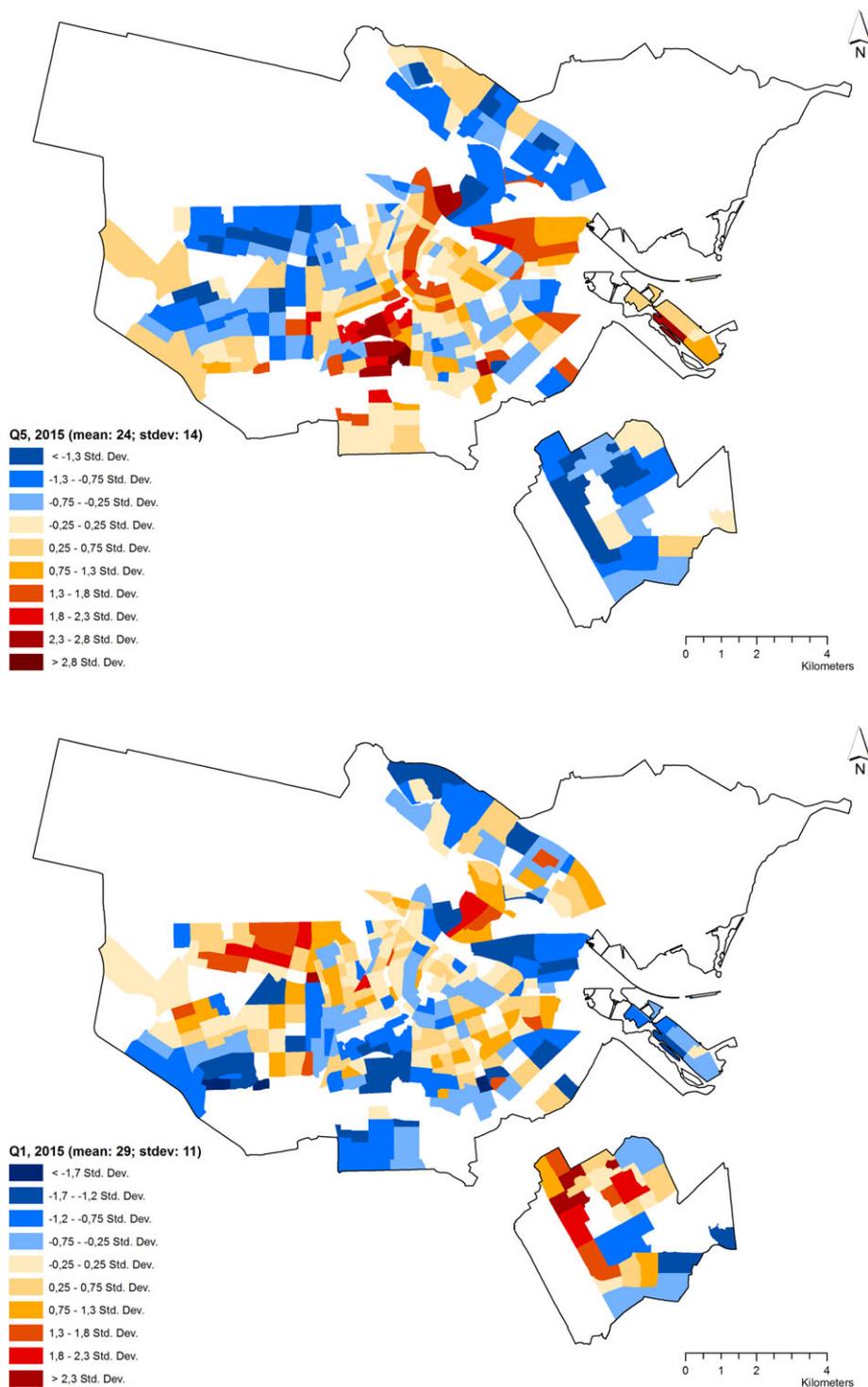


FIGURE 3 The share of high-income (top panel) and low-income (bottom panel) households in Amsterdam per neighbourhood in 2015. Data: SSD, own calculations

Furthermore, concentrations also exist in the elite Old South district—in line with overall geographies of affluence. Affluent households in their fifties (third panel) share this focus on the Old South borough and the waterfront, but strong concentrations particularly also exist in the city's southwest and the northern periphery. The centre-periphery divide found among affluent younger households is not as pronounced among those in their forties or fifties. Instead, these households typically do not live in most of the city's gentrifying

neighbourhoods. For households aged 65 or older, very clear patterns exist (bottom map)—concentrating overwhelmingly the city's most expensive and privileged areas (Canal Belt, Old South).

In sum, geographies of affluence are highly different between age groups. Whereas high-income younger households concentrate in the city's gentrifying neighbourhoods, older households concentrate in traditionally elite areas. Also patterns of change show clear differences (see Appendix A): Affluent elderly increased their

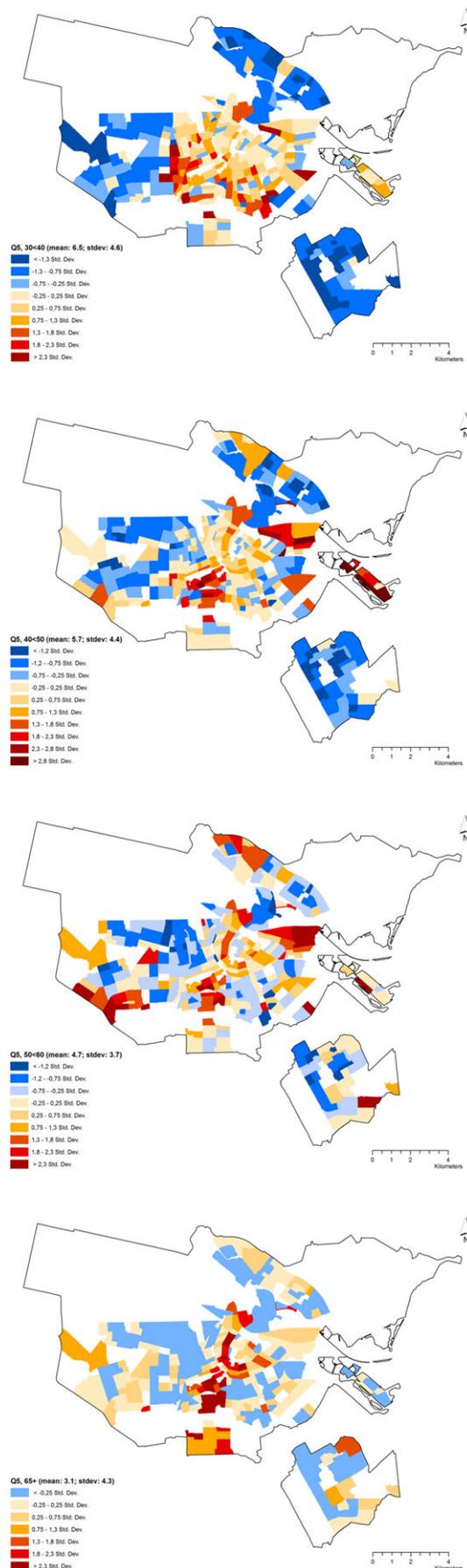


FIGURE 4 High-income households per age group as percentage of total neighbourhood household population in 2015. Source: SSD, own calculations

presence in elite areas between 2004 and 2015. The share of affluent households in their thirties decreased in elite areas but showed strong increases in gentrifying areas.

5.3 | Neighbourhood typologies

These variegated spatial patterns are reflected in uneven population distributions across neighbourhood typologies. Clear geographies of affluence exist: Only 6.5% of residents living in the least expensive neighbourhood decile have a high income, but this is the case for over 50% of those living in the top neighbourhood decile. These are the city's most expensive and privileged areas. Figure 5 shows how different age groups contribute to these spatial patterns. Although high-income elderly represent only 2.6% of the total Amsterdam population, they constitute over 12% of the total population in the most expensive neighbourhood decile. They concentrate in elite areas to a much greater extent than do other age groups. For example, high-income households in their thirties represent 6.4% of total population, but their shares are relatively constant between 8.6% and 9.7% for the top five neighbourhood deciles.

Spatial patterns are not as pronounced and uneven among low-income groups. Their shares range from 43.1% in the least expensive neighbourhoods to 18.2% in the most expensive ones. This reflects that low-income groups typically live less segregated than do high-income ones (Tammaru et al., 2016), as well as the enduring presence of social-rental housing spread across Amsterdam. Interestingly, low-income elderly are relatively evenly spread across neighbourhood types—ranging from 6.4% to 3.1% of the total neighbourhood-decile population (city average: 5.1%). Stronger differences exist for low-income households in their thirties and forties, with neighbourhood shares ranging from 9.6% to 2.8% (city average: 5.6%) and from 9.4% to 3.1% (city average: 6.3%), respectively.

Figure 6 then turns to a typology of neighbourhood change. Top deciles reflect areas where increases in house values have been strongest. These can be considered the neighbourhoods where gentrification is strongest. Bottom deciles constitute neighbourhoods of (relative) decline. For these neighbourhoods, percentage point changes in the relative presence of both high-income and low-income households are given. It shows that in the top neighbourhood decile, the share of high-income residents increased by 7.5 percentage points (from 21.7% to 29.2%). In most deciles, the share of high-income residents increased or remained stable. Only in the lowest gain decile did the share of high-income households notably decrease (-2.6 percentage points). The share of high-income households in their late twenties, thirties, and forties showed a relatively strong increase in the top two deciles. The share of high-income elderly also increased there, but at a lower rate. These trends suggest that neighbourhood gentrification is mostly associated with these younger high-income groups—contrasting the increasing concentration of affluent elderly in already expensive areas.

The decrease of low-income groups in gentrifying neighbourhoods (-4.5 percentage points in the highest gain decile) appears mostly driven by a decrease in poor households in their thirties (-3.7), followed by those in their forties (-1.4). These trends partly reflect cohort effects, with the overall share of households in

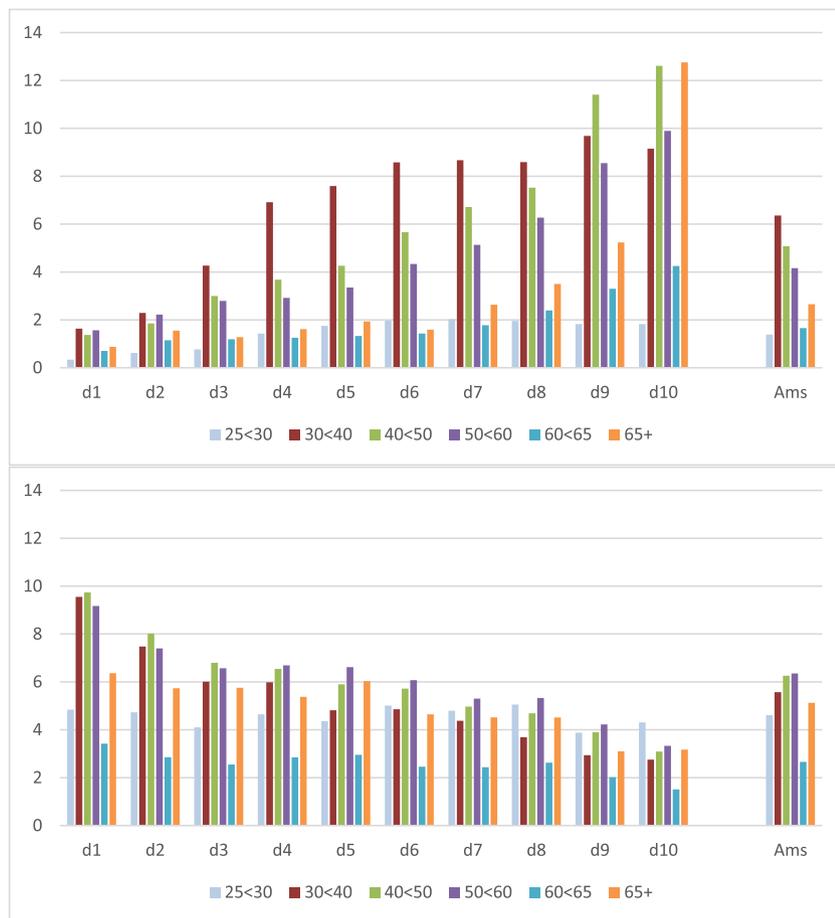


FIGURE 5 High-income (top panel) and low-income (bottom panel) households per age group as percentage of total household population in 2015, for house-value neighbourhood deciles. Source: SSD, own calculations. Note: d1, lowest house-value decile; d10, highest house-value decile; see Figure 2

their thirties decreasing, but also pertain to housing exclusion from low-income newcomers and outsiders. The share of low-income elderly particularly decreased in low-gain neighbourhoods, reflecting spatially uneven patterns of population aging (see Hochstenbach & Van Gent, 2015).

In sum, these patterns and trends reveal the age-specific urban geographies of affluence and poverty, as well as the crucial role of different age groups in driving or mediating population change in different types of neighbourhoods.

5.4 | Generational divides

Income position is only one dimension of broader social position. Inequalities between age groups also exist in terms of insider–outsider dynamics, and the uneven distribution of other financial and nonfinancial resources. Insider–outsider divides on the housing market may, for example, pertain to homeownership access. Figure 7 reports 2015 homeownership rates for Amsterdam households of different ages, looking at both the total population and high-income households specifically.

For the total population, homeownership rates peak among households in their late thirties (41% among 38-year old households). Lower rates of homeownership among older households relate to the fact that Amsterdam used to be dominated by rental housing: Only since the mid-1990s has the owner-occupied stock rapidly grown opening opportunities for newcomers. Among high-income households, homeownership rates are substantially higher and peak among

households in their midforties (around 68%). Also for older high-income households, homeownership rates stand around 60% to 65%.

Wealth is unevenly distributed along the lines of income and age. Median wealth possessions among the total household population range from –2,000 euros among young households to 17,000 euros among those in their late sixties (Figure 7). Differences are much starker among high-income groups, where median wealth possession range from 7,000 euros for young households, to 73,000 euros for those in their midforties, to over 300,000 euros for those postretirement age. These patterns confirm that wealth concentrates among households that are typically relatively old and affluent. Although differences are at least partly the expected result of gradual wealth accumulation over the life course, there is a clear generational dimension to it as well: Many affluent older households have benefited from relatively easy homeownership access and subsequent house-price gains, translating into strong wealth accumulation over time. This subsequently structures housing-market position, exacerbating age divides. Wealth position is itself also a product of owning property in these areas. Long-term absolute house-price inflation has been strongest in expensive areas (Arundel & Hochstenbach, 2018), which translates into stronger wealth accumulation for homeowners in these areas.

5.5 | Interpretation of spatial patterns and trends

Findings show notably different spatial patterns and trends between age groups. Simply put, affluent older groups mostly concentrate in

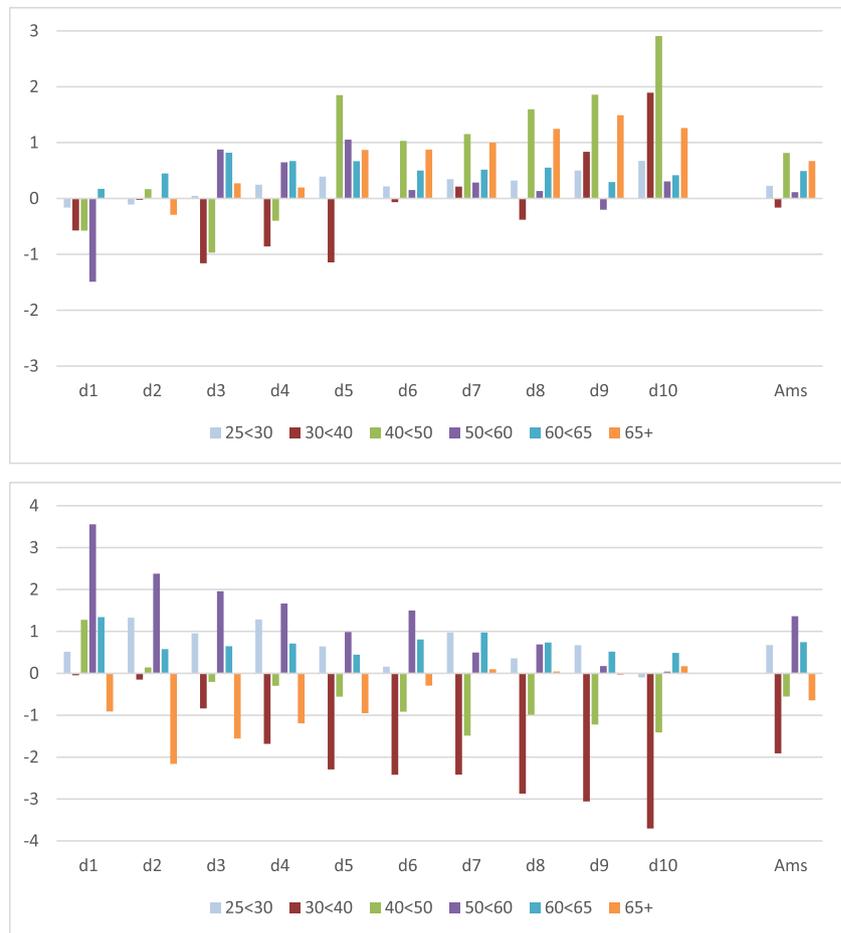


FIGURE 6 Percentage point change in the share of high-income (top panel) and low-income (bottom panel) households per age group in house-value change neighbourhood deciles. Source: SSD, own calculations. Note: d1, lowest house-value change decile; d10, highest house-value change decile; see Figure 2

Amsterdam's most expensive and privileged neighbourhoods. In contrast, younger high-income households concentrate more in somewhat cheaper neighbourhoods—often going through gentrification. Analyses of change over time highlight that these uneven geographies are not stable but have changed in recent years. Four perspectives may explain different spatial patterns and trends.

First, variegated geographies may, especially among affluent households, have to do with preferences relating to age and life-course position. The findings presented here corroborate the argument that younger adults are more drawn to gentrifying neighbourhoods. Older groups may be less inclined to do so and instead settle for established areas or luxurious developments (e.g., waterfronts). Furthermore, young adult households are relatively often single person or childless couples—allowing them to live in the relatively small apartments found in gentrifying locations. In a later life stage, they may still move into more spacious housing.

Second, temporal and cohort dynamics play an important role in forging uneven geographies of age. Although not explicitly studied here, many of the affluent elderly may have moved into what are now elite areas during previous time periods. They may have belonged to previous waves of (young-adult) gentrifiers themselves, subsequently remaining in place. By staying put, they reduce the opportunities for subsequent generations of young adults to move in, necessitating them to look elsewhere. Especially in high-demand contexts, these dynamics contribute to spillover gentrification toward other neighbourhoods, and thus to the spatial expansion of the

process (Hamnett, 2003). Timing can also be important among low-income groups: Tenant protection and rent controls may allow low-income elderly to stay put in their neighbourhood, even as gentrification around them continues. They may also use accumulated waiting time to acquire social housing in high-demand locations.

Third, findings of this paper also show how interventions in the built environment influence how and where life-course trajectories unfold in urban space. Concentrations of high-income households in their thirties, forties, and fifties can be found in urban extensions that were developed in different time periods. More specifically, when they came on the market, these developments absorbed young family households who since then remained in situ.

Fourth, spatial disparities may be influenced by inequalities between age groups. This paper has mostly looked at household income, but other socio-economic dimensions are also important. Younger households face greater labour-market precarity than do older generations, which translates into a weaker housing-market position. Furthermore, as shown, older high-income households have substantially more assets at their disposal than young adults, which translates into a stronger housing-market position despite potentially similar earnings. Contract and wealth disparities may also have spatial repercussions: Older generations with a permanent contract and substantial housing wealth at their disposal may be able to outcompete younger groups and move into the most expensive housing segments. This leads to a further divergence in wealth-accumulation prospects. Changes over time show that affluent elderly indeed increasingly

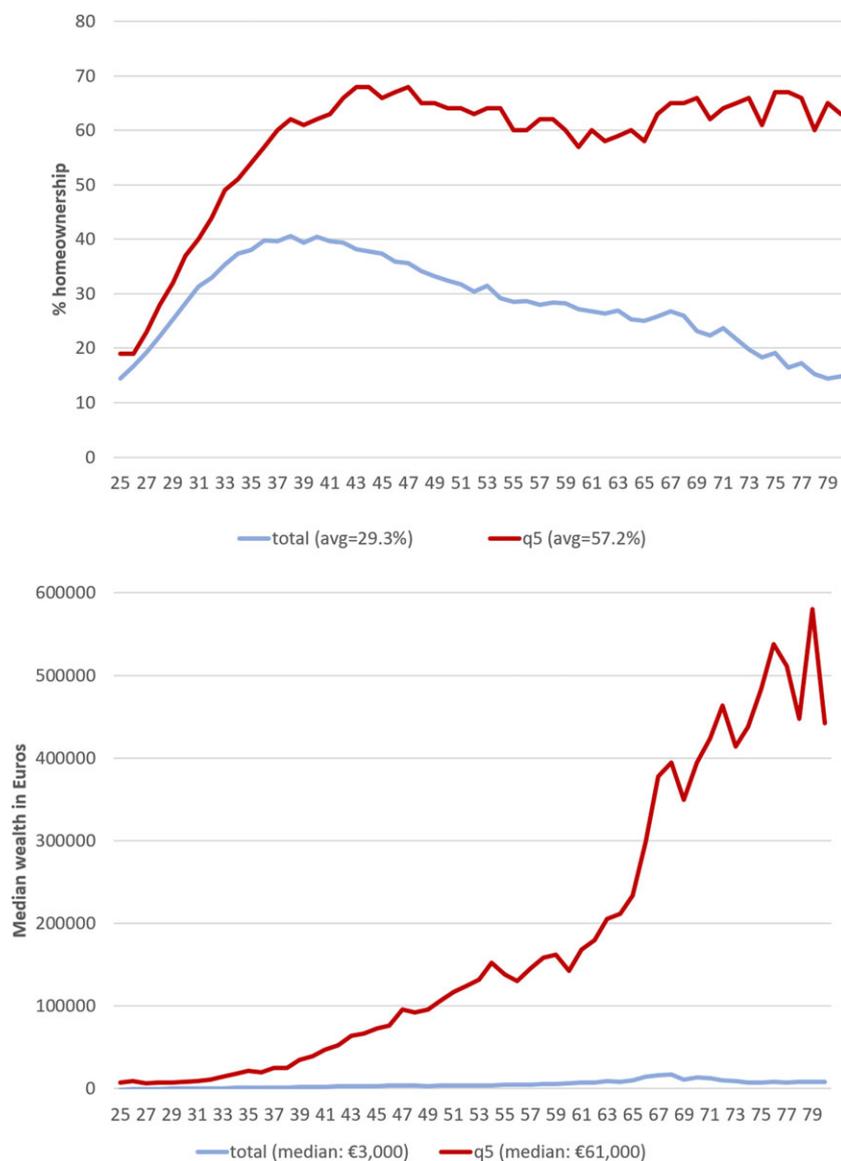


FIGURE 7 Homeownership rates (%) and median wealth possessions (in euros) along the lines of age in 2015, for the total household population and high-income households (q5). Source: SSD, own calculations

concentrate in the most expensive areas, and younger adults decreasingly so. These trends lend tentative support for the argument that dividing lines between young and old are growing, and that these divides are reproduced in, and influenced by, urban space.

The findings of this paper thus pertain to broader discussions about inequalities both between and within different generations—not in the least regarding access to housing—and gives new insights into how such divides may materialise in urban space. The findings also have wider relevance regarding the increasing popularity of the urban, explaining how multiple age groups are involved in age-specific urban upgrading. These findings may therefore be generalisable beyond the Amsterdam case study. Yet some of the patterns found may also be rather specific to the Amsterdam or Dutch situation. The Dutch housing system has a tendency to protect insiders, whereas outsiders may find it difficult to gain entrance. Although not explicitly studied here, this may exacerbate socio-spatial inequalities between old (insiders) and young (outsiders). A relatively large social-rental stock and strong tenant protection may explain why especially older aged low-income households are distributed relatively evenly across urban space. In addition, Amsterdam represents a particularly high-

demand context where competition for housing is fierce. Late 2017, the city entered the UBS real-estate bubble index—indicating house prices show signs of overheating (UBS, 2017).

6 | CONCLUSIONS

This paper has investigated how age dynamics factor into urban socio-economic change and the social geography of Amsterdam. It shows how such age dynamics play a key role in driving urban socio-spatial change (cf. Bailey, 2009). Of course, in producing these spatial inequalities, age intersects with other key dimensions including class, gender, and ethnicity in important ways (Massey & Denton, 1993; Musterd, 2005; Savage, 2015). In this conclusion, three specific contributions to the broader literature on urban change are highlighted.

First, by placing age centre stage, this paper has given new insights into how aggregate upgrading comes about. Some age groups drive urban upgrading more than others, whereas even other age groups have become poorer overall, thus dampening aggregate upgrading. For one, particularly the share of affluent elderly has increased, which

may be reflective of the fact that older generations are faring relatively well overall—and on the housing market specifically (Forrest & Hirayama, 2009, 2015). Yet also the group of affluent households in their thirties has substantially grown—running counter to expectations of growing intergenerational divides. Their growing presence is likely the product of selective moving patterns as the young and upwardly mobile increasingly flock to the city, for reasons of education and employment. Simultaneously, the decreasing presence of relatively young adults on a low income may signal exclusion. Urban socio-economic change is thus not simply a story of the young and upwardly mobile displacing or replacing an older and poorer population. Instead, aggregate upgrading should be considered the sum of multiple forces at work at different spatial scales—including growing divides between old and young, and interregional mobility flows—tying into each other.

Second, this paper has shown that age dynamics and inequalities are important to understand socio-spatial inequalities in cities, and how they unfold over time. Notwithstanding some commonalities, geographies of affluence and poverty differ substantially between age groups. Whereas affluent elderly concentrate in the most privileged areas, and increasingly so, high-income young adults move to neighbourhoods lower on the hierarchy. These age-specific geographies may be the result of a range of factors, including different residential preferences, temporal and insider-outsider dynamics, the influence of interventions in the built environment on life-course trajectories, and generational divides (e.g., wealth position). Such differences and inequalities materialise in urban space but may also be influenced by space.

Third, at first glance, it may seem that large swaths of cities are undergoing similar processes of gentrification, but a closer look reveals that, in fact, multiple age groups drive different types of upgrading in different neighbourhoods (cf. Hochstenbach & Van Gent, 2015). To understand how gentrification unfolds, it is key to study the diverse ways in which the process unfolds at the neighbourhood level—with variations of the same process taking place simultaneously in different places. No longer is gentrification a process only driven by young adults. Different age groups are implicated in different forms of gentrification in the city at one point in time. As affluent elderly increasingly concentrate in the city's most expensive locations, they necessitate younger adults to move elsewhere—propelling spillover gentrification. Together with the push by state and capital (Hackworth & Smith, 2001), gentrification's expansion and increasing intensity can be explained by the involvement of multiple generations. An explicit incorporation of such age dynamics thus help us understand how gentrification progresses over time, takes on new forms, and expands into areas previously left untouched.

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CONFLICT OF INTEREST

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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APPENDIX

Percentage point changes in the share of high-income households per neighbourhood between 2004 and 2015, for the total population (top), for households in their thirties (middle), and households aged 65 or older (bottom). Source: SSD, own calculations

