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EXECUTIVE SUMMARY

FINAL REPORT NO. 387

Filtering as a source of low-income housing in Australia: conceptualisation and testing

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Publication Date September 2022
DOI 10.18408/ahuri5124401

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ISBN

978-1-922498-54-0

Key words

Filtering, affordable housing, housing market dynamics, price elasticity of supply, rental depreciation metric.

Series

AHURI Final Report

Number

387

ISSN

1834-7223

Publisher

Australian Housing and Urban Research Institute Limited
Melbourne, Australia

DOI

10.18408/ahuri5124401

Format

PDF, online only

URL (full report)

https://www.ahuri.edu.au/research/final-reports/387

Recommended citation

Nygaard, C., van den Nouwelant, R., Glackin, S., Martin, C. and Sisson, A. (2022) *Filtering as a source of low-income housing in Australia: conceptualisation and testing*, AHURI Final Report No. 387, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/387, doi: 10.18408/ahuri5124401.

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Acknowledgements

This material was produced with funding from the Australian Government and state and territory governments. AHURI Limited gratefully acknowledges the financial and other support it has received from these governments, without which this work would not have been possible.

AHURI Limited also gratefully acknowledges the contributions, both financial and in-kind, of its university research partners who have helped make the completion of this material possible.

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HILDA disclaimer

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this report, however, are those of the authors and should not be attributed either to the DSS or the Melbourne Institute.

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Executive summary

Key points

- **Filtering is a market-based process whereby the supply of new, higher quality dwellings, for higher- and middle-income households also leads to additional supply of dwellings for lower income households as higher income households vacate their former homes. Theoretically, dwellings filter over time through successively lower market segments or sub-markets, becoming a supply of 'naturally occurring affordable housing'.**
- **This report tests for filtering dynamics in Melbourne and Sydney, using differently sourced data and different methods of analysis. Theoretically, filtering is traceable in the price dynamics of dwellings, and in the occupancy characteristics of residents in properties over time. Filtering dynamics are tested across the entire housing stock and in the private rental sector specifically.**
- **Overall, there is evidence that new dwellings – whether sold or rented – trade at a market premium. This is consistent with filtering dynamics.**
- **However, there is little corresponding evidence that these age-related price dynamics are sufficient to generate a supply of affordable housing for low-income households. Under the prevailing housing market and planning conditions, the evidence does not support relying on filtering as a substitute for the non-market provision of affordable housing for low-income households.**
- **The results show that the successive transfer of housing to lower income households as properties age (downwards filtering) may be negated or weakened by countervailing neighbourhood socio-economic determinants and locational characteristics (such as proximity to labour markets or urban amenities). While some properties are thus occupied by lower income households over time, the process is conditional on a number of locational and neighbourhood characteristics. For instance, the evidence from Melbourne suggests that many areas have largely retained their relative income status over the past 20 years.**

- **Supply is central to addressing the affordability of housing for low-income households. However, a key condition for market-based filtering to deliver affordable low-income housing is that the rate of housing supply exceeds the rate of household formation and new demand. In Melbourne, the price elasticity of supply at the neighbourhood level (Collection District) is almost zero. Additional demand is therefore not met by additional supply, resulting in price appreciation that potentially also generates additional economic rent for older and existing properties in high demand areas.**
- **The private rental market analysis focuses on two cohorts of rental properties: one-bedroom units and three-bedroom houses. The evidence shows that the rate of rental depreciation is insufficient to offset the overall increase in rental values, leading to worsening affordability for low-income households.**
- **The evidence from Sydney suggests that dwellings are removed from the filtering process before they reach lower income households.**
- **While additional research is required to establish and identify more detailed housing market dynamics, the results in this report suggest that filtering may be inhibited and/or interrupted by local housing market contexts such as social interactions, low price elasticity of supply and a lack of substitutability between dwelling typologies and locations.**
- **From an affordable housing policy perspective, the results in this report suggests that filtering cannot be considered in isolation from the remaining determinants of occupancy or price change. That is, new supply will not necessarily free up existing housing for lower income households, unless the remaining determinants of demand for housing in specific locations is also addressed; *and* new supply also results in sustained downward pressure on sub-market specific property prices (that is, the rate of supply exceeds the rate of new household formation and demand; and new housing constitutes effective substitutes for existing housing).**
- **Greater use of market signals in planning and regulation can assist in improving the responsiveness of new construction to market signals. However, importantly, supply dynamics are also determined by landowners and property developers that benefit from withholding new supply housing. Public land banking can contribute to overcoming some of the private sector based incentives that inhibit greater supply responsiveness.**

Key findings

Filtering is a market-based process whereby the supply of new dwellings for higher- and middle-income households leads to additional supply of dwellings for lower income households. As higher income households vacate their former homes, lower income households move in. If new dwellings provide a higher level of housing services (quality) and demand for housing services is income elastic, then new dwelling construction may lead to older properties becoming cheaper. As properties become cheaper they, according to the filtering thesis, successively move down through lower quality market segments, ultimately providing affordable housing for lower income households.

However, this rests on a set of assumptions, the most important of which are that:

- The supply of new dwellings exceeds the rate of new household formation (new demand).
- New dwellings provide effective substitutes for older dwellings.
- The quality of housing depreciates independently of the characteristics of the residents of the dwellings or neighbourhoods.

Empirically, filtering is observable in the price and occupancy characteristics of dwellings. In the housing literature, property age is frequently taken as a proxy for the quality of housing services provided. This yields a number of stylised outcomes indicative of filtering. In this report, we test whether these stylised outcomes are evident in metropolitan Australia by using different datasets and analysis techniques for Melbourne and Sydney.

Dwellings age and cyclicality in neighbourhood status

Since housing is immobile, when dwellings filter it is actually the characteristics of occupants that change; higher income occupants vacate and lower income occupants move in. Therefore, filtering also leads to change in the relative income status of neighbourhoods. In the Melbourne analysis, relative income is measured as the median income at Collection District (CD) level (2006 boundaries), relative to the median income for the metropolitan area as a whole.

Over the past 20 years or so (1996–2016), there has been a degree of stability in relative income levels across metropolitan Melbourne. Twenty years, however, is a relatively short period of time for the housing market. Over a longer period (since the 1970s), the social geography of Melbourne has changed more substantially. Overall, the relationship between change in neighbourhood relative income levels and the age profile of the housing stock at first declines and then rises again. In other words, areas with the newest and oldest housing tend to improve their income level relative to other areas (a u-shaped relationship). This is consistent with filtering.

However, when examining the role of dwelling age on the change in relative income at the neighbourhood level, the analysis suggests that the impact of dwelling age is not independent of the socio-economic characteristics of occupants. That is, in neighbourhoods with higher levels of education or owner-occupiers, a concentration of older dwellings (pre-WWII) did not typically result in the neighbourhood filtering down market. A potential explanation for this persistence in the occupancy characteristics of higher (and lower) income areas are endogenous social interactions between residents in these areas. Social interactions refers to the relationships and behaviours between people. These can condition the demand for specific locations when behaviour and interaction give rise to externalities, such as social capital (positive) or costs (negative), disproportionately to the concentration of the specific social characteristic. In this case relative dwelling prices may exhibit persistence also following new dwelling developments.

Dwelling age and relative price depreciation

In both Melbourne and Sydney, the evidence shows that new properties trade at a market premium. New properties for sale in Melbourne are typically more expensive that older properties. However, the relationship between dwelling age and transaction price is not straightforward. The relationship depends upon, and interacts with, local housing market context, locational and institutional determinants of demand.

In Sydney, the results also show that the rental price for new dwellings is higher than comparable older dwellings. This is the case for both three-bedroom houses and one-bedroom flats. However, the relationship between age and rental price differs between these two market segments. Rental prices for three-bedroom houses have a u-shaped relationship with age, whereas rental prices for one-bedroom flats shows a near linear rate of depreciation.

However, in neither Melbourne or Sydney does the price premium for new dwellings appear sufficient to generate systematic supply of affordable low-income housing via filtering.

In Melbourne, the improvement in relative income status is associated with a higher proportion of both new and old (pre-WWII) housing. However, relative income change is greater in areas with greater concentrations of older housing than new housing.

In Sydney, the relative depreciation that takes place in rental prices is insufficient to offset the overall rate of price appreciation. That is, while the rental value of older rental properties declines relative to the median rental value, the rental value has still increased relative to the rent levels that are affordable to low-income households.

There is spatial variegation in filtering dynamics in both Sydney and Melbourne. In both cities, specific features and changes in urban structure and local housing market contexts have shaped market dynamics. These features and changes typically outweigh the impact of dwelling-age related effects. In both cities, the evidence of greatest relative decreases in property rents or neighbourhood relative incomes appears to be in areas with lower rates of economic growth, largely as a function of post-industrial urban economic restructuring. That is, areas developed in conjunction with suburban industrial growth of the post-war period are those most likely to experience relative income decline.

One implication is that housing affordable to low-income households is more likely to be spatially sorted into the parts of the cities with lowest socio-economic opportunities.

Finally, the volume of housing for low-income households supplied via filtering is also determined by the removal of economically and physically obsolete housing. As an alternative to allowing properties to filter down market, property owners may upgrade dwellings or convert to non-residential uses when (or if) new supply in a particular location or sub-market lowers demand for existing dwellings. The Melbourne analysis provides some tentative evidence that the role of demolitions may be different in lower and higher income areas.

Price elasticity of supply and filtering dynamics

For filtering to operate, new housing construction must exceed the rate of new household formation and other demand determinants; that is, new supply is elastic in response to demand changes. For the Australian housing market as a whole, the literature suggests new housing supply has not kept up with new demand (Ball, Meen et al. 2011; Burke, Nygaard et al. 2020). In the present research the price elasticity of supply is tested directly for local housing markets in Melbourne, and inferred for the Sydney housing market.

Overall the Melbourne analysis suggests that the price elasticity of supply is substantially less than one. This implies that when an area experiences additional demand (such as due to population growth, or expansion of nearby employment opportunities), there is insufficient additional supply to meet demand. This means there is no resulting surplus of dwellings. As a result, most (or all) of the housing market adjustment takes place in the form of higher dwelling prices or rents. In Melbourne the price elasticity of supply, at Statistical Area Level 2 (SA2) is approximately 0.3. For example, a 10 per cent increase in house prices would lead to only a very small increase in supply of 3 per cent. There is some variation in the price elasticity across areas with different age profiles of dwelling stock. Areas with a higher proportion of properties built in 1976–85 and 1926–35 appear to have particularly low elasticities. However, overall, elasticities remain very low.

Planning and zoning have some impact on price elasticity. For example, mixed use zoning (zones that have experienced particular growth in apartments and units) has a higher price elasticity, and heritage overlays have a lower price elasticity.

In Sydney, the increase in rents, relative to the affordable level of rent, provides indirect evidence that the supply of new dwellings is insufficient to offset changes in demand. This is also the case when taking price depreciation into account The Sydney analysis demonstrates that the parts of the city where price depreciation is most evident (areas with the highest observed relative decreases in rent over time) also had the lowest volume of low-cost rentals, particularly for houses.

This points to the overlapping influence of other market factors. Specifically, it can be inferred that the housing markets are shaped by expectations of continued capital growth. Consistent with theoretical work on filtering and property hierarchies, dwellings may be redeveloped (or upgraded) before they filter down to the affordable lower income houses segment. The expectation of capital growth reduces the risk of over-capitalising. Relatedly, the depreciating rental yields could also see landlords – at least those not looking to invest in the property's improvements – depart the market.

Both of these factors are functions of real property price appreciation. This condition of Australian housing markets is a barrier to filtering generating a supply of affordable low-income housing.

Policy development options

This research suggests that while new dwellings typically have a market premium, the effect of this market premium is insufficient to rely on filtering as a source of housing supply for low-income households.

Additional supply of housing is central to addressing the affordability of housing for low-income households. However, for market-based filtering to have a greater role in supplying affordable housing for low-income households, some structural features of Australian cities would need to be brought into line with the premises of filtering. These changes are not necessarily desirable or practical. Subject to that qualification, Chapter 5 reflects on three broad areas in which significant policy change would be required:

1. price elasticity and supply volumes
2. housing typology and location
3. local housing market contexts and social interactions.

Elasticity and volume of supply

As a market-based mechanism, filtering is premised on new supply generating a surplus of dwellings within specific sub-markets, or across sub-markets. This new supply causes a price depressing effect. To achieve such an outcome, the supply of new housing needs to be responsive to changes in demand. The price elasticity of supply is determined by a range of factors – many of which are not easily targeted by public policy. However, land use planning and taxation *can* contribute to housing supply becoming more responsive to price changes at local levels. Key policy insights include:

- More specific use of price signals as a guide for where new housing is provided and the type of housing that is provided. For instance, planning and zoning designation can become more responsive to price changes. There are important (and not easy) trade-offs between preserving the characteristics of areas as they currently stand, and the distribution of social costs when housing affordability worsens.
- Land in capital cities (and in high house price regions of those cities) is typically (and naturally) constrained. However, land supply constraints are further exacerbated through selective planning (zoning and overlay) of designations and concentrations. In order to generate housing systems impacts, design and dwelling typologies need to respond to market signals.

- The results in Section 3.1.2 shows that there are significant interdependencies between areas, in terms of how their relative income status changes. Coordination of new housing supply at metropolitan or sub-metropolitan regions (further research can establish appropriate functional housing markets) can additionally improve the overall price elasticity of supply.
- The supply of land in cities is not only determined by zoning or regulation. A greater use of broad-based land tax *may* spur owners to bring under-developed land to the market (Wood, Ong et al. 2012: 41).
- Government-led land assembly or public land-banking can ensure greater predictability in both the supply of land (for developers) and greater say in when development takes. As such it provides a policy alternative to established business practices around land banking (Murray 2020) and/or firm strategies designed to ensure business stability over future time horizons (Evans 2004).

Housing typology and location

Filtering assumes that new construction provides superior housing services to the existing housing stock. Without new dwellings being more attractive than existing dwellings, existing dwellings would not be vacated. If starting from the premise that demand for housing services in a particular location is a function of where households want to be based in order to live and work (either travel to/from or work from home) then housing services are a function of the physical characteristics of the property, location relative to work requirements and characteristics of the neighbourhood. Key policy insights include:

- Planning and design standards can assist in ensuring that new supply more effectively substitutes for older supply. However, this would need to be accompanied by detailed market research to ensure that planning and design standards are responsive to market signals.
- One implication of such an analysis – and use of planning and design standards – might be that the scale of developments (number of dwelling units) is traded off for dwelling stock that is better targeted to local demand characteristics. However, other infrastructure provision also plays a role in the extent to which different locations can become substitutes for each other.

Local housing market contexts, neighbourhoods and social interactions

Filtering is associated with a change in the social characteristics of dwelling occupants, resulting in neighbourhood change. Under the filtering hypothesis, the ageing of the housing stock exerts a sufficiently independent and strong effect to alter the occupancy characteristics of areas over time. However, neighbourhood externalities arising from social interactions – such as the social capital (positive) or cost (negative) arising from the behaviour and interaction with other residents in an area, or perceived status of particular neighbourhoods – also determine demand for dwellings in specific locations (Ioannides and Zabel 2003; Rosenthal 2008). Social capital can be conceived as both a community-level resource, such as the features of neighbourhood social organisation including trust, norms and networks (Putnam 1995), and an individual level resource arising from membership of specific social networks (Bourdieu 1986). In Australia, as elsewhere, social capital is associated with health outcomes (Ziersch et al. 2005). Homeownership is frequently shown to exert a positive effect on social capital formation (Ruskruge et al. 2013). Conversely, public housing tenants in Australia exhibit lower levels of interpersonal trust (Donoghue and Tranter 2012). The strength of neighbourhood externalities arising from social interactions will naturally vary across neighbourhoods. In the Melbourne analysis, proxies for neighbourhood specific social capital and cost are captured by homeownership rate and social housing, prime age workers, and residents with graduate level education.

In some locations, the presence of social interactions substantially complicate the potential of filtering to deliver housing options for low-income households. Social interactions can lead to threshold and tipping point transitions that lock-in area status over longer periods of time (thresholds), but also rapid change following relatively small changes in neighbourhood characteristics (tipping points). Under social interaction conditions and neighbourhood effects, supply side measures may be less effective in generating downwards filtering in some localities. Theoretically, the additional dwelling stock may accentuate existing neighbourhood externalities, or result in conversion of existing dwellings before filtering downwards. That is, additional supply may make areas more attractive (by increasing the strength and concentration of social capital as new residents bring additional social capital to the area; or increasing the supply of local amenities through an increased concentration of purchasing power). Instead of older properties becoming available to lower income households due to a decline in price, these may instead be redeveloped to take advantage of the additional price premium generated by the social interaction effects. Alternatively, very large supply shocks may be required to offset both these effects and generate a surplus of dwellings. Key policy insights include:

- In the presence of externalities or amenities that increase the attractiveness of areas, development options for ensuring a supply of housing for low-income households (in the same locations) is to provide housing options that are matched specifically to income profiles. That is, in these locations supply alone may not reduce the attractiveness of existing properties and thus existing properties do not become available to lower income households.
- For instance, social and affordable housing developments (or mixed tenure developments) provide the ability to ensure a supply of housing is targeted to specific income groups. Such a policy does, in practice, not rely on filtering dynamics – except in cases where a policy substantially alters the social dynamics of these areas.
- The results in Chapter 3 suggests that any impact is likely to vary across neighbourhoods, with lower quartile areas negatively affected by concentrations of social housing in 2006. In comparison, there was no statistically significant effect for upper quartile areas. In other words, the provision of social and affordable housing in particularly high housing cost locations may do less to alter the dynamics of social interactions, than in lower housing cost areas.

The study

While data about property prices is common in Australia, longitudinal data about dwellings and occupant characteristics is much less common. Accessing detailed property level information is typically costly, inhibited by data protection and proprietary data conventions, and requires a very high level of data manipulation and cleaning. As a result, the analysis in this research draws on data that was already available to the research team. Therefore, the data basis and research design differs quite substantially between the Melbourne and Sydney analyses.

Ideally, filtering dynamics would be evaluated in different locations of Australia, using the same methodology. Notwithstanding this limitation, the approach taken here offers a complementary approach to assessing the role that filtering can play in the provision of affordable housing for low-income Australians.

The Melbourne analysis draws on census data (1996, 2006 and 2016), Victorian Valuer General data (valuation data), and Housing Development Data and Planning Data released by the Department of Environment, Land, Water and Planning (DELWP). This data was used to test the role of dwelling (age) characteristics and socio-economic characteristics in the change in relative income status of neighbourhoods (CDs) in Melbourne; and dwelling (age) and planning characteristics and demolition trends. ABS (experimental data) for small area dwelling supply was used for analysis of supply elasticities. Spatial econometric analysis was used to test for the association between relative income change, demolitions and housing supply, and neighbourhood age of dwelling characteristics.

The Sydney analysis draws on New South Wales (NSW) Rental Bond Board data, NSW Valuer General data and NSW Department of Planning Industry and Environment data to chart the property biographies of private rental properties (1997–2019) and establish a depreciation metric for rental dwellings. Detailed statistical analysis is used to chart the nature of new rental supply and tenure transitions, construct a depreciation metric of private rental dwellings as they age and explore spatial differences and filtering-interrupting events.

The aim of the research is to provide insight on how filtering contributes to market-provided low-income housing in Australia. The objectives are to:

1. Critically reflect on the conceptualisation of filtering as a source of housing for low-income households
2. Test for the presence of stylised outcomes associated with filtering dynamics in housing markets.
3. Reflect on policy options for enhancing (if so desired) filtering as a policy tool.

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