UNIVERSITY OF WAIKATO

Hamilton
New Zealand

The Effects of Immigration on Local Housing Markets

William Cochrane and Jacques Poot

Working Paper in Economics 7/19

June 2019

Forthcoming as a chapter in K. Kourtit, B. Newbold, P. Nijkamp and M. Partridge (eds)
The Economic Geography of Cross-Border Migration, Berlin: Springer Verlag, 2020.

Corresponding Author

Bill Cochrane
School of Social Sciences
Private Bag 3105
Hamilton
New Zealand, 3240

Email: billc@waikato.ac.nz

Jacques Poot
Department of Spatial Economics
Vrije Universiteit Amsterdam
and
National Institute of Demographic & Economic Analysis
University of Waikato
Hamilton
New Zealand, 3240

Email: h.j.poot@vu.nl

Abstract

This paper provides a survey of the international evidence regarding the impact of immigration on local housing markets. A theoretical framework is provided that highlights the complexity of the housing market and the importance of distinguishing between the ownership and use of the stock of dwellings vis-à-vis the residential real estate market. Evidence from eight countries (Canada, France, Italy, New Zealand, Spain, Switzerland, United Kingdom and United States) and from meta-analysis shows that immigration will lead to higher house prices and rents, and lower housing affordability. On average, a one percent increase in immigration in a city may be expected to raise rents by one-half to one percent and the effect on prices is about double that. However, there is a large variance around this average which is related inter alia to the time frame and spatial scale of the analysis, as well as to local economic conditions. Additionally, the housing impact of immigration will depend on the demographic and economic composition of the immigrant flow, on macroeconomic conditions and expectations, on the institutional factors that influence the price elasticity of the supply of new dwellings, and on how the native born react to immigration. The tendency of the native born to move out of city wards where migrants settle can lead to relative house price declines in these areas. Overall, immigration has been only a minor contributor to the sharply rising house prices in many fast-growing agglomerations in recent decades.

JEL Classification
F22, J61, L85, R21, R23

Keywords
immigration, housing, real estate, homeownership

Acknowledgment
This paper builds on a report commissioned by the New Zealand Ministry of Business, Innovation and Employment (MBIE). (See Cochrane and Poot 2016).

1. Introduction

We live in an age of intensive cross-border flows of information, capital, goods, services and people. One prominent way in which globalization has manifested itself is through international migration. At the time the most recent wave of globalization took off around 1980 there were about 100 million people living abroad and this number has increased greatly to about one quarter of a billion at present, representing about 3 percent of the current world population. However, international migration is highly selective of countries, regions and cities – leading to a percentage foreign born in some countries and cities that is much greater than the global average. With few exceptions, the percentage of foreign born in high income countries ranges from close to one tenth of the population (Portugal, Denmark and Italy) up to one quarter or more (New Zealand, Australia, Israel, Switzerland and Luxembourg). In many of the largest cities in the developed world, immigrants account for 30 to 40 percent of the population and in some wards of these cities the foreign born are by far the majority of those who live there.

Against this background we may expect that immigration may have relatively large effects on housing markets of metropolitan cities. Additionally, effects in the wards of such cities may vary to the extent that migrants are disproportionally represented in the local population. Historically, however, research on the economic effects of immigration has rather neglected the housing market impact and tended to focus on national macroeconomic outcomes such as effects on GDP per capita, trade and investment (see, for example, Mishan and Needleman 1966).

Since the 1980s, immigration economics focused initially predominantly on the effects of immigration on the wages of the native born and on the assimilation of immigrants in local labour markets (see the review by Hatton 2014). Pioneering work on integrative analysis of immigration impacts by means of applied multi-sectoral general equilibrium models that included the housing market was already conducted in the 1980s in Australia (Norman and Meikle 1985) and New Zealand (Poot *et al*. 1988) but only at the national level and in a relatively stylized way (by assuming a homogenous housing stock). Research in which housing market effects of immigration became a core focus did not emerge until the 21st century, with the seminal study by Saiz (2003) noting that there was only a very small literature on that topic until then.

Immigrants in a country are usually a very heterogeneous group of people and their impacts on the host economy and society can be wide ranging. In recent years, the study of economic consequences of immigration has emerged as a new and expanding field in economics (for comprehensive reviews see Chiswick and Miller 2015, Bodvarsson and Van den Berg 2013 and Nijkamp *et al.* 2012). At the same time, it has been long acknowledged that the housing market is one of the most complex markets in the economy. Housing economics therefore emerged as a separate field of study in the discipline during the 1980s (see, for example, Muth and Goodman 1989, Fallis 1985 and Mclennan 1982). Alternatively, housing

economics is seen as a sub-field in urban economics (for example, O'Sullivan 2019, DiPasquale and Wheaton 1995).

The question of how immigration affects local housing markets sits therefore at the intersection of the two complex fields of immigration economics and housing/urban economics. Since Saiz's (2003) study of the impact of a wave of Cuban migrants to Miami on housing rental prices there, the number of papers concerned with researching the effect of immigrants on local housing markets has grown relatively fast. Larkin *et al.* (2018) extracted from a relatively large body of literature 45 studies that quantified the impact of immigration on house prices in a comparable way. These studies permitted a meta-analysis of 474 estimates of immigration's impact on house prices in 14 destination countries.

Larkin *et al.* (2018) find that estimates of the partial correlation between immigration and house prices vary widely but they conclude that, on average, immigration *increases* house prices. However, while this study confirms that the relationship is *statistically* significant, there is still not enough comparable evidence available at the present time to be able to state how *economically* significant the relationship is on average across studies. For example, there is no consensus yet what the expected percentage increase in house prices might be, on average, when net immigration increases the population by one percent, ceteris paribus. Similarly, it remains uncertain what the impact of immigration is on a range of other housing market indicators (for example, rents and the proportion of dwellings that are rented, residential real estate sales and the construction of different types of housing units – varying from detached homes to apartments).

In the absence of enough evidence to provide the reader with a relatively precise estimate of how quantitatively important immigration in developed countries might be for the housing market, we aim to provide in this chapter a concise review of the available evidence to date, including the aforementioned meta-analysis and report a range of estimates the key studies have revealed under their specific study conditions. We also assess whether there are any lessons that can be drawn for public policy from the available evidence and we identify future lines of inquiry that could be potentially fruitful. However, we first provide in the next section a basic theoretical framework for the housing market and an assessment of how an 'immigration shock' might impact on prices and the housing stock in that market. Section 3 then reviews some of the representative empirical studies and the recent meta-analysis of the literature. This is followed by a more in-depth case study, focussing on New Zealand, in Section 4. Section 5 sums up.

2. Theoretical Perspectives

Houses and apartments are long lived assets that provide shelter and other residential services to their users. Because many dwellings are owner-occupied, or rented to tenants by means of long-term agreements, the housing market has the typical feature of markets for long lived assets that only a small fraction (of the order of a few percent) of the stock changes hands in any given year. This implies that the market can be represented in a diagram by two sets of demand and supply curves: one set for the total housing stock and one set for the residential real estate market. This is shown in Figure 1.

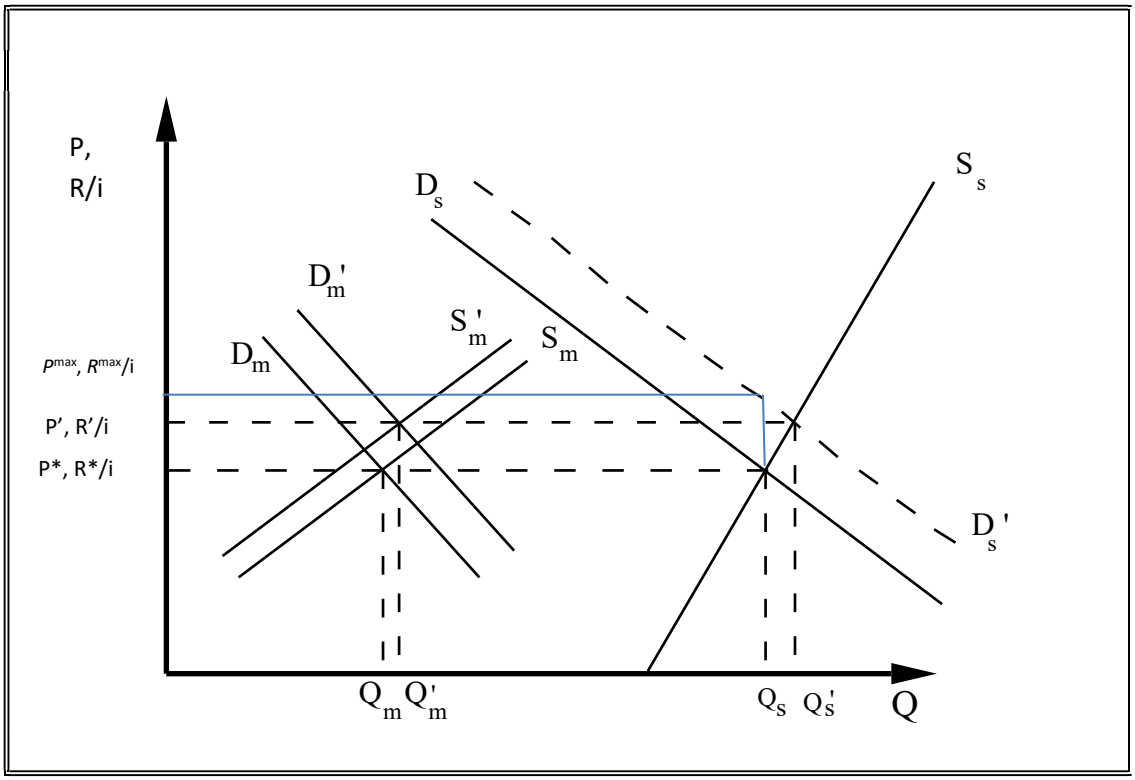
On the right-hand side of Figure 1 we see the supply curve for the stock of houses and flats, labelled S_s, and the demand curve, labelled D_s. The market is in equilibrium at market price P^* and the equivalent housing rent R^*. At that level of prices and rents, the total quantity of dwellings held by asset holders (including owner-occupiers) in their asset portfolios is exactly equal to the physical stock of dwellings that exists in the economy, Q_s. House prices P and rents R are here seen as equivalent concepts because, when housing services can be rented at rent R in a given period, the equivalent house price in a non-distorted housing market will be $P = R/i$, where i is the real interest rate.[1] At prices higher than the equilibrium level P^*, it will be profitable for construction firms to increase the stock of dwellings by building new housing units. The rate at which this can happen is constrained by the limited resources available to the construction sector and the time it takes from initial design and resource consent application to get to the stage where a dwelling is ready for occupancy. This is usually between six months to a year (for example, Poot 2000). The supply curve of the housing stock is therefore steep, that is, price-inelastic, particularly in the short-run. In the long-run, supply can be price-elastic, that is, an increase in house prices of one percent may in the long run lead to a housing supply increase of greater than one percent, with the actual magnitude depending on local conditions (for example, Malpezzi and Maclennan 2001).

The demand for ownership of the stock of dwellings is more elastic because, when prices rise above the equilibrium price P^*, demand by owner-occupiers for housing services would fall, that is, they would demand less floor space. At the same time, landlords would find that the equivalent higher rents lead to a lower quantity of housing demanded by tenants. Overall, housing demand is not very price elastic, with a classic analysis (Hanushek and Quigley 1980) suggesting a price elasticity of housing demand being between -0.3 and -1. In any case, there will be some excess supply at high prices that would put downward pressure on prices and rents which could – in a well-functioning market – lead to a return to the original real prices and rents (while, in nominal terms, prices and rents would then increase at the rate of inflation). Nonetheless, the short-term inflexibility in the stock of dwellings is one of the major factors

[1] The assumptions under which $P = R / i$ holds include: no depreciation, a perfectly competitive housing market and an absence of government intervention in the market. Clearly, in more realistic markets the relationship is mathematically more complicated but P and R remain nonetheless often strongly correlated.

responsible for the considerable volatility in the price of housing in response to various demand shocks.

Figure 1: The Impact of An Increase in Net Immigration on the Housing Market



When the market is in equilibrium, the quantity of housing units that changes hands in any given period (Q_m in Figure 1) is determined by the intersection of the housing real estate supply curve S_m and the demand curve D_m. Equilibrium implies that these houses sell at price P^* or rent R^* (indeed, the price of the vast majority of units that are *not* offered on the market at that point in time is usually assumed, for example for tax purposes, to be equal to the observed price of the properties sold). S_m and D_m may be expected to be more price elastic than the corresponding curves S_s and D_s, given that it relatively easy to list a property in expectation of a capital gain when prices rise (a move up S_m) or delist it from the market when prices fall. Similarly, a rise in P or R will lead to some potential buyers ceasing their search for a property while others may settle for smaller accommodation, resulting in a move up D_m. At the same time, at rising prices investors may find that yields of residential investment are declining relative to yields of other types of assets. This would lead to there being more sellers in the market. This is equivalent to a move up S_m.

What is the impact of immigration in this simple housing market model? The demand for housing triggered by the arrival of an immigrant is almost instantaneous: unless the person

moves in with an existing household in a residential unit,[2] the demand for an additional dwelling unit has been created. This demand is likely to be met initially by temporary accommodation in a hotel, motel or short-term rental unit, but the migrant will soon start to search for more permanent accommodation. Consequently, the demand can only be met by a vacant dwelling unit (temporary or permanent accommodation) or by new construction. Hence the increase in the number of households due to immigration shifts the demand curve for the stock of dwelling units from D_s to D_s'. A new equilibrium has been established when the equilibrium price increases to P' (and rent to R') and the stock of houses has increased to Q_s'. Consequently, Q_s' - Q_s is the net number of houses and flats to be built to meet the increase in demand. Given that it takes time for the additional housing supply to become available, the short-run upward effect of immigration on house prices is much greater (up to price level P^{max}) than the long-run effect (P'). However, house prices are not expected to return to the old level P in the long run. This is due to an increasing marginal cost of construction of dwelling units and due to a fixed supply of land, which therefore also increases in value. Partially offsetting factors could be technological and institutional changes that lower building costs. Additionally, there could be spatial variation (up or down) around the average price when migrants settle in certain parts of a city and this generates spillover effects on the native born. This will be elaborated later on.

Figure 1 shows also that, after an increase in net immigration, the market demand and supply curves D_m and S_m both shift upwards to D_m' and S_m' respectively. The demand curve D_m shifts up because the number of people searching for a home to buy or to rent has increased. Investors will also be wishing to purchase additional dwellings. The S_m curve shifts up because, at the current price, fewer landlords and owner-occupiers are putting their houses on the market when they know that the future equilibrium price will be greater than the current price, that is, a capital gain can be made by postponing sale. Additionally, people who do offer a dwelling unit for sale now will increase their asking price. While the market price and rent will increase to the new equilibrium levels of P' and R' respectively, it cannot be a priori established whether the turnover of dwelling units per period increases or decreases.

The case drawn in Figure 1 shows an increase in the total number of dwelling units changing hands from Q_m to Q_m', but if the anticipation of future capital gains is very strong, there will be a lot of 'banking' of dwelling units (some of which may remain unoccupied) and the units offered for sale will be declining (which can be shown by shifting the S_m curve much further up). In any case, both the demand for and supply of the stock of dwellings, as well as the listings and sales in the residential real estate market, are strongly affected by expectations regarding future prices and future economic conditions.

[2] The case of a migrant household sharing a dwelling with a resident household (often earlier migrants), can potentially lead to a high person to floor area occupancy rate, also referred to as residential crowding (Burr *et al.* 2010).

The housing market which we described in simplified form in Figure 1 by means of conventional demand and supply curves is, in reality, one of the most complex markets in the economy. There are many factors that determine the position and slope of the demand and supply curves (both in the real estate market and in the market for ownership of the dwelling stock). Together they determine the actual impact one may observe after an immigration shock. The size and composition of the immigration flow will clearly matter too.

Table 1 lists the wide range of factors which influence the housing market, on the supply side and on the demand side. Various observable market outcomes are listed also. It should be noted that Figure 1 and Table 1 have simplified the analysis to assuming just one type of dwelling unit. In reality, there are many types of dwellings ranging from detached home to apartments in multistory buildings. Additionally, there is huge quality variation among housing units such as the physical attributes of the dwelling, the amenities at the location and the accessibility of work, shops. Hence, there are many partially overlapping and interacting housing markets. The evidence provided in the following sections will show that some of these are much more affected by immigration than others. Additionally, housing markets interact spatially. For example, if a high level of skilled immigration contributes to rising apartment prices and rents in the CBD of a city, we would expect some outward migration of inner-city dwellers to the suburbs, thereby raising prices and rents there. Such spatial spillover effects are often incorporated in the form of spatial lags or spatial autocorrelation in the econometric modelling.

On the supply side, the stock of dwelling units diminishes by physical depreciation, with additions and alterations providing some compensation. However, most of the increase in the stock is by means of the construction of new dwellings. This is, in turn, affected by availability and cost of land, land and infrastructure development costs, construction costs, the availability of design and building workforces; and the availability of plant & equipment and building materials.

On the demand side, demographic factors are central, given that the demand for dwellings is most fundamentally equal to the number of households, which is population divided by average household size. A change in the observed population over a given time period equals births minus deaths plus net migration (internal and international). Average household size can change due to trends in fertility and mortality; and changes in household formation (for example, marriage, flatting) and dissolution (for example, divorce). There may be differences between the respective impacts of different components of demographic change on the housing market; and there may be notable differences in these demographic forces between immigrants and the native born. This chapter focuses only on the housing market impact of immigration – for the impact of other demographic changes see, for example, Mankiw and Weil (1989) and Levin *et al.* (2009).

Table 1: Factors Influencing the Housing Market

Supply of Residential Space in a Local Housing Market	**Market Outcomes**	**Demand for Residential Space in a Local Housing Market**
Price (P) and rent (R) per unit floor area Expectations regarding future prices and future economic conditions	Equilibrium market price (P^*) and rent (R^*) per unit floor area	Price (P) and rent (R) per unit floor area Expectations regarding future prices and future economic conditions
Stock of dwellings offered for housing services (S_s) Dwelling units offered for sale or rent in any period (S_m)	Current stock of dwellings (Q_s) Turnover of units for sale or rent (Q_m)	Stock of dwellings demanded for housing services (D_s) Dwelling units demanded for purchase or rent in any period (D_m)
Physical depreciation of the existing stock Additions and alterations Construction of new dwellings		Current population and number of households Household formation and dissolution Internal and international migration
Availability and cost of land for residential construction Land and infrastructure development costs Construction costs Availability of design & building workforce, plant & equipment, building materials	Proportion of the stock that is owner-occupied Proportion of households renting housing services Proportion of households owning residential real estate	Consumer preferences regarding housing services, tenure and amenities Income and wealth Return on other types of assets
Interest rates and the availability of finance Structure and regulations of the housing, building, real estate and financial markets Connectivity and spillovers between local housing markets	Housing affordability Indicators of mismatch: Unoccupied dwellings, crowding, homelessness	Interest rates and the availability of finance Structure and regulations of the housing, building, real estate and financial markets Connectivity and spillovers between local housing markets

Source: Adapted from Cochrane and Poot (2016).

As is the case for most other types of consumer expenditure, per capita demand for housing services is inversely related to house price or rent and positively related to income and/or wealth. However, housing demand is also strongly affected by consumer preferences regarding housing services (such as a long-term trend of households desiring a larger floor area per person, which can be observed in many countries), and regarding the demand for various amenities. Household formation and dissolution are affected by changes in preferences (such as changes in the age at which a young person may wish to leave the parental home). Tenure choice (to own or to rent) is partly a matter of preferences and partly a matter of the return to funds invested in housing compared with the return to funds invested in other assets.

Changes in preferences can also affect the type of housing demanded. An example is the increase in the demand for low maintenance apartments close to the city centre. The impact of immigration will be sensitive to differences in housing preferences between immigrants and the native born, for example with respect to tenure choice (also this may also be simply due to endowment effects, see, for example, Painter *et al.* 2001).

A final set of factors impacts on both the demand and the supply side of the market. They include the level of the interest rate and the availability of finance. Together with after-tax income this determines housing affordability (R/Y_d or iP/Y_d; where Y_d refers to disposable income) and, in extreme cases, homelessness. Additionally, housing demand and supply are both affected by the structure and regulations of the housing, building, real estate and financial markets. Differences in outcomes across countries in how house prices respond to similar immigration shock can be partly the result of differences in the composition of migration flows and cross-country differences in housing market behavior and institutional factors, as the empirical results in the following sections suggest.

3. Empirical Evidence

United States

As is often the case, the pioneering research has been done in the United States. Below we also briefly consider evidence from Canada, France, Italy, Spain, Switzerland and the United Kingdom. In the next section we review New Zealand evidence as a separate case study. This country is of particular interest given that it has had in recent years one of the highest net migration rates in the world.

Saiz (2003) provided a first estimate of how an immigration shock impacts on the U.S. housing market. He considered the sudden and huge migration from Cuba to Miami in 1980, the so-called Mariel boatlift. This is seen as a so-called 'natural experiment' in which the subsequent changes in rental prices in Miami were compared with changes in rental prices in three comparison groups. The immigration shock added an extra nine percent to Miami's renter population and an increase in rents that was 8-11 percent more than in comparable cities. Hence

this suggests an impact elasticity of about one: a one percent increase in the number of immigrants leading to an increase in the cost of rental housing of roughly one percent.

A large proportion of migration into the U.S. has gone to six states: California, New York, Florida, Texas, New Jersey, and Illinois. This led Saiz (2007) to consider the local impact of immigration inflows on the housing market in international migrant gateway cities. To account for the possible endogeneity of immigration with respect to factors that generate rent and house price growth, Saiz used an instrumental variable approach with instruments based on: changes in the national level of immigration; changes in the characteristics of the immigrants' countries of origin; and the spatial distribution of immigrants in earlier periods (Saiz 2007, p.346). He finds that immigration pushes up the demand for housing in the destination areas, with rents increasing in the short run and with house prices catching up with the passage of time. The magnitude of the effects is similar to that of the Muriel Boatlift case: an immigration inflow equal to one percent of the initial metropolitan area population is associated with, approximately, a one percent increase in rents and house values (Saiz 2007, p.364).

In recent years, the literature has been increasingly emphasising that such relatively small average effects may hide larger spatial differences. Using the techniques of spatial econometrics, Mussa *et al.* (2017) show with U.S. data from 2002 to 2012 that a one percent increase in population in a Metropolitan Statistical Area (MSA), due to immigration, increases rents and house prices there by 0.8 percent, but rents in surrounding MSAs increase by 1.6 percent and house prices by as much as 9.6 percent. These spillover effects to surrounding MSAs are expected to be predominantly due to spatial sorting: native born leaving the wards with growing numbers of migrants and moving to less diverse neighbourhoods. Evidence of such spatial sorting following an immigration shock is provided by Saiz and Wachter (2011).

United Kingdom

Sá (2015) uses a model that is based on Saiz (2007) but extended to include income effects in housing consumption and the possibility that the native-born population may move away from those cities that have a relatively large influx of immigrants. The elasticity of supply is expected to be crucial in determining the response of house prices to immigration. Essentially, where housing supply is less elastic the increase in demand for new housing created by new migrants will spur less construction and higher price increases than in cities with high elasticities of housing supply. Similarly, adverse demand shocks (such as net outward migration of natives) will see in cities with low elasticities of supply a relatively smaller reduction in construction and greater reductions in prices.

Sá uses in the empirical section of her paper OLS and instrumental variable techniques with official statistics for 170 local authorities in England and Wales to estimate the impact of migration on house prices. She finds that immigration has a *negative* effect on house prices: an

increase in immigrant population equal to one percent of the local population *reduces* house prices by 1.7 percent. One explanation for this advanced by Sá is the mobility response of the native born. An increase in immigrant population equal to one percent of the local population increases the native net out-migration rate by 0.048 percentage points. The reason why this might lead to lower house prices appears to lie in the differential sorting of the native population across local authorities. Natives at the top of the wage distribution leave high immigration cities and generate a negative income effect on housing demand which pushes down house prices in local areas where immigrants cluster. Sá notes that much of the negative effect is related to the clustering of migrants with low educational attainment in certain areas in England and Wales. This would suggest that in local areas where immigrants have higher educational attainment (such as in London) immigration will exert upward pressure on housing demand, counteracting the negative income effect from native out-migration.

A negative impact on house prices does not necessarily mean that rents will decline as well. Using, like Sá, data on local housing markets in England and Wales, Aitken (2014) finds that an inflow of immigrants equal to one percent of the initial population is associated with a 0.14-0.18 percent increase in average housing rent. Hence, following an immigration shock, rents do increase in the UK context, but only modestly so.

Braakmann (2016) and Zhu *et al.* (2018) extend Sá's work by considering the quality and location of the housing, and the skill levels or incomes of the migrants. Both papers report local house price declines due to immigration, but predominantly in poorer areas that would attract unskilled migrants. Besides the 'white flight' of higher income residents from such areas, the conversion of larger properties into several flats to accommodate migrants may lower the price per housing unit as well.

Canada

With panel data for the period 1996 to 2006 at census division level, Akbari and Aydede (2012) analyse the impact of migration on house prices in Canada.[3] The extent of migration to Canada is quite large, equivalent to an annual inflow rate of about 0.6 percent of the Canadian population (Akbari and Aydede 2012, p.1656). Akbari and Aydede's model contain a wide variety of immigration, labour market, demographic, cost and supply side variables and is estimated using a 'one-way within-fixed-effect' model. They conclude that immigration increases house prices slightly, but that the effect is close to zero and arises only from migrants who had been resident in Canada for 10 years or more (Akbari and Aydede 2012, p.1657).

[3] For census purposes Statistics Canada divides the country into 289 census divisions. These are intermediate in the spatial hierarchy between municipality (smaller) and province/territory (larger) (Akbari and Aydede 2012, p.1649).

Spain

Spain is a particularly interesting country to assess the effect of immigration on the housing market given that growth in the foreign-born population has been huge. In the period 1998-2008, the foreign-born share in the Spanish working-age population increased from 2 to 16 percent. In absolute terms, the foreign-born population increased from barely 0.5 million to 5 million over the course of the decade. The 2000-2005 increase in the foreign-born share in the population of Spain was the largest increase in the world (Gonzalez and Ortega 2013, Figure 1). Contemporaneously, housing prices appreciated rapidly, rising by 175 percent between 1998 and 2008, and construction of new dwellings rose from around 250,000 to 600,000 units per year (Gonzalez and Ortega 2013, p.38).

The mechanism Gonzalez and Ortega (2013) postulate for the link between migration and house prices/residential construction is simple: large increases in working age immigration lead directly to increases in the demand for home ownership, given that a considerable proportion of working age migrants in Spain are home owners (40 percent in 2007). The 60 percent of non-home owning migrants then raise demand in the rental market, encouraging higher demand for housing as an investment. Gonzalez and Ortega adopt an instrumental variables approach to guard against endogeneity bias arising from simultaneity in house prices and migration flows. They estimate two models: one for the logarithm of the price of housing (price per square meter) and the other for the logarithm of the stock of housing units.[4] They find large effects of migration on the Spanish housing market with the migration shock being responsible for about 25 percent of the increase in housing prices and more than 50 percent of the increase in the housing stock (Gonzalez and Ortega 2013, p.57). Over the 1998-2008 decade, immigration in aggregate was about 17 percent of the initial population and was responsible for a 1.2 to 1.5 percent increase in housing units annually, and an increase in housing prices of about two percent annually (Gonzalez and Ortega 2013, p.37).

We conclude that the impact elasticity is somewhat larger, but still quite comparable, than what was found for the U.S. This is reconfirmed by the study by Sanchis-Guarner (2017) who uses Spanish data for the period 2001-2012. She finds elasticities of approximately 0.8 percent for rents and 3.1 percent for house prices. Sanchis-Guarner's contribution is to separate out the effect of the mobility of natives, which at the regional level is *inward*, that is, natives move to regions in which migrants contribute to population growth. Consequently, native inward migration also contributes to the increasing cost of housing. The net effect, that removes this native mobility effect, is about one third lower than the overall effect.

Italy

Accetturo *et al.* (2014) develop a model that shows how an immigrant inflow in a district affects local housing prices through changes in how natives perceive the quality of their local amenities and how this influences their mobility (Accetturo *et al.* 2014, p.45). This model gives

[4] Two instruments are used; one based on the settlement patterns of past migrants (ethnic networks) and another based on geographic accessibility ('gateways') (Gonzalez and Ortega 2013, p.42-43).

rise to a number of predictions (Accetturo *et al.* 2014, p.48): first, migration increases the average price of housing at the city level; second, the impact of migration at the district level, relative to the city average, is negative (positive) if migration deteriorates (improves) the perception of the quality of local amenities; third, migration encourages the outflow of natives; and, fourth, a lower (higher) housing supply elasticity in the area affected by immigration implies a larger (smaller) outflow of natives but without affecting the house price differentials within the city.

These predictions are then tested with reference to a group of 20 large Italian cities, with the data being available at district level, for the period 2003-2010. Estimation of a series of models, one for each of the predictions, is carried out using both OLS and instrumental variable techniques. With respect to the first of the predictions, a 10 percent increase in the stock of immigrants (approximately the annual average growth 2003-2010 in the cities considered) would increase average house price by five percent (the implied impact elasticity is therefore about 0.5, which is somewhat less than that found in the U.S.). Generally, however, the results are similar to those obtained in studies for Canada (Akbari and Aydede 2012) and for the U.S. (Saiz, 2007).

However, both OLS and instrumental variable estimations show that prices tend to grow at rates *below* the city average for areas in which migrants settle. Quantitatively, a 10 percent increase in migrant numbers in an area is found to *lower* local prices by about two percentage points relative to the city average (Accetturo *et al.* 2014, p.53).

The instrumental variable estimates also indicate that 10 additional immigrants in a district above the city-year average induce six natives to relocate to other areas of the city (Accetturo *et al.* 2014, p.53). Finally, there is some heterogeneity in the housing impact within cities. Areas with a low elasticity of housing supply react more strongly to migrant in-flows (with 7 natives leaving for every 10 migrants there) than areas with higher elasticities of housing supply (where four natives leave for every 10 migrants).

France

d'Albis *et al.* (2017) provide the first French evidence on the relationship between non-EU immigration and housing by means of the panel vector autoregression (VAR) methodology applied to regional data for the period 1990-2013. The VAR methodology is a time series alternative to instrumental variables to address two-way causality, that is, to address the fact that immigration may not only impact on house prices but also respond to changing house prices. d'Albis *et al.* find that immigration had no significant effect on regional property prices in France, but higher property prices significantly reduced immigration rates. The authors explain these results in terms of some special characteristics of non-EU immigration in France, namely that most of this immigration is motivated by family reasons for which a residence permit requires the availability of suitable housing. The importance of social housing, which

accounts for 44 percent of rented housing in France, may have also impacted on the insignificant effect of non-EU migration on regional house prices.

Switzerland

Degen and Fischer (2017) examine the relationship between house prices and immigration flows in 85 Swiss regions over six years (2001-2006), a period during which house price inflation was relatively low. Using a regression model similar to Saiz (2007) they find that an immigration inflow equal to one percent of an area's population is coincident with an increase in prices of single-family homes of about 2.7 percent. The effect on higher density housing, such as multifamily homes, tends to be larger – presumably because migrants may disproportionally rent this type of housing. The Swiss results yield similar magnitudes to those found in the U.S. (Saiz 2007), Spain (Gonzales and Ortega 2013, Sanchis-Guarner 2017) and Italy (Accetturo *et al.* 2014). The housing impact in Switzerland is re-estimated by Adams and Blickle (2018) by means of both Swiss Household Panel data (51,000 household-year observations) and data on 2323 municipalities across 22 years. Adams and Blickle find a house price impact elasticity of about 1.15 for immigrants from the EU and OECD, while the impact of immigration from the rest of the world is less (0.37), presumably due to the lower income of the latter migrants and their greater impact on outward migration of the native born at the local level. In fact, Adams and Blickle conclude that the displacement effect is mostly due to a dislike of growing diversity of the neighbourhood and less due to higher housing costs and greater competition on the labour market.

Meta-Analytic Evidence

The case studies outlined above provide by no means all of the estimates of the effect of immigration on house prices. Larkin et al. (2018) consider a much larger set of estimates. They gathered 45 econometric studies with 474 comparable estimates that spanned 14 developed countries. Each of these studies estimated regression models of house prices (by location and time period) with a measure of immigration among the right-hand side variables. However, the studies are too dissimilar to calculate a weighted average of the impact elasticities (with weight determined by estimate precision). Instead, Larkin *et al.* (2018) use the partial correlation coefficient as the effect size and run a meta-regression model in which this partial correlation coefficient is regressed on 13 moderator variables (that is, study characteristics), using weighted least squares with inverse variance weights. This research shows that immigration does indeed increase house prices on average, thus confirming the theoretical predictions in Section 2 above. The main driving force is expected to be the relatively inelastic supply of new dwellings and land for residential development.

A novel aspect of this meta-analysis is that the results are linked to World Values Survey (WVS) data on attitudes towards immigrants/foreign workers. Larkin *et al.* (2018) find that in countries where a larger percentage of WVS respondents dislike having immigrants as

neighbours, the impact of immigration on house prices is muted. This is consistent with the evidence cited above that, at least at the local level, *homophily* (i.e. the desire to live next to those of a similar background) triggers outward migration of the native born from the city wards where migrants settle and thereby reduces the house price impact or even leads to house price declines (as in the case of the U.K.).[5]

4. A Case Study: New Zealand

According to data published by *The Economist*, New Zealand had in 2017 the most unaffordable house prices in the world.[6] At the same time, New Zealand had one of the highest rates of net immigration, equivalent to 1.5 percent of the resident population per annum. House prices are the highest in Auckland, which accounts for more than half of immigration (but only one third of population). House prices grew faster in Auckland than in other major cities in the country, particularly after 2012 (see Figure 2). Not surprisingly, homeownership rates (the proportion of households in owner-occupied dwellings) are lower in Auckland than in the rest of the country. While homeownership rates have been declining across New Zealand since the 1990s, the decline in Auckland has been in recent years relatively faster than elsewhere. Consequently, the impact of international migration on homeownership, house prices and rents is of considerable interest. We therefore provide in this section a review of the New Zealand evidence in somewhat greater depth.

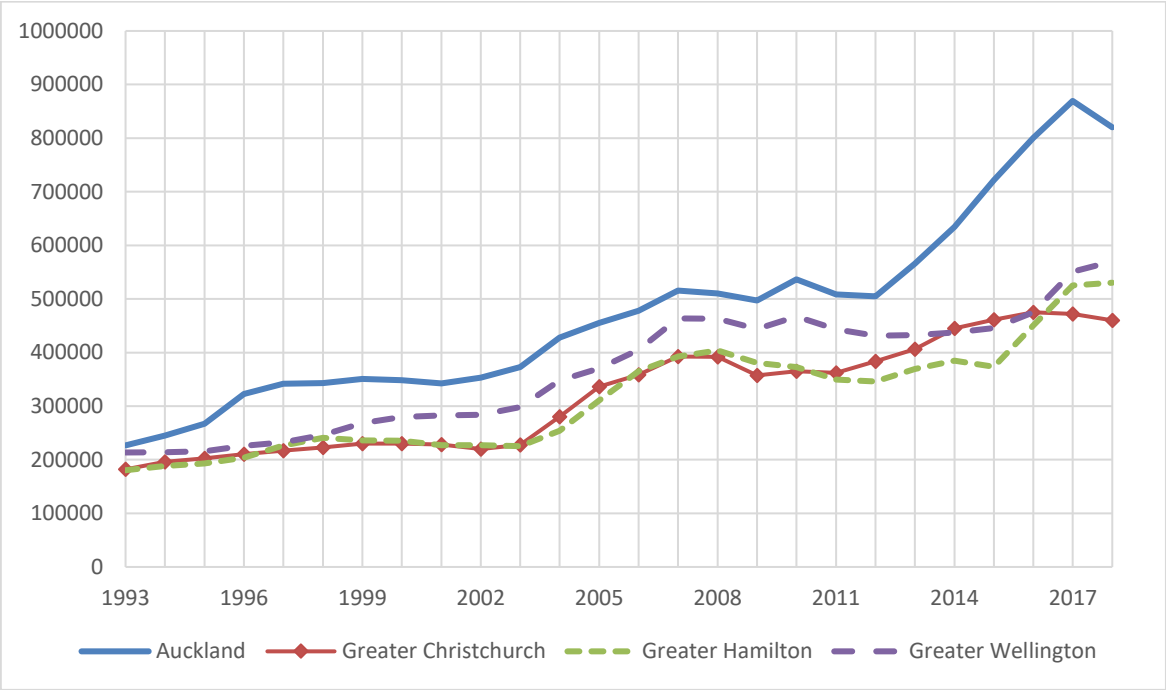
When assessing the impact of net international migration on New Zealand's housing markets, it should be kept in mind that much of the overall change in aggregate net international migration in New Zealand is due to sharp cyclical fluctuations in the net movements of New Zealanders themselves, who have the greatest cross-border mobility rates in the developed world (Bedford and Poot 2010). The rate of net Permanent and Long-Term (PLT) migration of foreign citizens per 1000 estimated New Zealand total population is cyclical but shows a long-term upward trend, with peaks around 1996, 2003 and 2017. Net PLT migration of New Zealand citizens is also cyclical but persistently negative, depressing New Zealand's population growth by 0.5 percent per annum on average (see Figure 3). However, net PLT migration of New Zealand citizens is even more cyclical than net migration of foreign citizens and the peaks do not always coincide. It could be argued that the 'perfect storm' in the 2014-2017 period of relatively low net outward migration of NZ citizens coinciding with peak net inflows of foreign migrants is a rare occurrence.

---

[5] The desire for homophily does not necessarily suggest that the native born are opposed to diversity. For example, the effect of greater ethnic diversity on the variety of ethnic cuisine offered in cities has been shown to be a positive amenity effect of greater immigration that may increase property prices (Bakens *et al.* 2018).

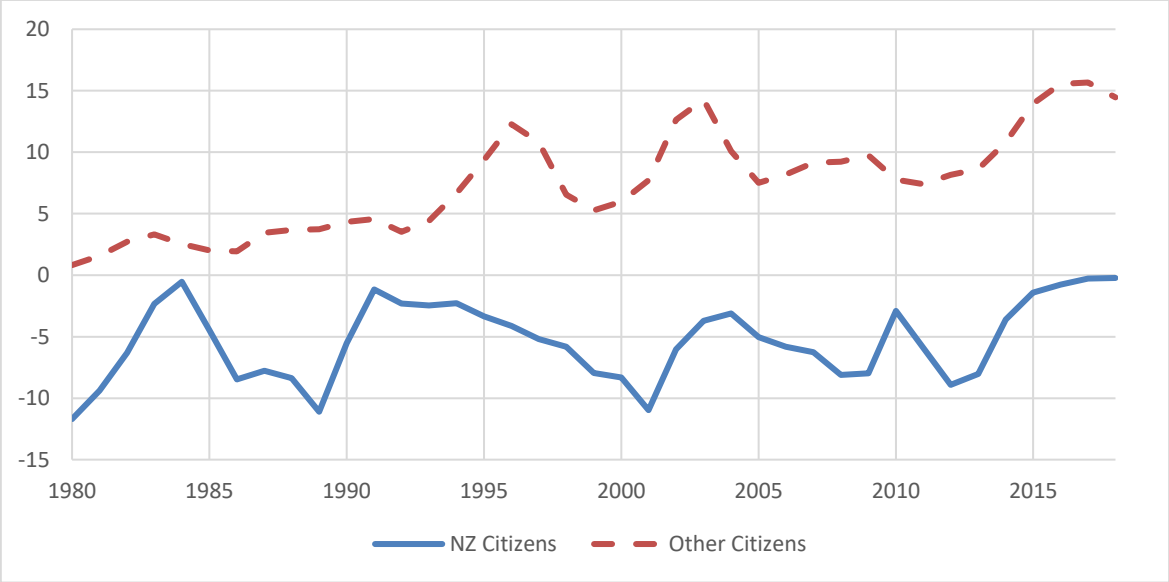
[6] See https://www.economist.com/graphic-detail/2017/03/09/global-house-prices, accessed 21/9/2018.

Figure 2: Main Centre Median Sale Price, March 2018
New Zealand dollars



Source : MBIE 2018 http://urban-development-capacity.mbie.govt.nz

Figure 3: Net Permanent and Long-Term (PLT) Migration by Citizenship
per 1000 Estimated New Zealand Total Population in Year Ending March 1980-2018

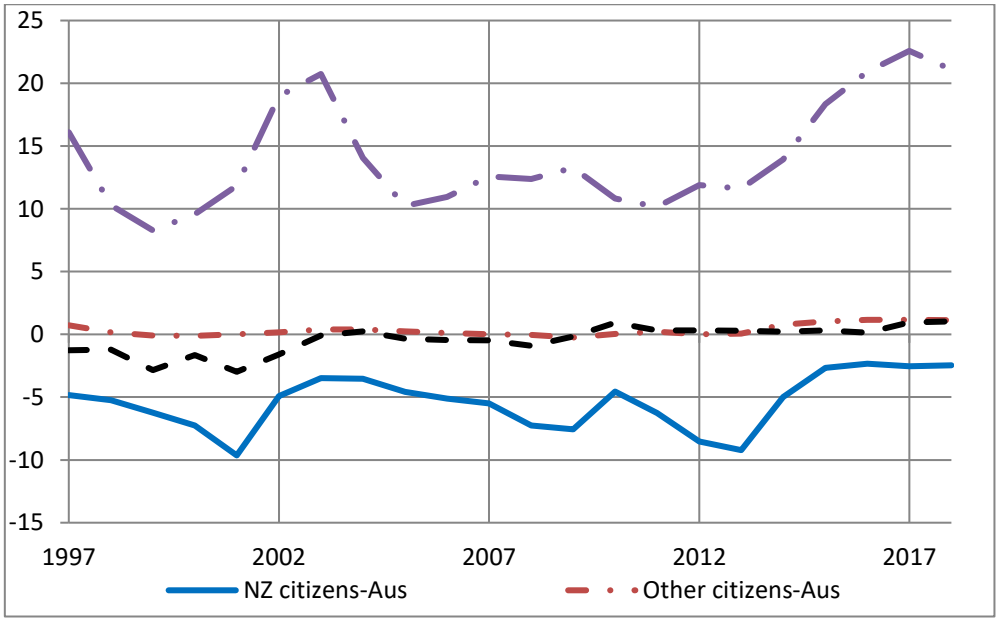


Source: Statistics New Zealand, *Infoshare.*

Figure 4 zooms in on net migration in Auckland, again distinguishing between the net migration of New Zealand citizens and citizens of other countries, but also considering migration from/to Australia and migration from/to the rest of the world. From 1997 (the earliest date for which Auckland data are available) onwards the net PLT migration rate of New

Zealand citizens in Auckland follows a similar pattern of change to the national net PLT migration rate of New Zealand citizens. The volatility in net PLT migration of New Zealand citizens in Auckland is almost entirely due to changes in the propensity of New Zealanders to depart New Zealand for twelve months or more.

Figure 4: Net PLT Migration by Citizenship and Origin/Destination Australia and Rest of the World (RoW)
per 1000 Estimated Auckland Total Population in Year Ending March 1997-2018



Source: Statistics New Zealand, *Infoshare.*

Figure 4 shows that these fluctuations in net PLT migration of New Zealand citizens in Auckland are predominantly determined by the net PLT migration between Australia and New Zealand (that is, trans-Tasman migration). The rate of net PLT migration of New Zealand citizens from Auckland to the rest of the world has been rather small. In fact, since 2010, there has been more return PLT migration of New Zealand citizens from those destinations to Auckland than outward PLT migration, resulting in a slightly positive net PLT migration rate of New Zealand citizens. The rate of net inward PLT migration into Auckland of foreign citizens has been increasing strongly since 2011, surpassing the 2003 peak in 2017.

It is important to note that the 2017 peak in net PLT migration of foreign citizens differs from previous peaks. The growth in inward PLT migration of foreign citizens in recent years has been particularly due to a growing number of foreign citizens entering New Zealand on a temporary visa, either to work (for example as construction workers contributing to the rebuilding of Christchurch after a major earthquake in 2011), under a working holiday visa arrangement, or for study for 12 months or more.

The trends discussed above suggests that the demographic impact of growing net inward PLT migration of non-New Zealand citizens on the Auckland population in recent years has

been no more important than the sharply declining net outward PLT movement of New Zealanders. Together, this has led to rapid growth in the number of households in Auckland in recent years, which has coincided with rapid growth in house prices. There have been several econometric studies exploring the relationship between international migration and house prices in New Zealand, to which we will now turn.

Using a structural vector auto-regression, Coleman and Landon-Lane (2007) analyse the relationship between migration flows, housing construction and house prices at the national level in New Zealand in the period 1962-2006. They find that a net inward migration flow equal to 1 percent of the population is associated with an 8-12 percent increase in house prices after one year; and with an even slightly larger effect after three years (p.43). This elasticity is much larger than what is found in the literature cited in the previous section. Coleman and Langdon-Lane speculate that the reasons for this might be found in short-run housing supply constraints and in the future income expectations of those who are already resident in an area (p.40).

Expectations regarding future house prices are important. Given the time it takes for additional dwellings to be built, housing supply does not respond immediately to an increase in population through migration. Hence owners and developers may expect an initial increase in house prices following a sharp increase in net immigration. However, house prices do not fall back to their original level once additional housing has been built. There are several reasons for that. Firstly, house owners may have adjusted their expectations of their properties' value to the higher price. Secondly, the additional population increases the demand for land and also its productivity (due to agglomeration effects). This translates into higher land prices and therefore property prices. Thirdly, the cost of new residential development tends to increase faster than general price inflation. Subsequent waves of migration repeat this process and create an upward ratcheting effect (Fry 2014, p.25-26).

Stillman and Maré (2008) obtain, using micro econometric techniques, an estimate of an increase in local housing prices between 0.2 and 0.5 percent following a 1 percent increase in an area's population (but with considerable variation in estimated impacts across time periods). Hence this local impact elasticity is smaller than found by, for example, Saiz (2007) for the U.S. However, once Stillman and Maré split population growth into its components, they do not find any evidence for foreign-born immigrants positively affecting local house prices. Instead, New Zealanders returning from abroad have a large impact on local house prices with a one percent increase in the local population, due to returning New Zealanders, being associated with a 9.1 percent increase in house prices (p.14). Given that there is not much fluctuation in return migration as compared with the intentions of New Zealanders to move abroad, this evidence can be interpreted as suggesting that the sharp reduction in the number and rate of New Zealanders leaving Auckland to go abroad for twelve months will have had a

bigger impact on Auckland house prices than the increase in net PLT migration of foreign citizens.

The findings of Stillman and Maré (2008) are reinforced by Hyslop *et al.* (2019), who included 2013 census data, as well as data on rents and building consents. Measured at the level of urban areas, Hyslop *et al.* (2019) find that a one percent increase in an area's population is associated with a 0.3-0.5 percent increase in local house prices, with the local effect on Auckland wards being even smaller. There appears to be little correlation of a population shock with house rents, nor with apartment prices and rents. However, there is a notable housing supply response to a population shock in terms of building consents, with an elasticity of close to one, that is, little evidence of household crowding.

McDonald (2013) analyses, by means of a macro-level vector auto-regression framework (with monthly data from January 1990 to October 2013), the relationship between different types of permanent and long-term migration and the New Zealand housing market. He finds that changes in net migration are associated with large housing market effects. A net migration inflow of one percent (of the existing population) leads to an eight percent increase in house prices over the following three years at the national level. Hence, this is consistent with the Coleman and Landon-Lane research reviewed above. Furthermore, an additional house will be constructed for approximately every six new migrants. Given that the average household size was 2.7 at the time of the 2013 census (and unlikely to be much more for migrants), this research suggests that there is a crowding effect.

In addition, McDonald finds that the impact of arrivals and departures differs: a 1000 person increase in monthly PLT arrivals is associated with a four percent increase in house prices while a decline of a similar magnitude in the number of monthly PLT departures raises house prices by half this amount (two percent). This asymmetry may be related to the difference in composition of the flows: PLT non-citizen arrivals include relatively many families with skilled (and therefore higher income) older adults, whereas New Zealand citizen departures include relatively many young and single (and therefore lower income) people. McDonald's results suggest that changes in foreign-citizen migration have a larger effect at the national level than changes in New Zealand citizen migration (but recall that Stillman and Maré (2008) found a larger effect for New Zealand citizens at the local level). The origin of the migration flow would also seem to matter: a 1000-person increase in monthly flows originating from a UK or European source appears accompanied by an eight percent increase in house prices after two years, while for flows with Asian origins this increase is less: around six percent.

Utilizing an estimated dynamic stochastic general equilibrium (DSGE) model of a small open economy and a structural vector auto-regression, Smith and Thoenissen (2018) consider the relationship between migration and business cycle dynamics. While housing markets are not their primary focus they conclude that, while migration shocks matter for residential

investment and real house prices, other shocks have a greater influence on housing market volatility (p.1), with migration shocks accounting for a modest four percent of the volatility in real house prices and 3 percent in residential investment (p.23).

Hence, in conclusion, New Zealand studies tend to find much larger effects when using aggregate national level data than when running regressions with urban and local level data. However, these differences are not necessarily contradictory. At the national level, migration and the housing market are strongly correlated over the business cycle, but it is difficult to control for the endogeneity of migration. There can be omitted aggregate time series factors in macro level studies that impact on both immigration and house prices (Hodgson and Poot 2010, p.26). Moreover, drivers of migration can differ between the national and local levels. Conversely, studies using local or regional data may understate effects as they do not take sufficient account of how local markets interact (Fry 2014, p.26), which may offset some of the initial effects (for example, net outward migration of Auckland residents to other regions offsetting initial house price increases associated with net inward international migration). Finally, the micro level studies are based on census-based observations that are five to seven years apart and therefore generate estimates of long-run adjustments whereas time-series models give more weight to short-run adjustments.

In terms of the policy debate in New Zealand, the issue of whether PLT migration has driven up house prices has become intertwined with the impact of non-resident buyers on the property market. It has been widely argued (see, for example, Ainge Roy (2018)) that non-resident investors' activity in the housing market, most notably in Auckland, has driven up house prices and priced native homebuyers out of the market. This has resulted in a number of policy initiatives. For example, the lack of adequate data on the scale of foreign ownership of property in New Zealand has been partially addressed through the Taxation (Land Information and Offshore Persons Information) Act 2015, which improved the availability of information on foreign buyers by requiring the collection of tax-related data when people buy sell or transfer property. While not a register of foreign ownership of residential or other property, these data do provide information on the tax residency status of those involved in property transactions (LINZ, 2017).

More substantively, the left-of-centre Labour Party-led government elected in 2017 has followed through on promises made to curb the purchase of residential property by foreign buyers. The instrument is the Overseas Investment Amendment Act 2018. This Act restricts, since 22 October 2018, the ability of foreigners to buy residential land in New Zealand. Generally, only New Zealand citizens and the holders of residence class visa, who spend most of their time in New Zealand, are able to purchase residential land, though resident class visa holder who do not spend the required amount of time in New Zealand may still do so with the consent of the Overseas Investment Office (OIO). It should be noted that a number of special provisions apply in the case of residential property development. There are also, due to pre-

existing agreements, exemptions for Australian and Singaporean citizens (LINZ,2018, The Treasury 2018).

Of more direct relevance to migration, given the historically high levels of net PLT migration experienced post 2015, has been the response of successive governments to try to limit the inflow of migrants by adjusting the settings of the legal regime governing migration. For example, the previous right-of-centre (National Party-led) government made major changes to both the skilled migrant policy and the temporary work policy in October 2016, and again in August 2017, in an attempt improve management of labour flows into New Zealand. Most, though not all, of these changes aimed to reduce the number of low skilled workers being approved for residency and to prevent low waged workers from extending their stay beyond three years (Bedford and Didham 2018, p.3).

With the election of the Labour-led government in late 2017 further tightening of the regulation of migration occurred. This involved further restriction of international students to stay post-qualification, especially for lower level qualifications, as well as adjusting the requirements around work visas. The move to a more restrictive migration regime by the government has led to a number of concerns around the impact of these changes on the New Zealand labour market's ability to react to skills shortages in industries such as construction, horticulture and agriculture (notably dairying). In addition, the changes in policy toward international students may negatively affect the international educational services sector. Altogether, these policies may have contributed to a recent decline in Auckland house prices that can be observed in Figure 2.

5. Conclusions

We started this chapter by emphasizing that the housing market is a very complex market that is affected by many forces of demand, supply, institutions, regulations and other forms of public intervention.[7] It is therefore not surprising that the empirical literature, as catalogued by the meta-analysis of Larkin *et al.* (2018), detected a wide range of statistically significant and insignificant effects. However, a qualitative synthesis of the evidence from eight countries (Canada, France, Italy, New Zealand, Spain, Switzerland, United Kingdom and United States) reviewed in this chapter suggests that Saiz's (2003) natural experiment of the Muriel Boatlift provided evidence of the order of magnitude of the effect that has been reconfirmed by several other studies. On average, a one percent increase in immigration in a city may be expected to raise private sector rents by one-half to one percent and the effect on prices is about double that. Much of this increase would happen relatively soon after an immigration shock, given that housing supply is very price-inelastic in the short-run. However, the tendency of the native born to move out of city wards where migrants settle can lead to relative house price declines

[7] See, for example, the recent study by Li and Tang (2018) on the case of immigration impacts in Singapore, in which public housing is only available to the native population.

in these areas. If the native-born move to other administrative areas outside the city boundaries, this redistribution effect may lead to an observed decline in house prices – as has been noted for the U.K. It is clear that the spatial level of the analysis may have a large effect on the measured impact.

In any particular case study, the observed impact will depend on the spatial unit of analysis, on the time frame over which the impact is measured, and on the demographic and economic composition of the immigrant flow. Specifically, household size and the human capital of the migrants will play important roles. Additionally, the institutional factors that influence the price elasticity of the supply of new dwellings will lead to different estimates for different countries. How the native born react to immigration turns also out to be important. Larkin *et al.* (2018) find that negative attitudes to immigration dampen the price effect. Estimates of the effect are also sensitive to the extent to which reverse causality has been controlled for by means of techniques such as instrumental variables and vector autoregression modelling. The behaviour of migrants and the native born in housing markets will also be strongly affected by expectations of future prices and rents: neither group may be discouraged from moving to areas with high house prices if significant further capital gains are expected.

Since various meta-analyses of the labour market impact of immigration suggest that average wage effects are negligible (see, for example, Longhi *et al.* 2005, 2008), we can also conclude that increasing house prices after an immigration shock will lower housing affordability. However, much of the sharp increases in house prices and rents in many cities that are attractors of international migrants (think besides Auckland of, for example, London, Sydney, Vancouver, Los Angeles and Barcelona) have been due to speculative forces that have been fuelled by low interest rates and growing foreign investment - leading to a property market bubble in some cases (see Greenaway-McGrevy and Phillips 2016, in the case of New Zealand). Hence, we conclude that immigration has been only a minor contributor to the sharply rising house prices that have been observed in many fast-growing cities of countries in Europe, North America and Australasia.

Finally, it is clear that there are still many potentially fruitful avenues to explore in this area of research, particularly at a more disaggregated level that takes explicit account of the different types of migrants that make up the immigration stream and of the various interacting public and private segments of the housing market.[8] A comparison between the effects of migration with those other demographic changes (fertility, mortality, household formation and dissolution) would also be of considerable interest. Measuring causal effects will remain challenging, particularly given that the housing market can be a push or pull factor in deciding whether to migrate and to which destination. Additional challenges in this research are the complexities of the housing market, the role of business cycles, the possibility of threshold

[8] We acknowledge, and incorporated, some suggestions for future research provided by two anonymous referees.

effects, and the dynamics of the generation of – potentially non-linear –expectations and responses.

References

Accetturo, A., Manaresi, F., Mocetti, S., & Olivieri, E. (2014). Don't stand so close to me: The urban impact of immigration. *Regional Science and Urban Economics*, 45(0), 45–56.

Adams, Z. & Blickle, K. (2018). Immigration and the displacement of incumbent households. Working Papers on Finance 2018/8. University of St.Gallen.

Ainge Roy, E. (2018). 'Tenants on our own land': New Zealand bans sale of homes to foreign buyers. *The Guardian*. Retrieved August 15, 2018, from https://www.theguardian.com/world/2018/aug/15/tenants-on-our-own-land-new-zealand-bans-sale-of-homes-to-foreign-buyers

Aitken, A. (2014). *The Effects of Immigration on House Prices and Rents: Evidence from England and Wales*. Royal Holloway, University of London. Mimeo.

Akbari, A. H. & Aydede, Y. (2012). Effects of immigration on house prices in Canada. *Applied Economics*, 44(13), 1645–1658.

Bakens, J., Florax, R.J.G.M., de Groot, H.L.F., & Mulder, P. (2018). *Living Apart Together: The Economic Value of Ethnic Diversity in Cities*. Tinbergen Institute Discussion Paper TI 2018-029/VIII. Amsterdam: Tinbergen Institute.

Bedford, R. & Didham, R. (2018). Immigration: an election issue that has yet to be addressed? *Kōtuitui: New Zealand Journal of Social Sciences Online*, 1–18.

Bedford, R.D. & Poot, J. (2010). Changing Tides in the South Pacific: Immigration to Aotearoa New Zealand. In: Segal UA, Elliott D and Mayadas NS (eds.) *Immigration Worldwide*. Oxford University Press, New York, NY, pp. 257-273.

Bodvarsson, O.B. & Van den Berg, H.F. (2013). *The Economics of Immigration: Theory and Policy*. New York: Springer.

Braakmann, N. (2016). Immigration and the property market: evidence from England and Wales. Real Estate Economics.

Burr, J.A., Mutchler, J.E., & Gerst, K. (2010). Patterns of residential crowding among Hispanics in later life: immigration, assimilation, and housing market factors. *Journals of Georontology: Series B*, 65B(6): 772-782.

Chiswick, B.R. & Miller, P.W. (eds.) (2015). *Handbook on the Economics of International Migration*, Volumes 1A&1B, Amsterdam: Elsevier.

Cochrane, W. & Poot, J. (2016). *Past Research on the Impact of International Migration on House Prices: Implications for Auckland*. Wellington, New Zealand: Ministry of Business, Innovation and Employment.

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

d'Albis, H., Boubtane, E. & Coulibaly, D. (2017). *International Migration and Regional Housing Markets: Evidence from France*. IZA DP 10516. Bonn: IZA Institute of Labor Economics.

Degen, K. & Fischer, A.M. (2017). Immigration and Swiss house prices. *Swiss Journal of Economics and Statistics*, 153(1), 15-36.

DiPasquale, D. & Wheaton, W. (1995). *Urban Economics and Real Estate Markets*. Upper Saddle River, NJ: Prentice Hall.

Fallis, G. (1985). *Housing Economics*. Oxford: Butterworth and Co.

Fry, J. (2014). *Migration and Macroeconomic Performance in New Zealand: Theory and Evidence*. Working Paper 14/10. Wellington: New Zealand Treasury.

Gonzalez, L. & Ortega, F. (2013). *Immigration and housing booms: Evidence from Spain*. Journal of Regional Science, 53(1), 37–59.

Greenaway-McGrevy, R. & Phillips P.C.B. (2016). Hot property in New Zealand: Empirical evidence of housing bubbles in the metropolitan centres. *New Zealand Economic Papers,* 50(1): 88-113.

Hanushek, E.A. & Quigley, J.M. (1980). What is the price elasticity of housing demand? *The Review of Economics and Statistics*, 62(3): 449-454.

Hatton, T.J. (2014). The economics of international migration: a short history of the debate. *Labour Economics* 30: 43-50.

Hyslop, D., Le, T., Maré, D.C., & Stillman, S. (2019). *Housing Markets and Migration – Evidence from New Zealand*. Motu Working Paper. Wellington: Motu Economic and Public Policy Research.

Hodgson, R. & Poot, J. (2010). *New Zealand Research on the Economic Impacts of Immigration 2005–2010: Synthesis and Research Agenda*. Wellington: Department of Labour.

Land Information New Zealand (LINZ). (2017). Understanding tax residency data. Retrieved August 8, 2018, from www.linz.govt.nz/understanding-tax-residency-data

Land Information New Zealand (LINZ). (2018). Overseas Investment Amendment Bill given royal assent. Retrieved August 25, 2018, from https://www.linz.govt.nz/news/2018-08/overseas-investment-amendment-bill-given-royal-assent

Larkin, M.P., Askarov, Z., Doucouliagos, C., Dubelaar, C., Klona, M., Newton, J., Stanley, T.D., & Vocino, A. (2018). *Do House Prices Sink or Ride the Wave of Immigration?* IZA DP 11497. Bonn: IZA Institute of Labor Economics.

Levin, E., Montagnoli, A., & Wright, R.E. (2009). Demographic change and the housing market: evidence from a comparison of Scotland and England, *Urban Studies*, 46(1): 27-43.

Li, X. & Tang, Y. (2018). When natives meet immigrants in public and private housing markets. *Journal of Housing Economics*, 71: 30-44.

Longhi, S., Nijkamp, P. & Poot, J. (2005). A meta-analytic assessment of the effect of immigration on wages. *Journal of Economic Surveys*, 19(3): 451-477.

Longhi, S., Nijkamp, P. & Poot, J. (2010). Meta-analyses of labour market impacts of immigration: Key conclusions and policy implications. *Environment and Planning C: Government and Policy*, 28: 819-833.

Malpezzi, S. & Maclennan, D. (2001). The long-run price elasticity of supply of new residential construction in the United States and the United Kingdom. *Journal of Housing Economics*, 10(3): 278-306.

Mankiw, N.G., & Weil, D.N. (1989). The baby boom, the baby bust, and the housing market. *Regional Science and Urban Economics*, 19(2): 235-258.

McDonald, C. (2013). *Migration and the Housing Market* (AN2013/10). Wellington: Reserve Bank of New Zealand.

Mclennan, D. (1982). *Housing Economics*. Boston: Addison-Wesley Longman.

Mishan, E.J., & Needleman, L., (1966). Immigration, excess aggregate demand and the balance of payments. *Economica,* 33(130): 129-147.

Mussa, A., Nwaogu, U.G., & Pozo, S. (2017). Immigration and housing: A spatial econometric Analysis. *Journal of Housing Economics*, 35(1): 13-25.

Muth, R.F. & Goodman, A.C. (1989). *The Economics of Housing Markets*. Reading UK: Harwood Academic Publishers.

Nijkamp, P., Poot, J., & Sahin, M. (eds) (2012). *Migration Impact Assessment: New Horizons*. Cheltenham UK: Edward Elgar.

Norman, N. R., & Meikle, K.F. (1985). The Economic Effects of Immigration in Australia: Committee for the Economic Development of Australia (CEDA) and Department of Immigration and Ethnic Affairs.

O'Sullivan, A. (2019). *Urban Economics*. 9th edition. New York: McGraw-Hill.

Painter, G., Gabriel, S., & Myers, D. (2001). Race, immigrant status and housing tenure choice. *Journal of Urban Economics*, 49(1): 150-167.

Poot, J., Nana, G., & Philpott, B.P. (1988). *International Migration and the New Zealand Economy: Long-Run Perspective*. Wellington: Institute of Policy Studies.

Poot, J. (2000). *Economic Principles for the Building Sector: a New Zealand Text*. Revised Edition. Wellington: School of Architecture, Victoria University of Wellington.

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

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

Saiz, A. & Wachter, S. (2011). Immigration and the neighborhood. *American Economic Journal – Economic Policy*, 3(2), 169-188.

Sanchis-Guarner, R. (2017). *Decomposing the Impact of Immigration on House Prices*. CReAM Discussion Paper CDP 06/17. London: Centre for Research and Analysis of Migration, University College London.

Smith, C. & Thoenissen, C. (2018). *Migration and Business Cycle Dynamics*. Discussion Paper No. 2018/07. Wellington: Reserve Bank of New Zealand.

Stillman, S. & Maré, D. (2008). *Housing Markets and Migration: Evidence from New Zealand*. Wellington: Department of Labour.

The Treasury (2018). *Screening of Residential Land: Questions and Answers*. Wellington: New Zealand Treasury.

Vehbi, T. (2016). *The Macroeconomic Impact of the Age Composition of Migration*. (AN2016/03). Wellington: Reserve Bank of New Zealand.

Zhu, J., Brown, S., & Pryce, G.B. (2018). Immigration and house prices under various regional economic structures in England and Wales. *Urban Studies*,

https://doi.org/10.1177/0042098018777420.