Joint Discussion Paper Series in Economics

by the Universities of

Aachen · Gießen · Göttingen
Kassel · Marburg · Siegen

ISSN 1867-3678

No. 24-2021

Isil Erol and Umut Unal

Local House Price Effects of Internal Migration in Queensland: Australia's New Interstate Migration Capital

This paper can be downloaded from
http://www.uni-marburg.de/fb02/makro/forschung/magkspapers

Coordination: Bernd Hayo • Philipps-University Marburg
School of Business and Economics • Universitätsstraße 24, D-35032 Marburg
Tel: +49-6421-2823091, Fax: +49-6421-2823088, e-mail: hayo@wiwi.uni-marburg.de

Local House Price Effects of Internal Migration in Queensland: Australia's New Interstate Migration Capital

Isil Erol[*]

Associate Professor of Real Estate Finance and Investment
Henley Business School
Department of Real Estate & Planning, University of Reading
Whiteknights, Reading RG6 6UD United Kingdom
Tel: +44-(0)7464-089150
E-mail: i.erol@henley.reading.ac.uk
ORCID: orcid.org/0000-0001-8125-9118

Umut Unal, Ph.D.

Visiting Researcher
School of Business and Economics, Philipps-Universität Marburg
Universitätsstr. 24, D-35037, Marburg, Germany
Tel.: +49-(0)6421-2823719
Email: umut.uenal@wiwi.uni-marburg.de

[*] Corresponding author. University of Reading, Henley Business School, Department of Real Estate & Planning, Whiteknights Campus PO Box 217, Reading Berkshire RG6 6AH, UK. Tel: +447464089150

Local House Price Effects of Internal Migration in Queensland: Australia's New Interstate Migration Capital

Abstract:

This paper examines the causal impact of internal migration on house price changes in Queensland – Australia's new capital of interstate migration. We study annual housing price growth across 82 Statistical Areas Level 3 (SA3) regions between 2014 and 2019 by employing a spatial correlation approach. We also estimate the impact of the increasing share of migrants from New South Wales on the local housing markets in Queensland. The main findings are summarised as follows: (1) an annual increase in the inflow of migrants equal to 1% of a region's initial population leads to a 0.6%–0.7% annual increase in Queensland's house prices across different empirical specifications; (2) internal migration inflow increases house prices in Greater Brisbane metropolitan area, whereas internal migration has a negative impact on housing price changes in the Rest of State regions; (3) migrants tend to move towards SA3 regions where house prices grow more slowly conditional on the local area controls and the time fixed effects; (4) the increasing share of migration from New South Wales does not have a significant effect on house price growth in Queensland. Our findings have important policy implications related to sustainable local economic development since sustainable development is, for the most part, achieved by attracting newcomers to the cities/towns and completed through the involvement of migrants in local housing and labour markets.

JEL Codes: R12; R23; R31

Keywords: Housing prices; Internal Migration; Shift-share instrument; Australia; Queensland

1. Introduction

Overseas migration has been the main driver of metropolitan population growth in Australia over the last four decades, and it has become a critical factor in the country's urban housing market growth. Internal migration, on the other hand, has been reshaping the geographical distribution of population in the country, leading to growth on the fringe of the major cities, as well as in particular coastal centres, but also loss from parts of remote Australia. Internal migration is a neglected component of population changes as researchers and policymakers generally focus on natural increase (the excess of births over deaths) and net overseas migration components of population growth or decline. Australia has the highest level of residential mobility through internal migration amongst other developed countries in Europe and the United States. Queensland has become the country's interstate migration capital over the past years mainly because an increasing number of residents (natives and long-term immigrants) have been leaving from other states of the country, mainly from New South Wales, and moving to Brisbane (the capital city of Queensland) and second-tier cities such as the Gold Coast and the Sunshine Coast, and also the smaller towns in the Rest of the State. According to the *Population Growth Highlights and Trends* reports published by Queensland Treasury, net interstate migration increased by 233%, from 6,860 people in 2015 to 22,830 people in 2019.

This paper provides the first empirical evidence on the housing market outcomes of internal migration in Queensland, Australia. Using the ABS data by region, we study annual house price changes in the 2014-2019 period across 82 Statistical Areas Level 3 (SA3), which are geographical areas that generally have a population of between 30,000 and 130,000 people and are designed to provide a regional breakdown of Australia. The panel data comprise six years since house price data for small areas (across SA3 regions) are available from 2014. Our data allow us to measure house price changes and the spatial concentration of migrants yearly instead of relying on discrete Census data, as is typically the case in the literature. Besides, working with SA3-level disaggregated data, rather than state-, metropolitan area- or city-level data is crucial for studying the local economic impact of internal migration, which is the primary channel through which the population adjusts to regional labour and housing market conditions (Vermeulen and van Ommeren, 2009; Greenwood and Hunt, 1984). Hence, we estimate the impact of migration inflow rate rather than population growth on house price changes. A spatial correlation approach is employed in which the annual change in house prices in different geographic areas is regressed on the annual inflow of migrants in that same area

along with appropriate local area controls. To address the potential endogeneity problem due to simultaneous causality between migration and house price changes we employ a manually constructed instrument that matches the shift-share instrument used in the immigration literature.

To date, only a limited number of studies have examined the impact of internal migration on house prices and/or rents for the United States (US), China, New Zealand, and Sweden. In common, these studies find a positive effect of internal migration on housing prices and/or rents. Howard and Liebersohn (2019) examined the effect of internal migration on housing markets through the aggregate rent increase in all U.S. cities and found that changing migration demand explains 54% of the rent increase and 75% of the CPI rent increase in the US from 2000 to 2018. For the Chinese cities, a 1% increase in inter-regional migrants (rural-to-urban migration) results in a 0.70% (0.34%) increase in housing prices when controlling other relevant factors (Wang *et al*., 2017). Stillman and Mare (2008) examined how population change in New Zealand, through international and internal migration flows, has affected rents and sales prices of apartments and houses from 1996 to 2006. The authors used five Censuses data and found that increases in internal migration flows are associated with higher house prices – i.e., a 1% increase in the New Zealand-born population is associated with a 0.81%-to-1.31% increase in house prices. Increases in the immigrant population, in contrast, are negatively associated with house price changes as a 1% population increase from immigrants is associated with a 0.48%-to-0.98% decrease in house prices. Finally, Tyrcha (2020) examined the impact of both internal migration and immigration on the housing market across 284 Swedish municipalities from 2000 to 2015 and concluded that house prices in an area increase by 0.91% with an internal migration impact equal to 1% of the initial population of the same local area.

Existing research on the Australian experience of internal migration has mainly focused on characteristics of internal migrants – e.g., age, gender, birthplace, labour force, and education –; the determinants of migration flows (Bell and Hugo, 2000; Bell and Cooper, 1995; Jarvie, 1989); and the relationship between international migration inflow and internal outmigration within the context of global gateways cities (Burnley et al., 2007; Ley, 2007). Unlike previous studies, this paper provides the first empirical evidence for the causal relationship between internal migration and house price changes in Australia's new capital of interstate migration: Queensland. To gain a broader understanding of the effect of population mobility on the housing markets, it is essential to carry out more case studies and explore the housing market

responses to internal migration in different national and local contexts. Australia provides a noteworthy case study because the country has the highest level of population mobility through internal migration[2], which is still increasing at a modest rate, unlike other developed countries in Europe and the US (Charles-Edwards *et al.*, 2018). In this sense, so far, only Erol and Unal (2021) studied the relationship between internal migration and house price changes in Australia. Yet, although similar methodologies are employed, this study intuitively differs from that one in at least three ways. First, the present paper focuses specifically on Queensland, which has become Australia's new interstate migration capital during the past years. Second, this study further considers the increasing share of outmigration from New South Wales to Queensland and its impact on the local housing markets. Last, but not least, the paper provides a piece of new empirical evidence to the existing literature on internal migration and housing price dynamics.

The findings of this study suggest that there is a local economic impact of internal migration in Queensland, Australia. Internal migration pushes up the demand for housing in migration-receiving areas and results in house price increases. We find that internal migration flow of 1% of the initial local area population raises housing prices by 0.6%–to–0.7% per year across Queensland. We also find that population mobility within the state has a significant positive effect on house price changes in Brisbane metropolitan area (or the Greater Capital City regions) rather than non-metropolitan areas (the Rest of State regions). Considering that house prices are an essential source of human capital accumulation and local economic growth (Miller et al. 2011; Edward and Gyourko, 2005), internal migration and its influence on house prices play a crucial role in local economic development, predominantly in the Greater Capital City Statistical Areas in Queensland. When we benchmark our results against the results reported by previous research on the impact of internal migration on house prices, we see that local housing markets in Queensland, Australia behave similarly to those in China, New Zealand, and Sweden as house prices respond positively to internal migration flows. Finally, our results suggest that conditional on the local area controls and the time-fixed effects, migrants tend to move towards regions where house prices grow more slowly.

[2] Bernard *et al.* (2017) showed that Australia exhibits the highest level of residential mobility among the sixteen countries, including the US and fourteen European countries, with an average of 5.1 moves per individual. Australia is among the most mobile societies in the world with 39% of the population changing their address within Australia in the year before the 2016 Census. Across the world, on average, 7.9% of people move each year domestically, while 21% move at least once every five years (Bell *et al.*, 2015).

The next section reviews migration dynamics in Australia between 2004 and 2019, and Section 3 covers the empirical specification. Section 4 presents the results of the data analysis and a discussion of the findings. Section 5 concludes the paper.

2. Population Mobility in Australia

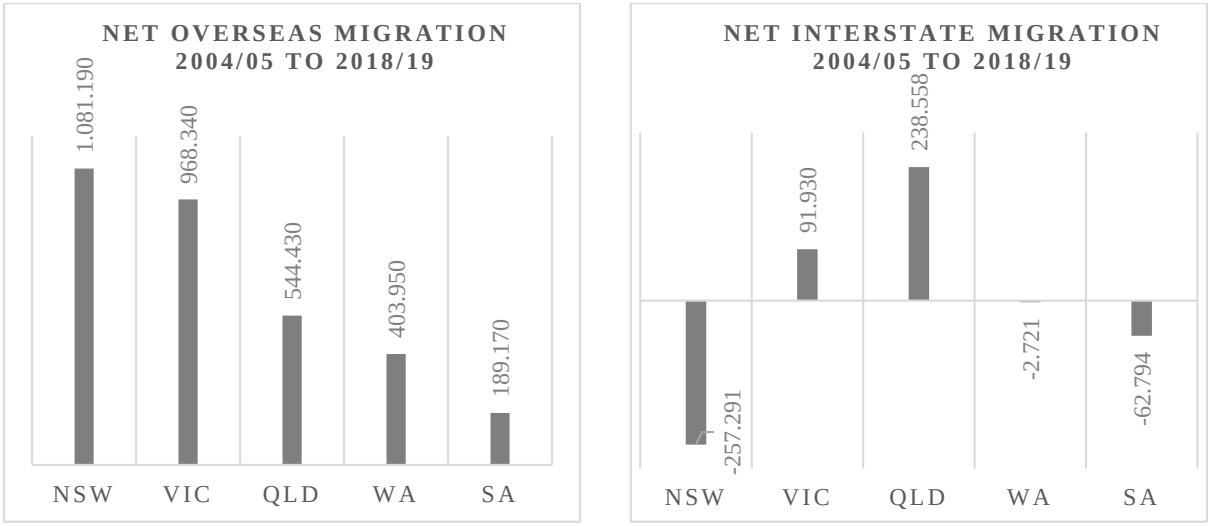
Overseas migration has been the main driver of Australia's population growth, adding up to 63% of population growth in 2017–2019, whereas it represented only 27%–30% of the country's population growth in 1983–1984.[3] Internal migration, in contrast, has been reshaping the geographical distribution of the population within the country. According to the Australian Bureau of Statistics (ABS), internal migration is the movement of people from one defined area to another within a country, and it is measured by interstate migration and regional internal migration. While the former is the net gain or loss of population through the movement of people from one state or territory of usual residence to another, the latter is the movement of people from one region to another within the country and includes both interstate and intra-state movements.

Figure 1 exhibits population mobility during the 2005–2019 period in five leading states of Australia. In the last fifteen years, New South Wales had the largest number of overseas migrants (1,081,190 people), followed by Victoria (968,340 people), and Queensland (544,430 people). New South Wales had a strong countervailing population flow of net overseas migration and net interstate migration as the arrival of a large number of overseas immigrants to the state can be associated with offsetting departures of the resident population through interstate migration, especially from Sydney (Figure 1). South Australia has also experienced a countervailing population flow of overseas and interstate migration by relatively small numbers compared to New South Wales. The state recorded the arrival of 189,170 net overseas migrants and, at the same time, suffered a net loss of 62,794 interstate migrants. Queensland, in contrast, had a substantial gain in interstate migration (238,558 people) and received far fewer immigrants over the same period. Western Australia recorded a net gain of 403,950 overseas immigrants, but the state had a negative number of (-2,721) net interstate migration. Hence, the link between overseas migration and interstate migration within Australia's urban system varies widely across the states. New South Wales and South Australia have experienced offsetting migration flows as net interstate migration losses are seemingly associated with net

[3] 3101.0 Australian Demographic Statistics, Table 1. Population Change.

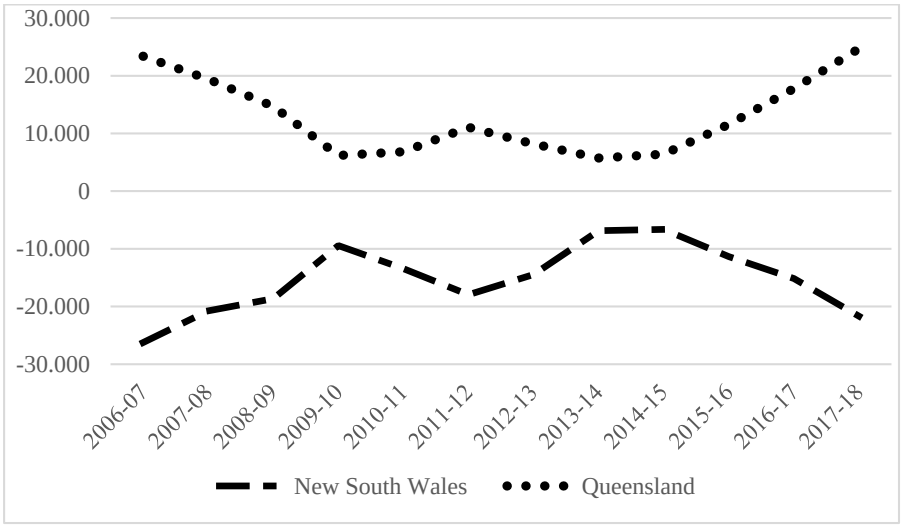
overseas migration gains. Victoria and Queensland, in contrast, have attracted both overseas and interstate migration. Queensland has overstepped Victoria and became the nation's interstate migration capital mainly due to the improving economy and its year-round sunny weather attracting migration inflow from the southern parts of Australia. The state recorded the highest gain in interstate migration as the annual average net interstate migration was 17,129 people from 2004 to 2019. Queensland has been remarkably influenced by New South Wales's massive loss of internal migrants – i.e., there is a strong negative correlation of -0.87 between regional internal migration flows in New South Wales and Queensland between 2007 and 2018 (see Figure 2).

Figure 1: Net overseas migration and net interstate migration in five main states of Australia.



Source: ABS 34120 Migration, Australia

Figure 2: Net regional internal migration in New South Wales and Queensland



Source: ABS, 34120 Migration, Australia.

Evidently, at the state-level aggregate data, net interstate migration is equal to net regional internal migration as intra-state migration flows cancel out each other. In each state, every movement 'in' a region is matched by a movement 'out' from another region. However, the two measures of internal migration certainly differ at the disaggregated statistical area level. This paper uses regional internal migration inflows across the SA3 areas to investigate how both net interstate and net intra-state migration flows have affected house prices in Queensland during the last six years.

3. Empirical Specification

The dominant methodology used in the empirical literature on migration impacts is the spatial correlation approach in which the change in house prices in different geographic areas is regressed on the inflow of migrants in that same area and appropriate controls (Saiz, 2007). In the absence of a well-identified exogenous shock to migration – i.e., ethnic German migrants who were exogenously allocated upon arrival to specific regions by government authorities (Glitz, 2012) or immigration shock after the Mariel boatlift in Miami (Saiz, 2003)[4] – there are four main problems in estimating the causal effect of migration on housing prices. The time-invariant unobserved heterogeneity or local area fixed-effects, simultaneous causality between migration and house prices, omitted variables, and house price adjustment to migration.

The first problem arises due to the fact that migration and house prices may be spatially correlated because of common fixed influences such as the climate or local amenities. To address this problem, in line with previous research by Sa (2015), Saiz and Watchter (2011), Saiz (2007), Coleman and Landon-Lane (2007), our regression model is estimated with the dependent variable in first differences. This eliminates or differences-out time-invariant, area-specific factors that affect migration flows and the level of house prices. The second problem is the endogeneity issue that arises due to the simultaneous causality between migration flows and house price changes. The direction of causality is not clear because migrants are not randomly allocated across geographic areas – i.e., a self-selection endogeneity problem. The sign of the bias is difficult to predict ex-ante. On the one hand, migrants may locate in more prosperous areas where house prices are growing faster. On the other hand, it is reasonable to expect that, controlling for economic conditions, migrants would choose to locate in areas

[4] Saiz (2003) examined the impact of an exogenous immigration shock after the Mariel boatlift on changes in rental prices in Miami, which added an extra 9% to Miami's renter population in 1980.

where house prices are growing more slowly. To address the second problem, we use an instrument for the recent distribution of the migrants based on the past spatial concentrations of migrants. The validity of this instrument relies on the underlying assumption that the past settlement pattern of migrants is uncorrelated with recent or current changes in the economic performance of geographic areas. In that case, lagged values of migrant inflows are correlated with changes in house prices only through their relations with the current flows of migrants (Sa, 2015).

Another source of endogeneity problem may occur due to omitted variables explaining both growths in migration and house prices. For example, changes in job opportunities and/or wages in different regions affect both house prices and migration, and it is a problem of trying to identify the separate effect of migration flows from the effect of other factors. In this paper, we use lagged change in the number of jobs and also lagged changes in local income (Saiz, 2007) and local wages (Howard and Liebersohn, 2019; Sanchis-Guarner, 2017) to capture omitted variables and establish causality between migration and house prices. The fourth problem concerns the length of time that it may take for migration to affect house prices; housing prices cannot adjust immediately. Following Saiz (2007), we estimate the change in house price from $t-1\ to\ t$ as a function of one-year lagged migration inflow at $t-1$ divided by the total resident population at $t-2$. Using lags of the control variables, we accept that house prices do not adjust instantaneously to changes in fundamentals.[5] The following model is used to estimate the effect of internal migration on house prices:

$$\Delta ln\left(HP_{i,t}\right) = \beta\left(\frac{Migrants_{i,t-1}}{Population_{i,t-2}}\right) + \alpha X_i + \delta Y_{i,t-1} + \rho\Delta Z_{i,t-1} + \Lambda_t + \Delta\varepsilon_{i,t} \quad (1)$$

where $\Delta \ln(HP_{i,t})$ is the change in the log of the median house sales price in each SA3 area i between years $t-1$ and t. The main independent variable is the annual inflow of migrants in year $t-1$ divided by the initial population in year $t-2$ in a local area. Given the nature of housing markets, the main specification uses migration inflow lagged one period with respect to changes in house prices. The coefficient β can be interpreted as the percentage change in house prices corresponding to an annual inflow of migrants equal to 1% of the initial local population (Sa, 2015). Following the literature, the independent variable of interest is the normalised migration flow as it is defined as the inflow of migrants into SA3 area i during a

[5] The way that housing markets adjust when houses differ in terms of their quality is essential; however, we do not have data on the size and quality of dwellings across SA3s to estimate models with different housing quality levels.

particular year divided by the local area's initial population. As highlighted by Sanchis-Guarner (2017), standardising migration flows by initial population stock deals with the fact that regions of different sizes have different population and house price dynamics (Wozniak and Murray, 2012; Peri and Sparber, 2011), and it eliminates any unobservables that might equally affect both the numerator (migration flow) and the denominator (original local population).

In Equation (1), X_i stands for initial local area attributes such as having a coastline and the land area. The log of SA3-level land area may capture supply factors related to land availability (Saiz, 2007). In order to isolate the impact of migration on house prices via its demand impact (e.g., keeping housing supply constant), one may need to include time-varying changes in housing supply as an additional control variable (Sanchis-Guarner, 2017). This variable would remove the bias arising from the fact that immigrants might be locating in areas where construction is growing faster (to work in this sector or due to higher availability of homes) and that house construction also affects housing costs via the increasing supply of housing units. Therefore, in our model, we include both time-varying housing supply (dwellings approved or the number of approved houses divided by local population) following Sa (2015) and the time-invariant area attribute of the log of total land area to capture supply factors related to land availability (Saiz, 2007). $Y_{i,t-1}$ stands for one year lagged local area characteristics, which may affect house prices. It includes the ratio of the number of building approvals (new housing construction) to the local population to control for the time-varying housing supply. $\Delta Z_{i,t-1}$ stands for time-varying area characteristics – i.e., changes in local income, wages and the number of jobs that may affect the housing demand. The variables of job opportunities and local income/wages variables are well-known essential determinants of housing prices/rents (Saiz, 2007; Jud et al., 1996). Since the model is written in first-differences, time-invariant factors specific to each SA3 area and that affect the level of house prices have differenced out. Finally, Λ_t are year dummies, which capture national trends in inflation and other economic variables.

Instrumental Variable

Internal migrants tend to move to areas where other migrants settled before (Thomas, 2019). Empirical evidence on the internal migration dynamics has hinted at the importance of non-resident family members and/or friends as an attraction factor encouraging and directing migration towards locations where the family/friends live even as a motive for long-distance

(e.g., inter-state) migration in addition to employment and education motives.[5] Relying on such evidence, an instrumental variable (IV) based on the settlement pattern of migrants in an earlier period is constructed. More specifically, we use the settlement pattern of migrants in 2007 to predict the geographical distribution of migrants in the current period. Our identification strategy is based on the tendency of newly arriving migrants to settle in areas where previous migrants from the same area already settle in. We construct and use the following instrument for the inflow of migrants in SA3 region *i* as a share of the initial local population that matches the shift-share instrument used in the immigration literature.

$$\frac{\sum_r \gamma_{ri0}\, Migrants_{rt-1}}{Population_{it-2}} \tag{2}$$

where γ_{ri0} is the share of migrants depart from SA3 region *r* that live or settle in SA3 region *i* in the base year t_0. Indeed, γ_{ri0} gives the direction of migration, namely, flows from and to SA3-level geographical areas and provides a measure of the size of the network from region *r* in each region *i*. We take the year 2007 as the base year because regional internal migration estimates data at the SA3 level is available from 2007. $Migrants_{rt-1}$ is the total number of migrants that move out of region *r* in year *t-1*; therefore, the predicted inflow of migrants from region *r* in year *t-1* that choose to locate in region *i* is $\gamma_{ri0} \times Migrants_{rt-1}$. Summing across all SA3 regions of origin across the country, we obtain a measure of the predicted migration inflow in region *i* in year *t-1*. We consider 322 SA3 regions of origin across all states and territories of Australia. As the migrants' country of birth information is not available in our dataset (ABS Data by Region at the SA3 level), it is not possible to analyse the separate impact of native versus foreign-born residents' mobility on house prices.

4. Empirical Results

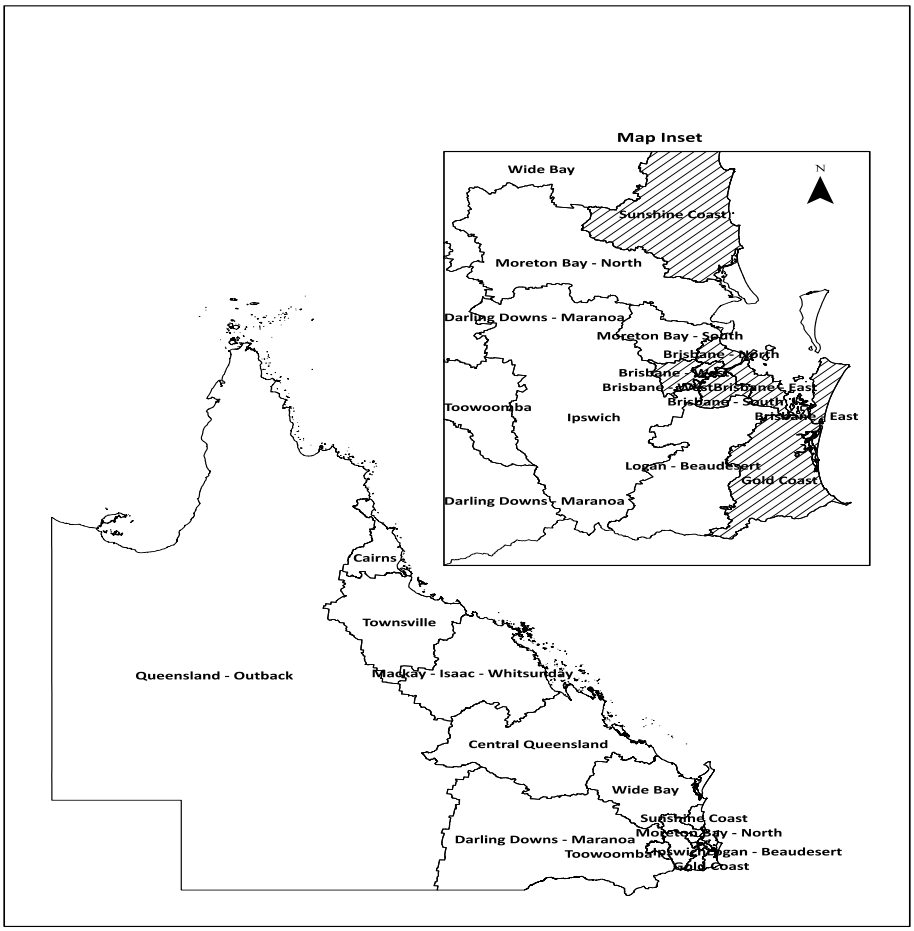
4.1. Data and Descriptive analysis

This study uses two main sources of data. The ABS Migration, Australia (cat. no. 3412.0) comprises the estimates of internal migration down to statistical areas, representing local areas and sub-populations. Data by region (cat. no. 1410.0) provides an overview of selected social and economic characteristics, and land area data across Queensland, from 2013 to 2019. The

[5] Cooke et al. (2016); Das et al. (2017); Silverstein and Giarrusso (2010); Pettersson and Malmberg (2009); Burnley et al. (2007).

data were collected for the SA3s, which are geographical areas that generally have a population of between 30,000 and 130,000 people and are designed to provide a regional breakdown of Australia. SA3s are classified into two groups: the Greater Capital City Statistical Areas (GCCSA) and Rest of State Statistical Areas (RSSA). The GCCSAs are geographical areas designed to represent the functional extent of capital cities (Greater Brisbane) to reflect labour markets using the 2011 Census travel to work data. As shown in Figure 3, the Greater Brisbane metropolitan area includes Brisbane City and the surrounding cities of Ipswich, Logan-Beaudesert, and the Moreton Bay region. In each state and territory of Australia, the areas not defined as being part of the Greater Capital City are represented by the Rest of the State regions. Rest of Queensland includes the major regional cities/centres such as Cairns and Townsville in the north, the Sunshine Coast, the Gold Coast in the east, the Central Queensland, Darling Downs (southwest), and Wide Bay (southeast).

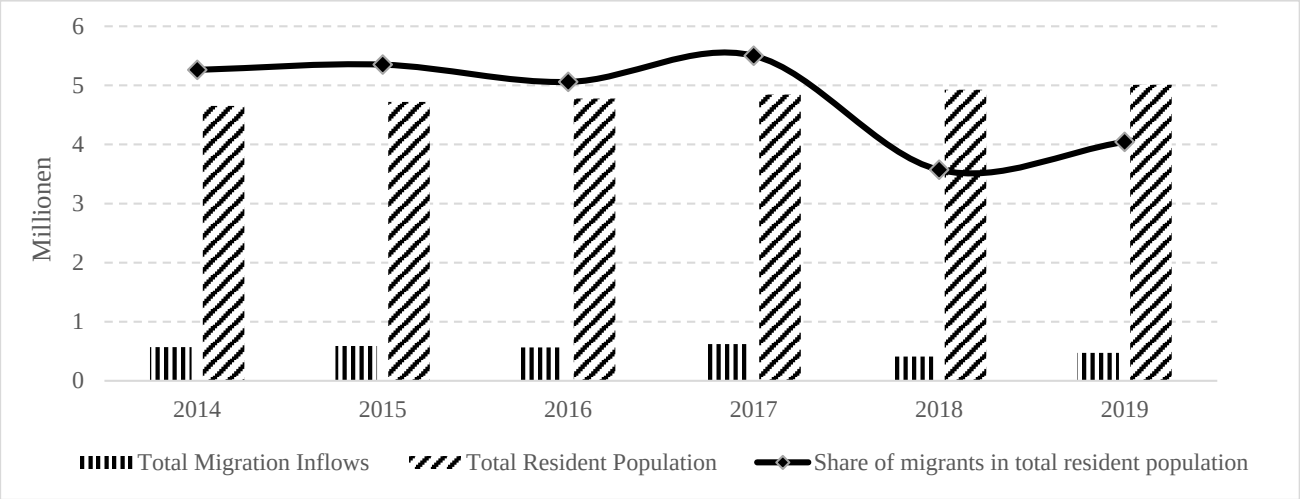
Figure 3: Map of Queensland



Source: Produced by authors using the Australian Bureau of Statistics data on the largest sub-state regions with a population of over 100,000 people, in general.

We study the median house sale price changes across 82 SA3s and observe that housing prices increased by 15%, on average, in Queensland during the 2014-2019 period. Whilst house prices in GCCSA increased by almost 20%, the average house price increase in RSSA was only 9%. During the same time period, 64 out of 82 SA3 regions (78%) have experienced increases in housing prices. The top ten regions for the highest house price growth (cumulative percentage change) are in the Gold Coast, Sunshine Coast and Brisbane inner-city regions, respectively, and ranging from 44% in Surfers Paradise to 40% in Gold Coast-North and 30% Brisbane inner-North. The SA3s that have experienced the largest declines in housing prices (from –38% to –15%) are mostly in the northern parts of Queensland, including Central Highlands, Bowen Basin, Queensland Outback, and Mackay (see Figure 3). We examine price changes for the separate houses rather than the attached dwelling types such as semi-detached/terrace houses and apartments/flats because Australia's capital cities are all highly suburbanised with low-density urban expansion. Almost 75% of the housing stock consists of separate houses, with very little high-density housing except in Sydney (Forster, 2006). According to the ABS data, detached houses comprise 79% of the housing stock in Queensland, whereas flats/apartments and semi-detached/terrace houses comprise 10.6% and 10.4% of the housing stock, respectively. If the capital city of Brisbane is excluded from the dataset, the ratio of separate houses increases to 81%, while the share of apartments decreases to 8.7%. Hence, this research examines the growth in detached house prices as they represent the dominating housing type in Queensland.

Figure 4: Total Migration Inflows in Queensland



Source: ABS, 34120 Migration, Australia.

Total migration inflows in Queensland are shown in Figure 4. The share of migrants in total resident population decreased from 12.3%–12.8% in 2014-2017 to 8.3%–9.4% in 2018-2019. The lowest level of internal migration was occurred in 2018 when migration inflows were 8.3% of the total resident population. Kalemba et al. (2020) studied the decline in internal migration levels in Australia and found that the strong impact of population ageing on the decline in internal migration has been fully counteracted by the positive effects of education and immigration. Furthermore, the behavioural effects are found to be the principal factor explaining this downward trend. It is important to note that the share of migrants in the total resident population decreased significantly in the RSSA by 19%, whereas there was only a 4% decrease in migrants' share across GCCSA between 2014 and 2019.

Table 1. Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Δ Log house median sale price	398	0.024	0.066	-0.416	0.223
Migrants at t-1 /resident population at t-2	410	0.108	0.028	0.043	0.179
Number of approved houses at t-1 /population at t-1	492	0.008	0.007	0.000	0.073
Δ Log mean wage at t-1	328	0.017	0.017	-0.094	0.089
Δ Log median Income at t-1	328	0.017	0.015	-0.100	0.057
Δ Log median wage at t-1	328	0.020	0.017	-0.078	0.081
Δ Log number of jobs at t-1	328	0.010	0.034	-0.117	0.176
Log of land area	82	10.749	2.759	7.212	17.951
Coastal dummy	82	0.305	0.463	0.000	1.000
Rest of States *[Migrants at t-1/resident population at t-2]	410	0.055	0.055	0.000	0.174
NSW share in total migrants to Queensland	720	9.622	3.705	4.33	30.54

Note:Δ represents first difference.

Table 1 provides further summary statistics for our dataset. House prices, on average, increased 2.4% per year across our sample during the period under consideration. There is a considerable variation behind this average. On the other hand, the most significant increase was registered in 2015 in Brisbane inner, where house prices increased by more than 22%. Turning to our variable of interest, the SA3s received an average annual inflow of 10.8% of its initial population and indicating a high variation. The largest increases were registered in Brisbane-inner and Ormeau-Oxford, wherein 2017 the inflow of migrants increases by 17.9%. In contrast, the lowest increase was in Rockhampton and Charter towers–Ayr-Ingham, which recorded a yearly inflow of migration equivalent to 4.8% and 4.3% of their initial population, respectively. In our sample, 30 of the 82of the SA3s have a coastline. The median income and median wage rise by 1.7% and 2.0%, respectively with a considerable variation across the sample. Finally, the annual average change in the number of jobs differs substantially, ranging from -11.7% to 17.6%., respectively.

4.2. Regression Analysis

Table 2 presents the estimation results of the first-differenced OLS specification in Equation (1) using 82 SA3s across Queensland. The dependent variable is the change in the log of the median house sales price, and the main independent variable is the inflow of internal migrants relative to the total population in the previous year. The results show that migration inflow is a significant explanatory variable for house prices changes as the estimated coefficient ranges from 0.250 to 0.572 across seven different model specifications. In all specifications, the standard errors are clustered at the SA3 level and robust to heteroscedasticity. The first and the second columns display the results obtained when we only include the main independent variable without and with the year dummies, respectively. In model [3] we include a set of controls, including the initial local area attributes, 1-year lagged values of and changes in local area characteristics, and time effects in our estimations. We find that the estimated value of β coefficient increases to 0.521 in the model [3] including all local area controls.

Table 2: OLS Estimation Results for Internal Migration Inflows and House Price Changes

Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Migrants at t-1 /resident population at t-2	**0.250*****	**0.372*****	**0.521*****	**0.557*****	**0.572*****	**0.462*****	**0.472*****
	[0.032]	[0.060]	[0.089]	[0.086]	[0.083]	[0.097]	[0.092]
Log of Land Area			**-0.006*****	**-0.005*****	**-0.004*****	**-0.005*****	**-0.005*****
			[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Coastal dummy			0.002	0.002	0.004	0.001	0.000
			[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Number of approved houses at t-1 /population at t-1			-0.632	**-0.774***	-0.648	-0.685	-0.544
			[0.464]	[0.432]	[0.447]	[0.424]	[0.444]
Δ Log median wage at t-1			**1.349*****	**1.252*****		**1.359*****	
			[0.405]	[0.407]		[0.447]	
Δ Log mean wage at t-1					**0.908*****		**1.016*****
					[0.245]		[0.262]
Δ Log number of jobs at t-1			**0.675****	**0.670****	**0.627****	**0.694****	**0.647****
			[0.268]	[0.266]	[0.263]	[0.271]	[0.267]
NSW share in total migrants to Queensland at t-1						**0.002*****	**0.002*****
						[0.001]	[0.001]
Rest of States *[Migrants at t-1/resident population at t-2]				**-0.160*****	**-0.179*****	**-0.144*****	**-0.162*****
				[0.046]	[0.045]	[0.044]	[0.042]
Observations	398	398	316	316	316	314	314
R-squared	0.16	0.20	0.47	0.48	0.46	0.49	0.47
Year Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes

Notes: SA3 level clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, Δ indicates first difference. We also run our models [4] and [6] with median income. Our independent variable has consistent and significant estimates with coefficients of 0.608 and 0.519, respectively.

Queensland is the second-largest state of Australia by area with a network of strong regional economies and communities. Hence, we further investigate whether or not the impact of migration on housing prices varies between the capital city of Brisbane (GCCS areas) and the rest of Queensland (RSS areas), where several flourishing regional cities have taken on new roles in the urban system, such as enhancing sustainable tourism development, specialising in

food and agribusiness, and improving health and aged care industries. In models [4] and [5] we provide the estimation results of the original model [3] with an interaction variable to measure the simultaneous effect of the migration inflow ratio (the main independent variable) and the Rest of the State Statistical Areas. This allows for a thorough consideration and understanding of metropolitan versus non-metropolitan region effects, and the analysis of whether the impacts of migration flow could differ across SA3 regions with different characteristics. An increase in migration inflow equal to 1% of an SA3's initial population leads to an annual decrease of 0.16% to 0.18% in house prices. It appears that internal migration is influential in housing price increases in Brisbane metropolitan area rather than the Rest of State areas.

Finally, in the models [6] and [7] we control for the effect of migration inflows from New South Wales, where the variable of *NSW share* gives the ratio of migration flows from New South Wales to Queensland in year *t-1* divided by the total number of internal migrants to Queensland from all other states and territories of Australia in year *t-1*. The estimated value of β coefficient is 0.002 and statistically significant at 1% significance level, indicating that outmigration from New South Wales to Queensland has a very small (negligible) positive effect on housing price growth. Changes in local median/mean wage, the number of jobs, total SA3 land area, and NSW migration share seem to be robust correlates of house price growth for the OLS estimations. In contrast, the evidence for the coastal dummy, housing approvals are not significant or that strong. Furthermore, neither the exclusion of controls nor the inclusion of these variables does alter the results, and therefore our OLS results in Table 2 are fairly robust across different specifications. However, we should note that these coefficients cannot be interpreted as the causal impact of internal migration on house prices as the location selection decisions of migrants are not random.

The estimation results using the instrument defined in Equation (2) are displayed in Table 3. The estimated coefficients for the first stage IV regressions are significant at the 1% level. Such a result suggests a strong correlation between the current geographic distribution of migrants and the past settlement patterns and supported by Kleibergen-Paap F statistic which consistently exceeds 10. Overall, regarding the full models with local area controls, an increase in migrant inflow equal to 1% of an SA3's initial population leads to an increase of approximately 0.61% (model 6) to 0.69% (model 5) in annual house price changes across the model specifications. The median house price for the sample data is $450,700, hence an annual increase in migration inflow equal to 1% of an SA3's initial population leads to $2,704 to

$3,155 annual increase in house prices. It is possible to argue that housing prices across Queensland would have been around 0.6%-0.7% lower per annum had there has been no internal migration. The extended models in [6] and [7] present instrument estimation results with the interaction variable, where we disentangle the effects of migration on housing prices across the Rest of State SA3s. The results suggest that migration inflow has a negative impact on house price changes in the Rest of State; the estimated coefficient ranges from – 0.159 to – 0.179 and significant at 1% level. Furthermore, the increasing migration flow from New South Wales to Queensland does not have any significant effect on house price changes.

Table 3: IV Estimation Results for Internal Migration Inflows and House Price Changes

Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Migrants at t-1 /resident population at t-2	**0.248*****	**0.380*****	**0.662*****	**0.658*****	**0.693*****	**0.607*****	**0.647*****
	[0.032]	[0.074]	[0.184]	[0.178]	[0.181]	[0.200]	[0.204]
Log of Land Area			**-0.007*****	**-0.005*****	**-0.005*****	**-0.006*****	**-0.006*****
			[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Coastal dummy			0.001	0.002	0.003	0.001	0.000
			[0.006]	[0.005]	[0.006]	[0.005]	[0.005]
Number of approved houses at t-1 /population at t-1			**-1.014***	**-1.057****	**-0.976***	**-1.017***	-0.931
			[0.574]	[0.530]	[0.570]	[0.534]	[0.573]
Δ Log median wage at t-1			**1.307*****	**1.240****		**1.232****	
			[0.499]	[0.503]		[0.497]	
Δ Log mean wage at t-1					**0.860****		**0.850****
					[0.340]		[0.331]
Δ Log number of jobs at t-1			**0.655****	**0.659****	**0.610****	**0.662****	**0.612****
			[0.283]	[0.280]	[0.274]	[0.281]	[0.275]
NSW share in total migrants to Queensland at t-1						0.001	0.001
						[0.001]	[0.001]
Rest of States * [Migrants at t-1/resident population at t-2]				**-0.165*****	**-0.185*****	**-0.159*****	**-0.179*****
				[0.046]	[0.045]	[0.046]	[0.044]
First Stage IV Coefficient	1.067***	0.975***	0.785***	0.787***	0.761***	0.728***	0.707***
	[0.068]	[0.167]	[0.212]	[0.210]	[0.214]	[0.215]	[0.217]
First Stage F test	244.2	34.06	13.69	14.00	12.63	11.46	10.62
Observations	394	394	314	314	314	314	314
R-squared	0.16	0.20	0.47	0.48	0.46	0.48	0.46
Year Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes

Notes: SA3 level clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, Δ indicates first difference. We also run our models [4] and [6] with median income. Our independent variable has consistent and significant estimates with coefficients of 0.690 and 0.643, respectively.

The IV estimates are higher than those obtained by OLS estimation of all model specifications, suggesting a negative (or downward) bias in the OLS results. Such an outcome suggests that conditional on the local controls and the time-fixed effects, migrants tend to move towards regions in which house prices are growing more slowly (Sanchis-Guarner, 2017; Sa, 2015). We argue that the estimations with instruments better capture the relevant behaviour because, in all cases, our instrument is strong. Across various IV estimations, total land area, change in median/mean wages and the number of jobs, and change in the stock of dwelling seem to be

robustly related to housing price growth in the regressions. However, it is also important to note that the results are insensitive to excluding these controls.

5. Conclusion

This paper shows that internal migration flows in Australia's interstate migration capital has increased house prices in migration-receiving areas in the last six years, from 2014 to 2019. Using disaggregated data from the ABS non-Census and Intercensal statistics we find that an increase in internal migrant inflow equal to 1% of the region's initial population leads to an annual increase of approximately 0.6%-0.7% in house prices in Queensland. Considering the upper bound of the median house price in Queensland as $1,200,000 for the sample period; an annual increase in the migrant inflow equals 1% of an SA3's initial population leads up to an $8,400 annual increase in house prices Our findings are in line with the previous research as Tyrcha (2020) found that house prices in Swedish municipalities increase by 0.91% with an internal migration impact equal to 1% of the initial population of the same local area. Whilst Wang *et al.* (2017) found that a 1% increase in inter-regional migration resulted in a 0.701% increase in housing prices in Chinese cities, Stillman and Mare (2008) concluded that a 1% increase in internal migration is associated with a 0.81%-1.31% increase in house prices in New Zealand.

The results suggest that the increasing share of outmigration from New South Wales to Queensland does not have any significant effect on housing prices. Thus, there is not a spill-over effect of outmigration from New South Wales, mainly from Sydney, on Queensland's local housing market (e.g., housing price growth). Internal migration delivers a negative impact on housing prices in non-metropolitan (Rest of State) areas, whereas it generates house price growth across SA3 areas in the Capital City of Brisbane (metropolitan Queensland). Our OLS estimations produce downward biased results, which implies that conditional on the local controls and the time-fixed effects, migrants tend to move towards regions where house prices are growing more slowly. The findings of this study have important policy implications regarding sustainable local economic development, which is, for the most part, achieved by attracting newcomers to cities/towns and completed through the participation of migrants in local labour markets and their involvement in local housing markets. Given that house price increase is an essential source of human capital accumulation and local economic growth

(Miller et al. 2011; Edward and Gyourko, 2005)[6], it is possible to argue that increases in internal migration inflow and its influence on housing prices play a crucial role in fostering the sustainable development of local economies and communities in Australia.

[6] Areas with low housing prices tend to exhibit human accumulation declines as well as regional economic declines (Edward and Gyourko, 2005), Miller et al. (2011) found that house price changes have significant effects on local gross metropolitan product in the USA.

References:

Bell, M., Charles-Edwards, E., Ueffing, P., Stillwell, J., Kupiszewski, M. & Kupiszewska, D. (2015). Internal migration and development: Comparing migration intensities around the world. *Population and Development Review, 41*(1), 33-58.

Bell, M. & Cooper, J. (1995). *Internal Migration in Australia 1986-1991: The Overseas-born*. Australian Government Publishing Service.

Bell, M. & Hugo, G. (2000). *Internal Migration in Australia: 1991-1996 Overview and the Overseas-born*. Department of Immigration and Multicultural Affairs.

Bernard, A., Forder, P., Kendig, H. & Byles, J. (2017). Residential mobility in Australia and the United States: A retrospective study. *Australian Population Studies*, 1(1), 41-54.

Burnley, I.H., Marshall, N., Murphy, P. A. & Hugo, G. J. (2007). Housing factors in welfare migration to and from metropolitan cities in Australia. *Urban Policy and Research, 25*(3), 287-304.

Charles-Edwards, E., Bell, M., Cooper, J. & Bernard, A. (2018). Population Shift: Understanding internal migration in Australia, 2071.0 Census of Population and Housing: Reflecting Australia – stories from the Census, 2016, Australian Bureau of Statistics.

Coleman, A. & Landon-Lane, J. (2007). *Housing markets and migration in New Zealand, 1962-2006* (No. DP2007/12). Reserve Bank of New Zealand.

Cooke, T. J., Mulder, C. H. & Thomas, M. (2016). Union dissolution and migration. *Demographic Research, 34*, 741-760.

Das, M., de Valk, H. & Merz, E. M. (2017). Mothers' mobility after separation: Do grandmothers matter? *Population, Space and Place*, *23*(2), e2010.

Edward, L. G. & Gyourko, J. (2005). Urban decline and durable housing. *Journal of Political Economy*, 113, 345–375.

Erol, I. & Unal, U. (2021). *Internal Migration and House Prices in Australia* (No. 202113). Philipps-Universität Marburg, Faculty of Business Administration and Economics, Department of Economics.

Forster, C. (2006). The challenge of change: Australian cities and urban planning in the new millennium. *Geographical Research, 44*(2), 173-182.

Glitz, A. (2012). The labor market impact of immigration: A quasi-experiment exploiting immigrant location rules in Germany. *Journal of Labor Economics*, 30(1), 175-213.

Greenwood, M. J. & Hunt, G. L. (1984). Migration and interregional employment redistribution in the United States. *The American Economic Review, 74*(5), 957-969.

Howard, G. & Liebersohn, C. (2019, June). What Explains U.S. House Prices? Regional Income Divergence. In *Proceedings of the Regional Income Divergence, 2019 Annual Meeting, St. Louis, MI, USA*.

Jarvie, W. K. (1989). Changes in internal migration in Australia: population or employment-led. *Regional Structure and Change, Experiences and Prospects in Two Mature Economies, Monograph Series*, (8), 47-60.

Jud, G. D., Benjamin, J. D. & Sirmans, G. S. (1996). What do we know about apartments and their markets? *The Journal of Real Estate Research*, *11*(3), 243-257.

Ley, D. (2007). Countervailing immigration and domestic migration in gateway cities: Australian and Canadian variations on an American theme. *Economic Geography*, *83*(3), 231-254.

Kalemba, S. V., Bernard, A., Charles-Edwards, E. & Corcoran, J. (2020). Decline in internal migration levels in Australia: Compositional or behavioural effect? *Population, Space and Place*, e2341.

Miller, N., Peng, L. & Sklarz, M. (2011). House prices and economic growth, *Journal of Real Estate Finance and Economics*, 42(4), 522-541.

Peri, G., & Sparber, C. (2011). Assessing inherent model bias: An application to native displacement in response to immigration. *Journal of Urban Economics*, *69*(1), 82-91.

Pettersson, A. & Malmberg, G. (2009). Adult children and elderly parents as mobility attractions in Sweden. *Population, Space and Place*, *15*(4), 343-357.

Sá, F. (2015). Immigration and house prices in the U.K. *The Economic Journal*, *125*(587), 1393-1424.

Saiz, A. (2007). Immigration and housing rents in American cities. *Journal of Urban Economics*, *61*(2), 345-371.

Saiz, A. (2003). Room in the kitchen for the melting pot: Immigration and rental prices. *Review of Economics and Statistics*, *85*(3), 502-521.

Saiz, A. & Wachter, S. (2011). Immigration and the Neighborhood. *American Economic Journal: Economic Policy*, *3*(2), 169-88.

Sanchis-Guarner, R. (2017). Decomposing the impact of immigration on house prices. IEB Working Paper 2017/14.

Silverstein, M. & Giarrusso, R. (2010). Aging and family life: A decade review. *Journal of Marriage and Family*, *72*(5), 1039-1058.

Stillman, S. & Maré, D. C. (2008). Housing markets and migration: Evidence from New Zealand.

Thomas, M. J. (2019). Employment, education, and family: Revealing the motives behind internal migration in Great Britain. *Population, Space and Place*, *25*(4), e2233.

Tyrcha, A. (2020). Migration and Housing Markets-Evidence from Sweden (Doctoral dissertation, University of Cambridge).

Vermeulen, W. & Van Ommeren, J. (2009). Does land use planning shape regional economies? A simultaneous analysis of housing supply, internal migration and local employment growth in the Netherlands. *Journal of Housing Economics*, *18*(4), 294-310.

Wang, X. R., Hui, E. C. M. & Sun, J. X. (2017). Population migration, urbanization and housing prices: Evidence from the cities in China. *Habitat International*, *66*, 49-56.

Wozniak, A. & Murray, T. J. (2012). Timing is everything: Short-run population impacts of immigration in U.S. cities. *Journal of Urban Economics*, *72*(1), 60-78.