

*Estimating the impact of immigration on housing
prices and housing affordability in New Zealand*

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Abstract

This research examines the response of New Zealand housing markets to immigration shocks. The effects of migrants in general have been widely debated in New Zealand, and have been the focus of many studies around the world. This research focuses solely on the impact of migration on the issue of housing, the largest component of peoples' wealth. Drawing on housing, migration and census data between the years 1996 to 2011, the regression analysis in this study reveals that there was a positive correlation between external migration shocks and house prices. A 1% migration shock increased house prices by approximately 7.5% on a national scale. Furthermore, it is found that smaller housing markets are less able to 'cope' with housing pressure exerted by migrants, compared to bigger cities where migrants tend to cluster. This research suggests that the possible existence of supply constraints in the New Zealand housing market, whereby the market is unable to adjust to a sudden inflow of overseas migrants.

Section 1: Introduction

Housing forms the largest component of household wealth. In the year 2006, New Zealand had a property ownership rate of 66.9% from either owning the dwelling or having it held in a family trust (Statistics NZ, 2012). However, home ownership rates have been on a steady decline from 2001 due to surging house prices, and the challenge for first homebuyers to obtain mortgages. Demand for housing caused by population growth is further added by overseas migrants entering into the country. As housing is a key priority for migrants, more competition on dwellings has pushed up house prices to new levels. This research asks the question whether there is a positive correlation between house prices and overall net migration in a region, and whether this relationship differs between the internal and external nature of this migration.

International labour migration most often occurs from higher wage rate differentials expected in New Zealand, given migration costs are not too high (Borjas, 2010). The International Organisation for Migration (2011) reported that there are 214 million estimated international migrants worldwide, a significant increase from an estimated 150 million in the year 2000. New Zealand is proving to be one of the most attractive destinations for migrants at least partly due to its free market philosophy and democratic political setup (New Zealand Now, 2012). As a country recently ranked in the top 10 from the Legatum Institute that measures wealth and general wellbeing, migrants come to New Zealand for a variety of reasons, including study, work, and business investment (New Zealand Now, 2012). One key issue for migrants as soon as they arrive is housing. The manner in which they integrate into the housing market and labour market are critical to their assimilation in their new country.

Existing Economics literature that evaluates the impact of the issue of immigration has emphasized its economic effects within the labour market, particularly on wages and employment. However, much less is known about its effect on local house prices and its social implications for local population. House prices in bigger cities such as Auckland have experienced substantial increases compared with those of smaller regions over the past two decades. We also

know that migrants tend to cluster in bigger cities. The question is, has this immigration widened the gap between house prices in metro areas and other smaller regions?

In the face of growing international migration, this research considers the impact of migration on house prices in New Zealand. Do migrants change housing values and thus affect housing affordability for local residents? If so, are there differences between regions of high and low migration inflows, and do local residents lose out in the presence of growing international labour migration? This research aims to fill the gap in the international migration literature focusing particularly on economic effects of migration in New Zealand. It will establish key relationships between house prices and that of migrants' numbers and local population changes within six key regions in New Zealand. This research will contribute and provide insights into the topic of immigration, focusing on the pricing effects of migration.

The structure of this research follows; Section 2 represents a literature review of key studies and their statistical evidence on the economic effects of immigration. Section 3 introduces the general framework and specific research methodology adopted in this study. It also discusses the data used in the empirical analysis, which follows in Section 4. Section 5 then concludes with a summary of key findings, some possible policy implications from this work, and a list of both the research limitations in this current study and possible research opportunities in future studies.

Section 2: Literature Review

Introduction

Immigration has been a much-debated topic in New Zealand among the general public and policy makers. The influx of migrants has produced a large population surge in urban cities such as Auckland, Wellington and Christchurch, where two third of migrants have settled between 1996-2008 (Statistics NZ, 2012). The migrants' flow has sparked a discussion point over its social and economic impact on New Zealand. For migrants, the first and foremost priority faced on arrival in New Zealand is the issue of housing. This increase in housing demand, along with the adjustment in housing supplies, determines the pricing effects in local markets.

Migrants are therefore often viewed as key determinants in house price inflation that adds inflationary pressure to the economy. In principle, migration shock shifts labour supply in the labour market and its implications include an increase in unemployment, declining participation rate and a fall in wages for competing workers, at least in the short run (Borjas, 2010). Macroeconomic policies need to also take into account the effects of migration on house prices, the largest asset held by households. Competing residents and households will push housing prices up, diminishing housing affordability for native residents. Rising housing values promotes domestic consumption, which in turn drive up domestic price levels. The global financial crisis in 2007 that erupted in the US was key evidence of the effects of an unsustainable increase in house prices caused by subprime mortgages. Figure 1 illustrates the number of migrants entering New Zealand between the years 1996 to 2011. It shows that the number of migrants peaked at in 2002 at 96,300, and now has 80,000 migrants arriving each year.

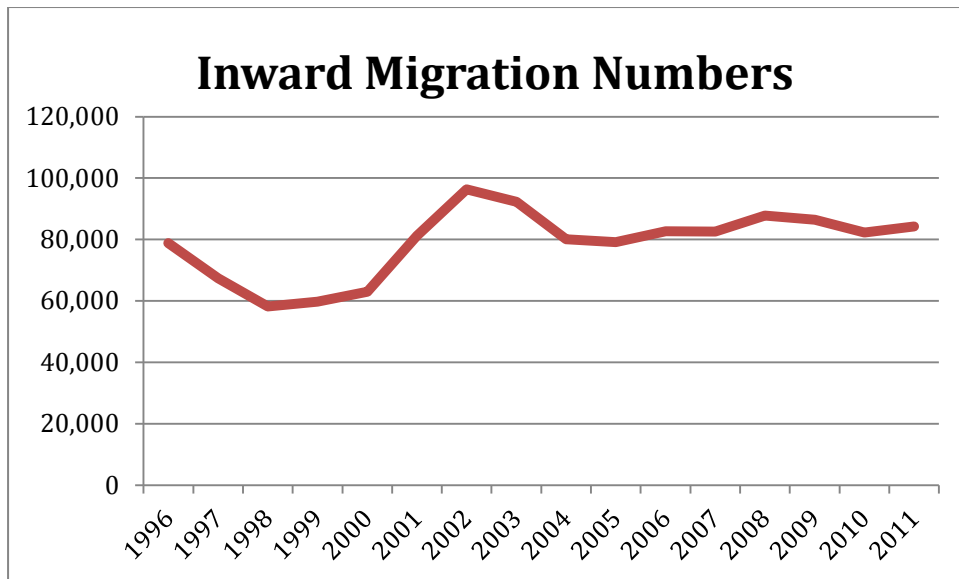


Figure 1: Inward Migration Numbers. Source: Statistics NZ, 2012.

While this is a plausible argument, it may however, suggest that local housing markets are unable to cope with rapid fluctuations. This should raise concerns for policy makers since supply constraints or the inability of housing markets to adjust to short run demand shocks that exist within the market. This inefficiency could hinder long run economic growth for New Zealand in the face of a growing trend of international labour mobility. As such, this research focuses on how inward migrant's affect domestic house prices, by comparing regions of high and low migrants' volume. The focus of this research is to investigate whether the increase in the foreign-born population would boost the demand, and thus prices for housing in New Zealand. The research uses data on immigration inflows and local population numbers within each examined New Zealand region to examine this issue.

Migration Effects on House Prices

Key prominent studies have focused on the global economic powerhouses such as the United States and the European Union. This literature on the economic impact of migrants pays attention to its effect on the housing market and labour market. Its impact on the housing market supports the notion that migration leads to an increase in house prices. Many studies used an instrumental-variable approach to estimate the impact of migration on housing prices. An instrument is a variable that can directly influence an endogenous explanatory variable, but

has no direct impact on the dependent variable. It could be, for example, be a change in immigration policy that might directly affect the number of incoming migrants. The key focus is to find and use the appropriate instruments that are valid and convincing in relationship to a particular study.

Firstly, Gonzalez and Ortega (2009) found a causal positive effect of immigration on both prices and quantities in the housing market from 1998 to 2008 in Spain. During this period, Spain experienced a sizeable wave of immigration that added 17% of the working age population to an average Spanish province. House prices also increased by a staggering 175% that hit the peak during the boom in 2008. Although numerous factors such as unprecedented low interest rates and deregulation of the mortgage market, increasing income was partly responsible for these changes, immigration was also critical in raising demand for housing in Spain. The study used the increase in foreign-born population relative to total population against the annual change in the price per square meter of housing and a flow of new construction in a given year. Their study estimated that immigration contributed one third of the overall increasing house prices by about 52% as well as lifting new housing construction by 37% (Gonzalez and Ortega, 2009). The study suggested that house prices continue to rise while taken into account a surge of residential construction in Spain. Migration, as a result, has been the trigger of this boom.

Similarly, Saiz (2007) estimated the impact of immigration on housing prices and rent in US destination cities. The study suggested that immigration pushed up demand for housing, with an increase in rent in the short run, followed on by a rise in housing prices. The instrumental variables estimates found that an immigration inflow that amounts to 1% of the initial population led to a 1% increase in rent and housing values. Earlier by the same author, Saiz (2003) also estimated the impact of immigration in housing markets and rental prices in the US city of Miami. This study used data on immigration inflows, census data, housing rent and home values and found that as a result of low-skilled immigrants shock during 1979 to 1981, higher residential densities caused rental costs in urban Miami to increase by between 8% to 11% relative to a comparison group of less popular migration destinations. The immigration shock

increased Miami's rental values by 9%. This price hike has affected the low-income units, while the higher rental units were unaffected.

Rapid migration was suspected of driving up house prices in major Canadian cities of Vancouver and Toronto during 1986 to 1996 (Ley and Tutchener, 2001). During the mid 1980s, house prices in these two cities broke away from the national trend experienced by other regions. Heavy inflows of wealthy business migrants to these cities are consistent with the global pattern that produced huge effects on house prices. Over this time period, migration represented 85% of net population growth in Toronto and a rise in house prices has shown more robust linkages with international migration compared to national factors.

These studies clearly suggest that migration pushes up both rental prices and house prices in both low skilled migrants (US and Spain) and wealthy groups of migrants (Canada). One potential difference to this research will be that of the migrants' composition entering into the country's labour market. New Zealand immigration rules are heavily regulated, promoting high skilled migrants and potential investors into the country. This will differ greatly from that of the US, and the European Unions which have experienced an abundance of low skilled workers and illegal migrants.

Migration Effects on the Labour Market

In contrast, migration effects on the labour market, particularly wages and employment levels are not clear amongst literature. Perhaps this is because migrants tend to cluster in bigger cities where it has a smaller impact across localities in the country. Aydemir and Borjas (2007) estimated that a 10% labour supply shift caused wages levels for US, Canada and Mexico to be reduced by 3-4% across these countries. Data drawn from national censuses from these countries between 1960-2001 were used. Despite the similarity in the declining wages levels, migration has reduced wage inequality in Canada since migrants tend to be disproportionately highly skilled. The opposite is true for the US, where migrants have increased wage inequality.

In contrast, a study by Shan, Morris and Sun (1999) believed that immigration led to economic growth and capacity utilization and found no evidence of

causality between immigration and employment in either direction in Australia and New Zealand (1983-1995) by using the Granger causality test, and found no causal linkage in a six-variable vector autoregression model. The study claimed that migration, therefore, does not displace local workers from jobs. Mare and Stillman (2010) share this view and reported that net migration in New Zealand did not displace native workers or early migrants with similar skills. The study used an instrumental variables approach from census data from 1996-2001 to investigate how migrants in a particular skill group affect the incumbent locals with the same skill group. The study further claimed that migrants added 'positive spillovers' to encourage individuals to remain in the area of migrants' settlement. These two studies suggest that smaller economies such as New Zealand benefit economically from the additional inputs of skills that are brought with migrants.

However, pricing levels caused by migrants in New Zealand need to also be considered to truly understand the costs and benefits of immigration. A rapid surge of actual house prices to the fundamental house prices lead to a property 'bubble' where an increase in valuations of house prices caused by speculation until prices reach an unsustainable level at which time the bubble bursts, causing prices to suddenly decline. Fraser, Hoesli and McAlevey (2007) found that between 1970 and 2005, New Zealand house prices were overvalued by as much as 25% by using the time-varying present value model driven by disposable income. The overvaluation is caused by price dynamics in the market rather than an overreaction to fundamentals, suggesting that housing prices respond much more dramatically to the demand and supply within the market.

Mare, Grimes and Morten (2009), investigated the adjustment of local employment, participation rate, wages, and house prices in response to employment shocks, caused by the inflow of migrants at both national and regional levels using a panel vector autoregressive approach with data sourced from the Household Labour Force Survey. Various regions have had different employment effects; Auckland and Canterbury during the period of 1986 to 2006 experienced employment growth above the national level, especially compared to those in the Waikato and Southland region. They found that a one percent

employment shock increases house prices by six percent nationally in the long run, while surprisingly, this relationship does not hold at a regional basis.

This current research draws a great deal of relevance from these studies, taking a direct examination at how migration affects house prices in New Zealand across different regions to ascertain the cluster effects of migrants. It will establish key relationships by utilizing regression approach on the panel data analysis. It examines local housing market responses to exogenous input of migration shocks. However, similar to the paper by Mare, Grimes and Morten (2009), this research also considers the significance of native population to house prices and asks the important question of 'whether local housing market responses vary by the source of the migration (domestic against international)? Contrasting local housing impact is expected amongst different regions of migrants' density, particularly, between big cities and smaller rural regions. In that case, housing bubbles are likely to be form and its economic impacts need to be considered.

Section 3: Methodology and Data

Introduction

This section details the specification of the model and the data used for this analysis. The study will utilize a data analysis approach similar to the one deployed by Mare et al, 2009 whereby an estimation is made of how house prices respond to migration shocks. This research differs in that it also considers the changes in population in each region and measures this impact on house prices. As migrants are likely to have a cluster effect, where migrants are likely to settle into particular regions e.g. Auckland. Thus, this research considers whether there is a statistical difference between regions of both high and low migrants' cluster. There would be an expectation that migrants would be the bigger factor in contributing in driving up prices in Auckland where migrants are settling compared with smaller region like Northland. Internal migration may play a bigger factor in driving up prices in Northland, where incoming migrants are smaller in numbers.

As housing is a personal investment good, prices should respond to population shocks from the concept of demand and supply. As such, regression analysis will be used as a statistical tool to investigate relationships between variables. In this case, regression analysis can predict the changes in housing values corresponding to changes in population stocks while holding other factors constant, *ceteris paribus*. The model specification attempts to estimate the effects on house prices from the data collected for migration numbers and population changes in the sample period.

Data Collection

To accurately estimate the impact of migration on local house prices, the research has acquired secondary data from New Zealand databases. First, the house price data will be gathered from the Quotable Value New Zealand (2012) website; this regional data is released on a quarterly basis. The six main regions that will be investigated and examined for comparison in the research are; Northland, Auckland, Bay of Plenty, Wellington, Canterbury and Southland. Each of these regions differ in the migrants composition as migrants tend to cluster in big cities like Auckland, Wellington and Christchurch, and are less abundant in smaller regions such as Northland and Southland. Figure 3 represents the different make up of migrants' numbers in these regions. As expected, migrant numbers moved to bigger cities like Auckland, Wellington and Canterbury regions compared to the smaller regions where internal relocation makes up the majority of the changes in population. As a result, house prices changes should differ significantly between these two main types of regions.

Annual Net External Migration

<i>Year</i>	<i>Northland</i>	<i>Auckland</i>	<i>BOP</i>	<i>Wellington</i>	<i>Canterbury</i>	<i>Southland</i>
1997	-0.107	0.926	-0.134	-0.202	0.119	-0.337
1998	-0.268	0.307	-0.353	-0.464	-0.201	-0.560
1999	-0.532	-0.100	-0.720	-0.745	-0.404	-0.734
2000	-0.562	0.030	-0.667	-0.794	-0.511	-0.463
2001	-0.544	0.031	-0.639	-0.747	-0.279	-0.299
2002	-0.030	1.518	-0.062	0.171	0.515	-0.024
2003	0.160	1.762	0.138	0.354	0.858	0.201
2004	-0.020	0.936	-0.069	0.248	0.595	0.057
2005	-0.115	0.514	-0.321	-0.002	0.268	-0.077
2006	-0.139	0.575	-0.341	0.089	0.296	-0.060
2007	-0.289	0.606	-0.386	0.102	0.276	-0.114
2008	-0.440	0.439	-0.510	-0.071	0.147	-0.297
2009	-0.447	0.608	-0.405	0.094	0.295	0.216
2010	-0.117	0.612	-0.077	0.065	0.372	0.314
2011	-0.585	0.425	-0.487	-0.149	-0.274	-0.057

Figure 2: Annual percentage changes in net external migration. Source: Statistics NZ (2012).

Annual Net Internal Migration						
<i>Year</i>	<i>Northland</i>	<i>Auckland</i>	<i>BOP</i>	<i>Wellington</i>	<i>Canterbury</i>	<i>Southland</i>
1997	1.102	1.843	2.216	1.209	0.922	-1.279
1998	1.113	1.637	2.137	1.090	0.902	-1.391
1999	0.881	1.452	1.931	1.183	0.874	-1.151
2000	0.979	1.379	1.780	1.184	1.020	-0.604
2001	0.544	1.367	1.333	1.364	0.907	0.946
2002	1.138	1.560	1.601	1.101	1.177	0.238
2003	1.141	1.566	1.577	1.104	1.201	0.441
2004	1.101	1.252	1.677	0.968	1.209	-0.057
2005	1.118	1.213	1.517	0.832	1.084	-0.349
2006	1.265	1.212	1.524	0.929	1.227	-0.474
2007	1.009	1.077	1.290	0.756	1.002	-0.101
2008	1.025	1.043	1.332	0.815	0.950	0.297
2009	1.158	0.931	1.294	0.919	0.845	0.322
2010	1.144	1.008	1.105	0.917	0.790	0.434
2011	1.093	1.223	1.214	1.059	-0.610	0.800

Figure 3: Annual percentage changes in net internal migration. Source: Statistics NZ (2012).

Secondly, Statistics New Zealand (2012) provides the regional population data, along with the numbers of external migration into each of the specified regions in an annual basis. Thus, the net population changes within regions can be determined to add to the analysis.

Research Design

The research will examine the data between the years 1996 to 2011, the period where there was a large influx of migrants into the country. As the population figures, along with the net external migration numbers can be extracted, the internal population changes can be calculated by taking the differences of the two:

$$\text{Net change in population numbers} = \text{Net External migration} + \text{Net Internal migration.}$$

This has formulated a profile of each region in terms of its relative external and internal movement of population. To accurately estimate the impact of such population changes, and comparing them between regions, the relative growth in migration needs to be considered rather than using raw data. As such, an identical increase in migrants' number will show a relatively smaller increase in the region compared to that of Canterbury, as Auckland is the most populated city in New Zealand. This can be shown as:

$$\text{Proportional change in external migration} = \frac{\text{Net external migration}}{\text{total population of the previous year}}$$

$$\text{Proportional change in population changes} = \frac{\text{Net population changes}}{\text{total population of the previous year}}$$

$$\text{Relative change QV indexes} = \frac{\text{The change in QV}}{\text{QV index of the previous year}}$$

It is the relative change that will presumably put upward pressure on house prices. This can be calculated by dividing both the external and internal migration numbers by the population in the region from the previous year. Similarly, the relative changes in house prices index gathered from QV will be used, this too can be ascertained by dividing the changes in house price index by the house price index of the previous year.

From the data gathered, the independent variables of the changes in external migration, and changes in domestic population can explain the dependent variable in the changes in house prices. The raw data gathered are converted to percentage changes on an annual basis to provide better understanding of the results produced. Hence, a one percentage change of population can reflect the

percentage changes that can be expected in house prices. The regression analysis will seek to investigate this relationship and to estimate the impact of population changes in each region to the changes in housing price movements. This can be expressed as:

$$\Delta P_t^{\text{House}} = \beta_0 + \beta_1 \Delta \text{Pop}_t^{\text{Dom}} + \beta_2 \Delta \text{Pop}_t^{\text{Ext}} + u_t$$

$$\Delta P^{\text{House}} = \text{Year}_t - \text{Year}_{t-1}$$

Where P = the changes in house prices index (QV), $\text{Pop}_t^{\text{Dom}}$ = changes in population changes, and $\text{Pop}_t^{\text{Ext}}$ = changes in external migration into the region (exogenous). The β_1 and β_2 are coefficients that measure the average effects of the two types of migration on changes in house prices. The coefficients will capture the increase in house prices for a one-percentage point increase in both population changes and external population shock.

Section 4: Results and Discussions

National Housing Impacts

This section presents the results of the regression analysis proposed above. Firstly, this regression model was estimated with the disaggregate data to produce the panel analysis to estimate the impacts from both net internal and external migration shocks on housing prices. This initial analysis assumes that these coefficients are the same across both regions and time. Tables 1 and 2 summarize these regression results. The analysis with no time lag (i.e. assuming that the effects of migration shocks are purely contemporaneous) produced a more robust result as indicated by the t stats. This indicates that a 1 percent positive shock in net external migration in a region increased house prices by approximately 7.48 percent on average between the years of 1996 to 2011. This estimated coefficient is significantly different from zero at better than a 1% level (the reported P-value is 0.0005). This timeframe illustrated the period of high numbers of inward migrants, particularly the latter stages of the 1990s and early 2000s under the Labour government. Meanwhile, a 1 percent increase in population changes from domestic migration increased house prices by an average 0.36 percent. This estimated coefficient is insignificant at conventional test levels (the reported P-value is 0.8084). This suggests that population changes from domestic migration have much lower impacts on housing prices compared to that of population changes coming from external migration. Hence, overseas migration has a substantially different effect compared to domestic migration on house prices at a regional level over this time period.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	5.8041	1.7177	3.3790	0.0011
Internal	0.3601	1.4804	0.2432	0.8084
External	7.4751	2.0660	3.6182	0.0005
<i>Regression Statistics</i>				
Multiple R	0.3722			
R Square	0.1385			
Adjusted R Square	0.1187			
Standard Error	9.0823			
Observations	90.0000			

Table 1: Regression analysis of disaggregated data showing common coefficients across regions and time.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	6.0455	1.9145	3.1577	0.0023
Internal	-1.7754	3.6814	-0.4823	0.6309
Internal - 1	1.8124	3.4461	0.5259	0.6004
External	5.1115	3.3875	1.5089	0.1353
External - 1	3.7408	3.4066	1.0981	0.2755
<i>Regression Statistics</i>				
Multiple R	0.4096			
R Square	0.1678			
Adjusted R Square	0.1257			
Standard Error	9.2998			
Observations	84.0000			

Table 2: Regression analysis of disaggregated data with time lag effect showing common coefficients across regions and time.

This clearly shows that New Zealand housing prices are heavily influenced by net external migration, but not by internal migration. This pattern can be expected for several reasons. First, New Zealand immigration policy attracts those with relevant skills, those that look to invest in businesses, or those promoting foreign direct investment into the country. These skilled working class migrants brought with them financial backings and are likely to make housing decisions as soon as they arrive. Immigration New Zealand screens this process, and have selected with suitable criteria to enter into the country. As a relatively small country,

external migrants might be more volatile than internal migration at a regional level. Thus, it might be harder for local housing markets to absorb external migration without substantial price effects. Secondly, migrants are likely to cluster both within a region and in terms of the type of housing they demand. An inflow of migrants from a particular country may seek to reside closer together in particular suburbs within Auckland, or seeking houses within a particular price range. This behaviour is common amongst migrants since they feel more comfortable and settle around those with similar backgrounds, ethnicity, and values. And thirdly, it is more difficult for housing supply in terms of developers and housing projects to anticipate and forecast external migration levels and compositions entering into the country. Thus, when there are a high number of external migrants in a short run, house prices rise rapidly.

In contrast, internal population changes play no significant role, since these changes could occur from an increased number of younger generations, who have less of an impact on housing markets, or young people or students who could not yet afford to influence house prices. It is also relatively easier to predict and forecast population growth in regions from internal migration. Housing supplies, therefore, are better able to accommodate internal migration and population changes numbers.

Regression results reported in Table 2 show no significance in the lagged variables suggesting that house prices may not respond to migrants' movement from the previous year. This test was done to capture any lagged relationship of house prices movement to the migration in the previous year. This allows for housing prices to respond with up to a one-year lag from changes in both external and internal migration at a regional level. This model also suggested that external migration influences house prices more than that of internal migration. The "long term effect" by summing up the estimated coefficients suggests that a 1% percent increase in external migration eventually increases regional house prices by nearly 8.9%. This allowed for a lagged price response of only a single year. This point estimate is nearly 20% higher than the previous estimate of a simple contemporaneous effect. Although the individual coefficients on external migration are not significantly different from zero at an

individual level, this estimated long-term effect is highly significant. Meanwhile, the estimated coefficients on internal migration essentially cancel out each other, and show little evidence of any long-term effects of domestic migration on regional house prices. These results again suggest that external migration has a substantial impact on house prices, where internal migration does not.

These results suggest that New Zealand's housing market is unable to cope with an exogenous shock in the short run. Housing supplies do not adjust in the short run to relieve housing demands caused by the sudden injection of migrants into the country. This indicates on the inability of housing markets to adjust and accommodate the sudden fluctuations of population. The findings also supported the study done by Mare et al (2009) by which employment shock raises long run house prices by 6 percent as it can be assume that migrants are likely to enter the labour market after settling into their new country, and hence, would trigger changes in the employment rate, participation rate and wages level.

Regional Housing Impacts

Regional regression analysis attempts to break down the effects of migration by allowing the coefficients on external and internal migration to vary across the regions. This allows for different responses across the regions to these migration shocks over this sample period. It may be that some regions are better able to cope with an inflow of overseas migrants, and will therefore experience much smaller changes in house prices. It can be expected that the effects/absence of migrants may impact each region in house prices in different ways. While there may be less number of migrants moving into smaller region, the presence of external movement may lead to bigger influence on house prices in relatively smaller housing markets. This may be due to the smaller regions are less able to cope with the housing pressures exerted by migrant moving into the regions.

<i>Regions</i>	<i>Internal Change</i>	<i>T-stat</i>	<i>External Change</i>	<i>T-stat</i>
<i>Northland</i>	-8.5351	-0.4830	27.0453	2.1690
<i>Auckland</i>	-1.4769	-0.2166	12.8426	3.7400
<i>Bay of Plenty</i>	6.5925	0.8802	26.2264	2.6607
<i>Wellington</i>	6.3396	0.4543	6.7867	1.0781
<i>Canterbury</i>	1.3085	0.2384	14.5980	2.3797
<i>Southland</i>	-1.8207	-0.3121	18.4410	1.2825

Table 3: Summation of regional regression analysis allowing for difference in coefficient in region.

The results of the regional regression statistics analysis are consistent with the previous panel regression analysis. House prices changes are largely affected by external influences. An increase in internal migration by one percent has in fact a negative impact on house prices in Northland, Auckland and Southland as shown by Table 3. However, none of these estimated coefficients are significantly different from zero at conventional test level. Thus, we would have to conclude that domestic migration has no measurable effect on house prices in any of these regions over this time period.

The results on external migration in this regional regression analysis show consistent evidence of positive impacts on house prices, and four of the six estimated coefficients are significant at conventional test levels (Northland, Auckland, Bay of Plenty and Canterbury). Only in Wellington and Southland is there an absence of a statistically measurable effect of overseas migration on house prices. It is also evident that in smaller regions such as Northland, Bay of Plenty and Southland, an injection in external migrant numbers into the region has larger point estimates of their effects on house prices. These estimated coefficients are relatively larger in these smaller regions. This can be caused as those regions have relatively smaller markets to their bigger cities. This suggests that the same external migration shock in Northland, for example, is likely to cause a larger increase in house prices compared to larger population centres like Auckland and Wellington. Further, as fewer numbers of houses in small regions can be expected, the presence of migrants can have bigger impacts to the local price mechanisms. Higher demands for housing would fluctuate, whereas

the supply of houses would be sluggish and slower in response to the population shocks.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0698	8.8455	-0.0079	0.9938
Internal	-1.4769	6.8196	-0.2166	0.8322
External	12.8426	3.4339	3.7400	0.0028
<i>Regression Statistics</i>				
Multiple R	0.7405			
R Square	0.5483			
Adjusted R Square	0.4730			
Standard Error	6.3859			
Observations	15			

Table 4: Auckland region regression analysis

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	2.6475	5.0854	0.5206	0.6121
Internal	1.3085	5.4883	0.2384	0.8156
External	14.5980	6.1343	2.3797	0.0348
<i>Regression Statistics</i>				
Multiple R	0.6253			
R Square	0.3910			
Adjusted R Square	0.2895			
Standard Error	8.1439			
Observations	15			

Table 5: Canterbury region regression analysis

In areas of migrants' settlement, a one percent increase in external migrants caused a 12 percent house price increase in Auckland as illustrated by Table 4, having much less impact to that of smaller regions but still higher to that of the national level. An increase of one percent in population changes, however, caused house prices to drop by 1.5 percent. This is consistent with all other regions in population changes having the inverse effect on house prices. Canterbury also reflected on similar pattern, where the city is a popular place for students. Wellington, however, experienced a different trend whereby both the effects have led to similar increase in house prices.

One of the factors can be due to the simultaneous growth in demand and supply within bigger cities such as Auckland. Although migrants and students numbers have hugely increased the Auckland landscape within the last 15 years, the economic effects have led to rapid increases in supply of housing and dwellings projects. State housing, smaller dwellings, city apartments, small units and terraces homes have been built at a rapid pace to accommodate and as an incentive to the ever increasing demand in housing within the region. As demand and supply expanded together, prices increased in a smaller rate compared to other cities. While population changes in workers, students, couples also moved or expanded in Auckland, their presence is far outweighed by the relatively larger numbers of migrants who have dominated the housing scenes, especially in areas in high migrants' cluster such as Birkenhead, Albany in the North, Pakuranga, Howick in the East, and Avondale and Sandringham in Central Auckland.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	1.4088	13.9361	0.1011	0.9211
Internal	6.3396	13.9561	0.4543	0.6578
External	6.7867	6.2952	1.0781	0.3022
<i>Regression Statistics</i>				
Multiple R	0.3075			
R Square	0.0946			
Adjusted R Square	-			
Standard Error	6.8517			
Observations	15			

Table 6: Wellington region regression analysis

Wellington, on the other hand, has been influenced more so by internal population changes as shown in Table 6. One of the key reasons behind this is the relatively lower cost of living, while the level of income is not affected. As a result, house prices are dictated more equally amongst both the migrants' shock and internal drives. Figure 4 illustrated the wages growth in New Zealand during 2007 and 2012. On the national level, this has reflected key economic events and has similar pattern to that of the business cycle. A recent economic downturn of 2007 has seen the wages levels plunged where many lost their jobs during a

difficult global financial crisis. However, New Zealand has not been affected as much as other main economic regions around the world. There has been a steady recovery from the year 2010, as wages levels continue to grow by 2-3 percent annually. Wellington is also a region of smaller migrants' settlement compared with that of Auckland. In fact, Wellington has been the third most popular migrants' destination, behind Auckland and the Canterbury area. This, of course, has allowed population changes to dictate and influence house prices in the region to that of migration shocks.

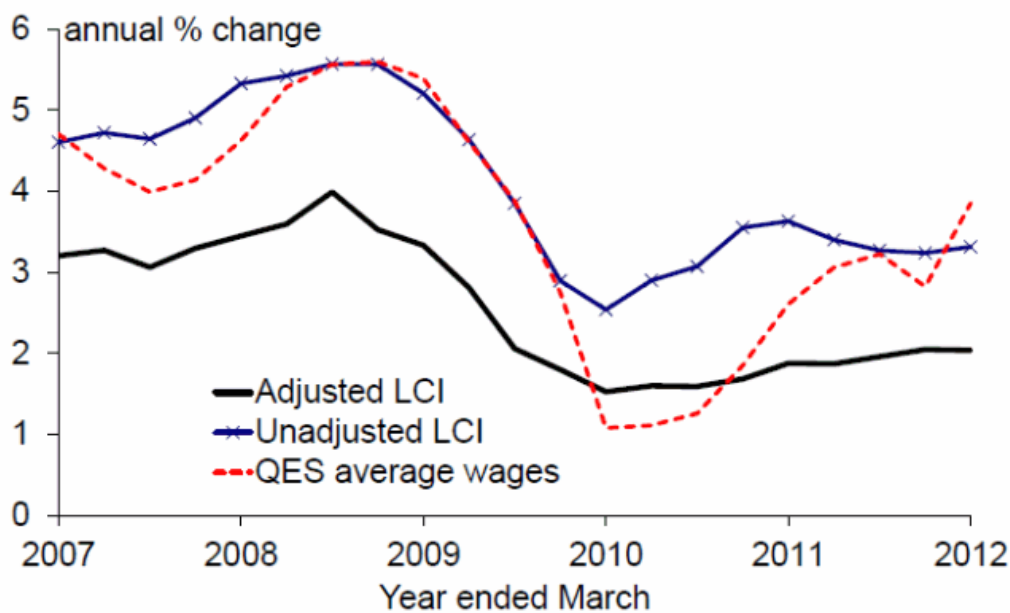


Figure 4: Wages growth in New Zealand. Source: Statistics NZ 2012. Data come from the Labour Cost Index (LCI) and the Quarterly Employment Survey (QES)

Smaller regions have experienced a greater correlation between external migrants shocks to the house prices compare to the bigger cities as refer to Table 7-9. In Northland, a one percent change in migrants number increases house prices by 27%. It is the same scenario for Bay of Plenty (26 percent), and Southland (18 percent). It is also surprising to discover that an increase in population changes in these regions has a much smaller impact by Northland decreasing house prices by 8.5 percent; Bay of Plenty increases by 6.5 percent and Southland decreasing house prices by 1.8 percent.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	21.3760	20.8315	1.0261	0.3251
Internal	-8.5351	17.6722	-0.4830	0.6378
External	27.0453	12.4691	2.1690	0.0509
<i>Regression Statistics</i>				
Multiple R	0.5602			
R Square	0.3138			
Adjusted R Square	0.1994			
Standard Error	9.1490			
Observations	15			

Table 7: Northland region regression analysis

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	4.2195	12.5235	0.3369	0.7420
Internal	6.5925	7.4895	0.8802	0.3960
External	26.2264	9.8571	2.6607	0.0208
<i>Regression Statistics</i>				
Multiple R	0.6322			
R Square	0.3997			
Adjusted R Square	0.2996			
Standard Error	9.2906			
Observations	15			

Table 8: Bay of Plenty region regression analysis

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	8.8008	3.6020	2.4433	0.0310
Internal	-1.8207	5.8344	-0.3121	0.7603
External	18.4410	14.3787	1.2825	0.2239
<i>Regression Statistics</i>				
Multiple R	0.3867			
R Square	0.1496			
Adjusted R Square	0.0078			
Standard Error	12.1959			
Observations	15			

Table 9: Southland region regression analysis

In comparison with the results found to that of the wages levels, this research has found that the presence of migrants has diminished the housing affordability

of native residents in smaller regions such as Northland, Bay of Plenty and Southland; while in bigger cities, external migration has relatively smaller effects on housing prices in Auckland and Wellington. While the injection of migrants thus the surging short run demand has contributed in the increase of house prices, its overall impact has been relatively smaller than that of internal migration changes.

The presence of migrants has in fact widened the gap between the metro areas to that of smaller regions. While migration contributed to higher house price increases in smaller regions like Northland, house prices in metro cities such as Auckland have increased at a much faster pace (QV, 2012). We can assume that a relatively larger number of migrants have contributed to this effect by increasing both housing demand and supply over the timeframe examined. House prices, therefore, are likely to continue to rise in the foreseeable future in the presence of migration shocks.

On the national scale, New Zealand has room to improve to utilize resources and efficiency to increase its housing outputs to cope with the ever-rising housing demands from both migrants and population changes. Smaller regions, in particular, felt the squeeze of migrants in their local housing markets, as prices rose sharply compared to that of bigger cities. One of the key arguments is that as New Zealand being a relatively small country, housing supplies are slower to react to the rapid changes in demand from an external source. The ongoing rebuilding of Christchurch after the major earthquake has shown that the rebuilding progress is sluggish. This inability to hasten response to such shock could potentially be a barrier to economic growth within the economy, whereby the housing market could not respond to the market incentives being created by the incoming migrants.

However, in looking from a wider perspective, migrants also brought other benefits to the host nation such as human capital, technology, new ideas, and capital. On house prices alone, the results have shown that migrants have contributed to price increases, speculative pricings and bidding wars in local housing markets. However, the abundant of increase in supply of houses have also given home buyers more choices, competition amongst developers, at which

will keep a constraint in prices and hindered the possibility of a rapid property boom. Policy makers, therefore, need to consider both the advantages and disadvantages migrants brought into the country.

Section 5: Conclusions and Limitations

Overview

In the face of increasing overseas migration in New Zealand, this research has found statistical evidence that external migration has a positive impact in increasing house prices. Migration has increased house prices in both big metropolitan areas like Auckland and Wellington, and smaller regions like Northland and Southland. It appears that housing markets are unable to respond, at least in the short run, to the influx of migrants.

Contribution to the Literature

This research has contributed to the existing knowledge in several ways. Firstly, past papers have focused on the migrants' effect to the labour market directly. Another strand of study has also focused on the effects of immigration on the general price levels. Although house prices have been mentioned, the specific focus on migrants and house prices has been absent. This research investigates the impact of migrants on housing prices, with the focus on examining both the external shocks and the population changes due to domestic migration on house prices. Secondly, the research also briefly touches on the issue of housing affordability, widening of prices between regions to measure its impact on native residents.

We find that a one percent increase in net external migration increases national house prices level by 7.47 percent. Similarly impact has been discovered on a regional level, where Auckland and Canterbury had house prices raised by 13 and 15 percent respectively. Internal population changes have no significant impact on house prices. Furthermore, external population changes have larger and more significant impacts on house prices in smaller regions where housing supply may be relatively more sluggish in responding to external migration shocks.

Policy Implications

This result is also proof that local housing markets are unable to cope with sudden fluctuations of migrants, while demand rose quickly, housing supply was slow to respond. This suggests possible supply constraints in local housing markets. Wages levels do not increase as rapidly as house prices; this has indicated a decrease in affordability for locals, and potentially a policy dilemma for policy makers. Policy makers should also look beyond house prices, and consider other economic benefits that migrants brought such as human capital, technological spillover, and capital.

Limitations and Future Research Opportunities

The findings should be evaluated with certain limitations. This study has been limited by data availability, as population data were found to be on an annual basis only, this has limits the sample size of the analysis. Quarterly data on migrants and internal migration changes would have been preferred to match that to the house prices index. This, unfortunately, has reduced the sample size of the study considerably. Future researches should focus on other statistical approaches to investigate these impacts, as this research has focused on a simple regression analysis. One might also consider both internal and external migration to be endogenous variables to house prices, given that migrants respond to economic climates in making migration decisions. Also, wages and employment level should also be examined in a more detail, in order to test the affordability to housing for locals.

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Appendices

Estimated Resident Population for Regional Council Areas, at 30 June (1996+) (Annual-Jun)

<i>Year</i>	<i>Northland Region</i>	<i>Auckland Region</i>	<i>Bay of Plenty Region</i>	<i>Wellington Region</i>	<i>Canterbury Region</i>	<i>Otago Region</i>	<i>Southland Region</i>
1996	140700	1115800	230600	426900	480400	189300	99000
1997	142100	1146700	235400	431200	485400	189300	97400
1998	143300	1169000	239600	433900	488800	188900	95500
1999	143800	1184800	242500	435800	491100	188200	93700
2000	144400	1201500	245200	437500	493600	188100	92700
2001	144400	1218300	246900	440200	496700	188300	93300
2002	146000	1255800	250700	445800	505100	191000	93500
2003	147900	1297600	255000	452300	515500	193500	94100
2004	149500	1326000	259100	457800	524800	195900	94100
2005	151000	1348900	262200	461600	531900	197900	93700
2006	152700	1373000	265300	466300	540000	199800	93200
2007	153800	1396100	267700	470300	546900	201700	93000
2008	154700	1416800	269900	473800	552900	203500	93000
2009	155800	1438600	272300	478600	559200	205400	93500
2010	157400	1461900	275100	483300	565700	207400	94200
2011	158200	1486000	277100	487700	560700	209900	94900

Net External Migration

<i>Northland region</i>	<i>Auckland region</i>	<i>Bay of Plenty region</i>	<i>Wellington region</i>	<i>Canterbury region</i>	<i>Otago region</i>	<i>Southland region</i>
-87	17825	216	-274	1903	106	-201
-151	10332	-309	-862	571	-357	-334
-381	3523	-830	-1999	-977	-750	-545
-762	-1169	-1726	-3232	-1973	-944	-701
-808	361	-1617	-3460	-2510	-769	-434
-785	377	-1568	-3266	-1378	-470	-277
-43	18496	-153	752	2556	465	-22
234	22129	346	1578	4334	912	188
-29	12150	-177	1122	3068	724	54
-172	6814	-831	-7	1409	512	-72
-210	7753	-895	412	1575	442	-56
-441	8319	-1023	477	1490	235	-106
-677	6134	-1366	-333	803	3	-276
-692	8611	-1092	445	1630	67	201
-183	8805	-209	312	2081	519	294
-921	6220	-1340	-718	-1548	-4	-54

Net Internal Migration						
<i>Northland region</i>	<i>Auckland region</i>	<i>Bay of Plenty region</i>	<i>Wellington region</i>	<i>Canterbury region</i>	<i>Otago region</i>	<i>Southland region</i>
1551	20568	5109	5162	4429	357	-1266
1581	18777	5030	4699	4377	350	-1355
1262	16969	4626	5132	4273	244	-1099
1408	16339	4317	5160	5010	669	-566
785	16423	3268	5966	4478	670	877
1643	19004	3953	4848	5844	2235	222
1666	19671	3954	4922	6066	1588	412
1629	16250	4277	4378	6232	1676	-54
1672	16086	3931	3807	5691	1488	-328
1910	16347	3995	4288	6525	1458	-444
1541	14781	3423	3523	5410	1665	-94
1577	14566	3566	3833	5197	1797	276
1792	13189	3492	4355	4670	1833	299
1783	14495	3009	4388	4419	1481	406
1721	17880	3340	5118	-3452	2504	754

QV Price Index							
1996	716.9139	588.7974	752.1411	525.5941	712	591.7252	743.8469
1997	764.3917	622.0758	839.2947	586.8373	757	583.5285	732.9079
1998	822.5519	582.8666	876.5743	634.8263	741	491.413	687.3291
1999	849.2582	606.2603	906.2972	667.7331	748	505.8548	643.5734
2000	841.543	604.2834	778.8413	734.4607	732	509.3677	649.4986
2001	843.9169	604.6129	754.6599	736.2888	715	540.9836	633.0902
2002	865.2819	687.6442	826.1965	768.7386	739	633.8798	695.5333
2003	904.451	853.0478	906.801	882.9982	847	845.0429	837.7393
2004	1086.6469	1011.5321	1189.9244	1046.1609	1095	1059.719	1103.9198
2005	1357.5024	1052.3805	1397.8321	1158.2017	1294	1196.2784	1293.6044
2006	1604.6878	1121.3968	1646.6405	1273.0862	1422	1270.6786	1396.0808
2007	1815	1285	1733	1459	1624	1442	1690
2008	1765	1193	1658	1409	1531	1454	1921
2009	1604	1178	1587	1414	1501	1367	1762
2010	1563	1265	1617	1442	1553	1378	1780
2011	1417.5	1318	1615.3	1411.7	1578.4	1339.2	1697.7

Changes in QV Price Index

47.4778	33.2784	87.1536	61.2432	45	-8.1967	-10.939
58.1602	-39.2092	37.2796	47.989	-16	-92.1155	-45.5788
26.7063	23.3937	29.7229	32.9068	7	14.4418	-43.7557
-7.7152	-1.9769	-127.4559	66.7276	-16	3.5129	5.9252
2.3739	0.3295	-24.1814	1.8281	-17	31.6159	-16.4084
21.365	83.0313	71.5366	32.4498	24	92.8962	62.4431
39.1691	165.4036	80.6045	114.2596	108	211.1631	142.206
182.1959	158.4843	283.1234	163.1627	248	214.6761	266.1805
270.8555	40.8484	207.9077	112.0408	199	136.5594	189.6846
247.1854	69.0163	248.8084	114.8845	128	74.4002	102.4764
210.3122	163.6032	86.3595	185.9138	202	171.3214	293.9192
-50	-92	-75	-50	-93	12	231
-161	-15	-71	5	-30	-87	-159
-41	87	30	28	52	11	18
-145.5	53	-1.7	-30.3	25.4	-38.8	-82.3