Immigration, Capital Flows, and Housing Prices

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Abstract

Research on immigration and house prices has found that immigrants raise metropolitan area house price levels, but lower them in immigrant destination neighbourhoods. In this paper we find that this latter result is not globally true. Rather neighbourhood house prices can respond positively to immigrant volumes, at least for the subset of immigrants studied here, which are those who come with wealth. The contrast with existing work highlights the importance of capital flows, in addition to people, in the effect of immigration on local asset markets. Unlike previous work that relies on panel data, we exploit a surprise suspension and subsequent closure of a popular investor immigration program in Canada to assess the impact of wealthy immigrants on local real estate markets using a difference-in-differences methodology. Using transaction data from the Greater Vancouver area, we find that the unexpected suspension of the program had a negative impact on house prices of three percent in the neighbourhoods and market segments most likely to be favoured by the investor immigrants. The negative impact of the suspension occurred quickly, within the first three months following the policy change. This speed suggests it resulted from declines in seller expectations and demand by builders to redevelop existing properties into newer more luxurious housing homes. The price declines are larger for more expensive houses in the target neighbourhoods and for neighbourhoods where the share of recent Chinese immigrants among the population is highest. None of our findings hold for property types not likely to be favoured by investor immigrants, nor for immigrant neighbourhoods favoured by those unlikely to be investor immigrants. Adding our findings to the existing literature on immigration and housing markets makes it clear that immigrants can have positive effects on local housing prices, but the effects depend on who the immigrants actually are and highlights the role of capital in augmenting immigrant demand.

Key words: Real Estate Demand Shocks, Immigration, Real Estate Valuation

1   Introduction

Immigration has become a highly charged political topic as large refugee flows in Europe and the desire to control borders in other developed nations has led to the rise of support for nativist and nationalist polices by select governments and parties in Australasia, Europe, and North America. And while much of the anxiety about the impact of population flows has focused on the effects on cultural norms, labour makrets, and security, at the local level there are housing market effects from immigration driven demand. At the same time, international capital flows (foreign investment) has been blamed for exacerbating, or by some causing, severe problems with housing affordability in cities such as Hong Kong, London, Melbourne, New York, San Francisco, Seattle, Singapore, Sydney, Toronto, and Vancouver.[2] While the attention in the press has been on non-resident buyers, capital can come with people as well: Australia, France, Germany, the UK, and the US, among others, have visa programs that provide residency to those with wealth who invest a proscribed amount in the local economy. In this paper we study the relationship between wealth, immigration, and local housing markets by examining the changes in programs for this type of wealthy immigrant. Our results show that the packaging of people and capital raises house prices in destination neighbourhoods, so that if there is in fact any native flight, this is more than offset by immigrant demand for housing.

In response, countries such as Singapore and the UK have recently taken steps to limit foreign investment through restrictions on purchases and higher taxes on non-resident buyers.[3]

To identify the effects of wealthy immigrants on local housing markets, we exploit the surprise suspension and subsequent closure of Canada's investor immigration program.[4] Unlike previous work, which uses panel data, the sudden termination of the Canadian investor immigrant program allows us to treat this as a quasi-experiment and use a difference-in-differences methodology to identify the effects of immigrants, or at least this class of immigrants, on neighbourhood house prices. Using transaction data from

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[2] South China Morning Post 3/13/13; Credit Suisse 3/4/14; www.sfgate.com 11/29/14; New York Times 2/7/15; Globe and Mail 4/20/15; Evening Standard 10/21/15; www.bloomberg.com 11/2/15.

[3] For example, in the UK the government imposed capital gains taxes on foreign owners of residential real estate, reduced the threshold for higher stamp duty rates, and applied them to homes owned through companies.

[4] The program has since been reopened the program, but with the number of applicants nationally for 2015 limited to 120, as compared with over 10,000 accepted per year during the height of the program

Vancouver BC, the largest single destination in Canada for investor class immigrants, we compare within metropolitan area house price appreciation between census tracts that were likely destinations for investor immigrants to those that were not. The period of analysis is the short window immediately preceding and following the July 2012 announcement of the program suspension. We compare the effect of this shock on the change in house prices in likely investor immigrant census tracts as compared to change over the same period house prices in census tracts unlikely to be destinations for these immigrants. Because the effect of people is not separate from that of capital in our target population, our contribution to the policy debate on the effects of foreign capital alone on local housing markets is somewhat limited. But, we unambiguously demonstrate that some classes of immigrants can cause neighbourhood house prices to rise.

Our main finding is that immigrant flows can raise local house prices is in clear contrast to previous work such as Saiz and Wachter (2011) and Sa(2015) who found that native flight dominates immigrant demand resulting in lower house prices in immigrant destination neighbourhoods. Specifically, the results in this paper show that in the year following the suspension of the immigrant investor program, house appreciation in neighbourhoods with high concentration of recent Chinese immigrants lagged other neighbourhoods in the Vancouver metropolitan area by 2.3 percent. The house price appreciation underperformance starts in the month following the announcement, and extends over the following 12 months. The effect dissipates for longer periods. This dissipation does not appear to be because the drop in demand is then spread to other areas, but rather because house prices in the wealthy immigrant investor destination census tracts recover. The net positive effect on house prices of wealthy immigrant demand requires that local residents do not choose to segregate themselves from wealthy immigrants in substantial enough numbers to offset the positive effect on neighbourhood prices from the demand effect of the inflow of households with high levels of wealth. We believe that the difference between our findings and those in the existing literature on the effect of immigrants reflects the difference between our subject group of wealthy immigrants and the more commonly studied groups of less fortunate and lower human capital immigrants where their demand is not sufficient to offset native flight, and where the latter may be larger in magnitude than in our case.

Our results are robust to various model specifications and variable definitions. We document no differential across the program suspension on sub-market segments not favoured by investor immigrants. These include destination census tracts for immigrants unlikely to be investors, condominium units, and census tracts with lower valued housing. For both of the latter we treat these as sub-markets that would be less likely to be purchased by households with the considerable wealth necessary to qualify for investor immigrant status. Our approach requires that certain neighbourhoods (census tracts) be intended destination areas for investor immigrants. Unavoidably there is potential bias because "treatment effect" of the program suspension and closure will not be randomly allocated across census tracts. We rely on both the short time window and fixed effects for larger neighbourhood classifications to mitigate this bias.

The paper proceeds as follows. Section 2 reviews the existing literature on the impact of immigration and capital flows on real estate values. Section 3 identifies the theoretical issues in the relationship between wealth, immigration and neighbourhood house prices. Section 4 presents and explains the natural experiment. Section 5 describes the data and variable definitions we use. Section 6 presents the empirical findings, including robustness analysis. Section 7 concludes with a summary and suggestions for future research.

2 Immigration and Real Estate - Background

Saiz and Wachter (2011) point out "immigration is not so much defined by the consumption of foreign labor, which can also be achieved by international trade, international outsourcing, or telecommunications...(as) by the physical presence of immigrants in the host country." The primary focus of studies on the economic effects of immigration has been on its impact on native born wages, employment and economics growth. A large body of research focuses on the labour market effects (early work of note includes Card 1990; Borjas, Freeman, and Katz 1996; Butcher and Card 2001). Papers such as Manacorda, Manning, and Wadsworth (2012), Ottaviano and Peri (2012), and Dustmann, Schonberg, and Stuhler (2017) highlight differential impacts of immigration on various labour market segments, a result that echoes with the differences in our findings compared to other research on the effect of immigration on house prices. Negative effects of immigration on housing require native flight because of a desire to avoid living near immigrants or changes to neighbourhood amenities because of immigrant inflow, this too has analogies in other areas of research such as Scheve and Slaughter (2003) and Mayda's (2006) work on native attitudes towards immigration and Cutler, Glaeser, Vigdor. (2008) on immigrant segregation.

The main body of research on immigration and housing markets has studies metropolitan area effects, typically through a panel of metro areas or on occasion through time series in a single housing market. Burnley and Murphy (1994) find that there are positive links between immigration and house price movements in Sydney, Australia, and Bourassa and Hendershott (1995) show that net overseas migration is associated with the real estate gains in six Australian state capitals. Using the metropolitan area as the unit of analysis, Saiz (2007) finds that immigration flows raise house prices and rents: immigration volumes on the order of one percent of total population raise these 1.0 and 2.9-3.4% respectively. Using more aggregate provincial level data in Spain, which is then disaggregated into multiple within province regions, Gonzalez and Ortega (2013) yield similar magnitude effects for immigration and house prices. A dissenting view is Sa (2015) who with a panel of United Kingdom local authorities finds that the same one percentage point increase in immigrant volumes as a percent of total population lowers house prices by 1.7 percent. She does find variation across the distribution of immigrant education levels, as there relationship is not statistically significant for the local authorities with the top quartile of average immigrant education.

In contrast to the positive aggregate effects, studies of immigration and house prices that have used within metro area variation for identification have found negative relationships between immigrant volumes and house prices. Saiz and Wachter (2011) use a geographic diffusion model to represent the growth of immigrant density of a neighbourhood. Their main conclusion is that growing immigrant density appears to cause native flight and slower appreciation. Ibraimovic and Masiero (2014) find that immigrants to Switzerland are willing to pay a modest premium to locate near co-nationals. But, as in Saiz and Wachter, native born pay a higher premium to avoid neighbourhoods with

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large non-native populations. However, this premium declines with education level and as the immigrants are less "dis-advantaged." They do not identify the extent to which immigrant preferences for locating with co-nationalists dominate or fail to dominate the preference of local-born to avoid immigrant neighbourhoods. In a paper looking at census tract in Vancouver, Moos and Skaburskis (2010), find the reverse. [5] They compare the changes between the 1981 and 2001 Canadian censuses and allow for geographic variation by disaggregating the Vancouver Census Metropolitan Area (CMA) into 4 distinct areas: inner city, old suburbs, new suburbs, and exurbs. At the census tract level the correlation between recent immigrant status and higher dwelling value appreciation is positive over the twenty year period, controlling for other factors such as median tract income or population. This finding is more noticeable in the inner city and old suburbs, than in the new suburbs. Their paper cannot determine causality or whether immigrants are attracted to neighbourhoods with higher house price appreciation.

Related to these within city studies are longer run studies using census tract data, which get identification across within city districts. The ten to twenty year samples evaluated at five year intervals allow for a more elastic supply response than mor cross-sectional analysis. Stillman and Mare (2008) and Akbari and Aydede (2012), studying high immigration countries of New Zealand and Canada respectively, find small but still positive effects of immigration volumes on house price levels, on the order of immigrations volumes of one percent of population increasing house prices one percent.

Despite this substantial and long-standing effort to estimate the impact of immigration on real estate, we are not aware of any attempts to use a change in the immigration policies of a country or a region to capture a causal relationship, or to identify the channel through which such a relationship works. This is understandable, as changes in immigration policies are rare, modest, and/or not surprising. The discontinuation of the immigrant investor program in Canada, and the socio-economic characteristics of Vancouver, offer a rare opportunity to fill this gap in the literature and allow us to investigate the possibility of a direct causal link between immigration and real estate values. The nature of immigrant is an important issue. Saiz and Wachter suggest that immigrant neighbourhoods may not be becoming relatively less attractive because they are populated by the foreign born per se, but because they are more likely to contain populations with perceived low socioeconomic status. This is consistent with Sa's findings that higher education levels among immigrants appears to attenuate negative effects of immigrant volumes on house price levels. Our analysis of a change in a program targeting high net worth immigrants allows us to identify differences in results stemming from immigrant type.

The Canadian investor immigrant program that we study focused on high net worth

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[5] Immigration is particularly important for growth in aggregate demand in Vancouver. Ley and Tutchener (2001) calculate that immigration to Vancouver contributed 54% to net population growth between 1986 and 1991, and 79% during the first half of the 1990s.

individuals and involved the transfer of financial capital as well as the immigrants own human capital. As such, the effects of the capital brought by these immigrants should be similar to those resulting from foreign direct investment in residential real estate. Favilukis, et. al. (2013) review the literature on capital flows and house prices, finding a paucity of clear results. Sa, Towbin, and Wieladek (2014) use a country level panel for OECD countries and a panel VAR approach, finding that capital inflows are positively associated with faster rates of house price appreciation. At the sub-national level, but still using market level aggregation, Sa (2016) looks at the share of transactions for a local authority in the UK that are registered to overseas corporations and the relationship of this measure to house price appreciation. She borrows from Badarinza and Ramadorai (2015) using their approach to create instruments for foreign investment shares. In her work, a one percentage point increase in foreign company share of transactions is associated with 2.1 percent higher house prices. [6]

A second group of papers study the effects of capital inflows into real estate by exploiting within market variation. Liao, et.al. (2015) identify the transmission of shocks to sales to foreigners and price increases in the prices of units sold to local buyers in Singapore, but this effect is small: a one percent increase in the volume of sales to non-residents results in a 0.027% increase in prices in the domestic market. The price effects in the non-resident market are five times as large. They use a time series approach and rely on the separation of the two markets, where few non-residents can buy in the resident market. Cvijanovic and Spaenjers (2015) study non-resident demand in Paris. They find capital inflows concentrate in the most desirable neighbourhoods and affect prices more generally. Their effects are twice those of Liao, et. al, a one percent increase in non-resident purchases leading to a 0.05% increase in overall Paris prices. Their identification comes from the geography of preferences, where non-resident purchases are concentrated in particular higher-end districts of Paris. Finally, Badarinza and Ramadorai (2015) find evidence that risk driven capital flight can explain short-term movements in London property prices: house prices rise relatively faster in immigrant concentrated neighbourhoods as risk increases in said immigrants' home country. Their paper takes advantage of clustering in space by immigrants in different areas of London by ethnicity. Both for this reason and because capital and people are likely to flow together in their study, it is the closest in both subject material and method to our work here. Their variation comes through changes in the desire of people and capital to leave their home country, while ours works through changes in whether they are allowed to do so. A connected paper is Suher's (2016) examination of the introduction of a differential property tax (approximately a 20 percent increase in tax incidence) in New York City for condominium owners whose property is not their primary residence. This is not identical to foreign capital because of domestic investors. He finds a clear effect on extent of non-resident ownership, a drop of up to four percent depending on price segment, but no effect on the overall level of prices. However, in areas with significant non-resident ownership, prices fell by nearly 10 percent.

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[6] This turns out to be non-trivial. Her counterfactual is if there was no foreign investment, cetris paribus, average house prices would be 19% lower in England and Wales.

The primary contribution of the work in this paper is t highlight that immigration can result in higher neighbourhood prices. Whether native flight is present is indeterminate in our empirical approach. But if present, in our data immigrant demand effects would dominate flight. We show this using a quasi-experiment methodology, which gets around some of the causality challenges in the existing work. Our contribution to the literature on immigration and capital flow is to highlight a number of patterns. First, immigrant neighbourhoods are not necessarily close substitutes for all other areas, as demand shocks are only partly transmitted in a two year period. Second, effects, at least at the upper end, operate not through native flight, but through changes in demand for housing and/or expected changes in immigrant buyer demand on the part of sellers and developers

3 Immigration, Capital Flows, and House Prices

Immigration and capital inflows affect house prices through three channels: increases in aggregate market-wide demand, increases in expected future rents, and preferences for specific locations (neighbourhood demand). Individual immigrant household demand for housing reflects immigrant household composition, income, and wealth. In all cases the effects will depend on citywide and local area supply elasticities, which in turn depend on the extent of regulatory strictness (Mayer and Somerville 2000, Quigley and Raphael 2006, Glaeser and Ward 2009, and Jackson 2016), geographic features and developable land supply (Rose 1989 and Saiz 2010), and the presence of geographic amenities (Davidoff 2008).

Both immigration and capital inflows should increase aggregate demand for housing resulting in higher house prices. The first shifts the aggregate demand function to the right because of the increase in the number of households demanding housing. The second is a shift out in demand per household, either because new households arrive with greater wealth than the existing average household has or non-resident buyers who demand housing without changing the resident population.

A more subtle way immigration and capital inflows can affect current real estate values is through the capitalization of future rents into current house prices. This requires immigration induced changes in labor supply or capital inflow generated investment increases that raise productivity or yield further inflows of labour or capital, all of which would increase future demand for real estate and thus future rents. These higher future expected rents will be capitalized today as increases in current real estate prices. As with aggregate demand this is a metropolitan area wide effect.

The feature that this paper addresses is the variation in the effect of these inflows across neighbourhoods within a metro area housing market because of immigrants or investors preferences for distinct neighbourhoods or non-immigrant residents preferences to avoid living near immigrants. Either can result in changes in the relative price of housing across different neighbourhoods in a metropolitan area. The extent to which differential price responses are observed depends on the strength of the preferences and the cross-elasticity of demand between neighbourhoods. If neighbourhoods are perfect substitutes, than any change in wealth and population will affect all neighbourhoods identically. In contrast, with perfectly inelastic cross-substitution demand increases in one area, would not change prices in other areas of the city. Card (2001, 2007) finds no evidence of Immigrant displacement or native flight, while Borjas (2006) finds in metro areas about a 60 percent displacement factor.

To identify this third effect we use a difference-in-differences empirical methodology across census tracts within neighbourhoods. To observe a differential effect between investor immigrant destination neighbourhoods and others following the change in immigration policy we need both that immigrants prefer certain neighbourhoods (or locals

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have dis-utility from living with immigrants) and then in the aggregate there be "sufficient" cross-neighbourhood inelasticity to observe price effects. If either conditions fail than any effect from the policy change would be the same for all areas and thus not be observable in our tests.

4 Identification and Methodology

The Vancouver Metropolitan Area offers an excellent location to test the effects of immigration on the housing market. Immigrants made up 79% of the change in metropolitan area population between 2006 and 2011, and 56% between 1986 and 2011. We treat the suspension of the investor immigrant program as an exogenous shock to expected future immigration to British Columbia (BC). Our methodological approach is a standard difference-in-differences test between neighbourhoods that are the destination for immigrants most likely to have entered under the investor immigrant program compared with those that are less likely to host investor immigrants. Any effect from this suspension will be concentrated in the Vancouver market as over 95% of the investor immigrants to BC between 2007 and 2011 settled in the Vancouver metropolitan area.

4.1 The Canadian Investor Immigrant Program

The investor immigrant program to Canada started in 1986.[7] The program required potential immigrants with a certain minimum net worth to provide money for a five year term to the Federal or Quebec government to invest as the government saw fit, with no promise of interest. The amount started as investment of $C150k for individuals with $C500k of net worth, which was raised to $400k and $800k in 1999 and then to $C800k and $C1.6M in 2010.[8] The actual equity at stake was even lower: Canadian banks would loan about eighty percent of the funds for an investor, holding the government promissory note as collateral and requiring the remaining twenty percent of funds be held in their bank. The program is quite inexpensive by international standards. For instance, Australia requires a minimum investment of $A4M, approximately $C3.9M. While the US only required a $US500k investment for the EB-5 program, this could not be financed.

The investor immigrant program was closed to new applicants on July 1, 2012 and completely eliminated on February 11, 2014. While some applications already in the

[7] At the same time the Province of Quebec started a similar program. In Canada the Federal Government administers immigration for all provinces and territories, except for Quebec, which administers its own program for economic class migrants. Since 2005 provinces and territories are also allowed to nominate their own immigrants under federal guidelines, which accounted for 15 percent of all immigrants in 2013. This focuses on a province's own areas of economic need.

[8] Over the period the exchange rate for the Canadian dollar with the US dollar ranged from $C 1.00 = $US 0.63 in 2002 to a high of $US 1.04 in 2010.

system were processed following the July, 2012 suspension, it was widely accepted that the program had de facto ended.

The program has had a relatively small share of total immigration to Canada, but it has been rather more important for BC. From the start in 1986 the number of immigrants arriving in Canada under the investor immigrant program rose to a peak of 12,624 in 1993. This represented 5.4% of all immigrant arrivals that year. The numbers then declined to a nadir of 3,695 (1.5%) in 2003 before rising to a peak again in 2010 of 11,700 arrivals (4.3 percent of total immigrant arrivals that year). The program has been more significant for British Columbia, and by extension Vancouver since as noted above nearly all economic class immigrants to BC settle in the Vancouver area. In 1993, 6,866 investor immigrants landed in BC. [9] The number dropped to 1,387 in 2000 before rising again to peak at 5,870 in 2008. Investor immigrants made up 13.3% of all immigrants to BC in 2008 and 57.5% of all investor immigrants to Canada in 2008 initially settled in BC.

4.2 Identification Strategy

Our identification strategy rests on a number of factors. First, that the program cancellation was a shock. Second, that at a minimum there was an expectation that the program suspension would affect the future arrival of wealthy Chinese immigrants, whether it did or not. Third, that immigrants, and in particular those that did and would use this program choose distinct neighbourhoods. Finally, that we can accurately identify these neighbourhoods.

Though its formal closure in February, 2014 was not considered a surprise (the Globe and Mail, February 11, 2014), the initial suspension was. Local immigration experts have confirmed that nobody in the industry expected the change. It was reported in the Canadian and Asian press as an unexpected move. Many applicants were in the process of preparing their documents when the suspension was announced and the applications of those in the pipeline were subsequently terminated. These facts are consistent with treating the announcement as a surprise.

How much the suspension changed the actual flow of wealthy Chinese buyers of Vancouver property is hard to determine. In the immediate aftermath of the suspension,

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[9] This does not include those who landed in another province and then moved to Vancouver. For instance, 36 percent of business class immigrants to Quebec between 2000 and 2006 subsequently moved to British Columbia. In comparison only 0.9 percent of family class immigrants made a similar move. This movement is fairly unique to Quebec investor class immigrants another one-third of whom moved to Ontario (Toronto).

investor immigrants who had received their visa continued to arrive but at a sharply declining rate. In BC the arrivals fell from 3,860 in 2011 to 2,245 in 2013 to 175 in 2015. What matters for our analysis is that, in addition to the actual drop in immigrants, sellers or developers buying existing homes to redevelop for the wealthy immigrant market also expected a decline in demand at the time of the program suspension. What we need for identification is any combination of an actual drop, expected decline, or even just increased uncertainty regrading future arrivals. Our discussions with local experts confirms both an immediate decline in distinct mechanisms for high net worth individuals to immigrate based on their net worth and the uncertainty that were in media reports.[10] Wealthier immigrants to Canada from China, typically use immigration consultants in China to advise them on which programs to use and how to apply. After the suspension of the Federal Investor Immigrant Program, consultants looked for other mechanisms to facilitate immigration from China to Canada for wealthy clients. Conversations suggest that there was a delay in applications as these alternatives were being assessed. The choices seemed to be the Quebec investor program, which had 1,250 slots in 2014, and limits by country, or various options for investors under the provincial nominee programs. For instance, after July 2012 applications to the BC provincial nominee business program went from 100-150 to 1,000. In any case, the loss of the Federal investor program resulted in a substantial and clear decline in the number of available visa slots limited exclusively to wealthy immigrants. While wealthy immigrants are likely to have found other mechanisms to continue to immigrate to Canada, the suspension and closing of the Federal program removed the number of slots at the federal level exclusively available to them, disrupted the flow of these immigrants, raised the application and compliance requirements, substantially extended the process, and, above all, increased the uncertainty about the number and time frame for the arrival of wealthy immigrants.

There are clear immigrant areas in the Vancouver CMA by country of origin, which will allow us to identify destination neighbourhoods for wealthy immigrants. In 2011 recent (defined as those who had arrived in the past five years) immigrants made up 3.6% or less of the population in 25% of the 454 census tracts in the Vancouver CMA and their population share exceeded 8.9 percent for the upper quartile. In three tracts, at least 22% of the population were recent immigrants. The skewness of the distribution of the proportion of recent immigrants in a tract is 1.11 suggesting significant asymmetry in the distribution. Within particular immigrant groups, this is skewness is even stronger. For immigrants from China, Taiwan, or Hong Kong, 35% of tracts had no recent immigrants from these countries and in 13 of the 454 census tracts recent immigrants from these countries made up over 10% of the population. For this group the skewness of this population share is 2.19.

Unfortunately, we are not able to explicitly identify tract level variation in recent im-

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[10] The information in this section is a result of conversations with immigration lawyers in Vancouver about the investor immigrant program as well as media reportts at the time.

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migrants by the category for which they obtained a visa. At the census tract level we are restricted to home language and country of origin, and with the latter both for the total number of non-native born and those who arrived over the previous five years. We use the dominant presence of immigrants from China and Taiwan in the investor immigrant program to identify likely investor destinations by immigrant country of origin. Between 2006 to 2011, 24,509 investor immigrants and their dependents landed in British Columbia. Of these, 66 percent were from Mainland China and another 15 percent from Taiwan. China was the leading home country for immigrants to BC over this period with over 23% of all immigrants to BC arriving from China, and of these 36% came under the investor program. Investors made up 43% of immigrants from Taiwan, but immigrants from Taiwan made up only 4.4% of all immigrants. In contrast, for the next two largest source countries for immigrants to BC, the Philippines and India (17 and 14% shares of immigration respectively), only 0.6% and 0.4% of immigrants came in under the investor program. Overall investor immigrants made up only 3% of immigrants from all other countries. Since we use all Chinese immigrants to proxy for wealthy immigrants, we likely overestimate the volume of wealthy immigrants, thus underestimating their specific wealth effects. Therefore, that any price effects we find should considered as a lower bound.

The connection between wealth and country of origin shows up in other ways. Chinese immigrants are more likely to locate in census tracts with higher median house values. The correlation between recent Chinese and Taiwanese immigrants and median tract value in 2011 was 0.37, compared with -0.49 for recent non-Chinese immigrants. The local conventional wisdom is that the wealthy immigrants buy primarily single-family homes in very specific neighbourhoods for their own use, immediately or in the future, is consistent with these correlations. In other words, while the impact of the immigrant investor program over the entire metropolitan area may be modest in terms of both population and income/wealth growth, the impact of the program in terms of localized real estate values is potentially substantial. To put this in perspective, approximately 2,200 immigrant investor households can have a very substantial localized impact on the real estate markets that recorded approximately 20,000 single-family transactions for all of 2010.

The above facts lend themselves to a natural identification strategy. Since the immigrant investor program brought in immigrants who had tended to purchase housing in specific neighbourhoods, we can use the difference in appreciation rates between neighbourhoods to measure the impact of the suspension. Specifically, we identify neighbourhoods with high concentration of recent Chinese immigrants using 2011 Census data. We then estimate a hedonic model of single-family transaction values on various physical characteristics and time-related variables that allow for different appreciation rates for neighbourhoods with high and low concentration of recent Chinese immigrants around the July 2012 suspension date.

4.3 Methodology

For all methods described in the paper, we use semi-log regression models. The variables in the hedonic pricing model are lot size (logged), living area (logged), age, number of bedrooms, number of bathrooms, garage, and pool. We include the square of age, lot size, and living are to capture the non-linear impact of these variables on price. Finally, we model the interaction of time effects and immigrant concentration data using three model specifications described below.

In our empirical specification, we use the ratio of recent Chinese immigrants (previous 5 years) to total population by census tract, as measured by the 2011 census, to capture areas that are desirable to Chinese immigrants.

$$propChinese = \frac{\text{(Recent Immigrants from China, 2011)}}{\text{(Total Population, 2011)}} \tag{1}$$

This is admittedly an imprecise measure as close to 20% of investor immigrants are not Chinese and 64% of Chinese immigrants enter Canada on programs other than the investor program. To address the latter, in the robustness checks below, we examine higher value homes, which should be more likely to be bought by investor immigrants than those who entered by other programs. We also utilize quantile regression methods. The results of these robustness tests are consistent with our more general findings and result in larger coefficient point estimates.

4.4 Statistical Estimation Difference-in-Differences Hedonic Model

We estimate a hedonic model with a difference-in-differences specification that includes an indicator variables to capture tracts with high concentration of Chinese immigrants and the interaction of this variable with an indicator variable that captures whether a transaction took place after July, 2012. Specifically, we regress the log price as a function of the above characteristics, neighbourhood fixed effects, and the Chinese immigrant and post-July, 2012 indicator variables. The measure of immigrant concentration we use is defined above by Equation 1. A census tract is defined as "Chinese" if it has above-median concentration of recent Chinese immigrants. In the empirical section we present results for various other cut-off levels used to define a Chinese census tract.

$$log(Price) = \beta_0 + \beta_1 Characteristics + \beta_2 \sum 1(\text{Property in neighbourhood i}) +$$
$$\beta_3 Chinese + \beta_4 postJuly2012 + \beta_5 Chinese * postJuly2012 \tag{2}$$

We are primarily interested in the parameter β_5. A negative parameter would indicate that prices in "Chinese" neighbourhoods declined more than otherwise post announcement.

4.5 Linear Trend Analysis

In addition to the time dummy variable estimation described above, we employ a linear trend model to test for a difference in returns between Chinese and non-Chinese tracts:

$$
\begin{aligned}
log(Price) = \beta_0 + \beta_1 Characteristics + \beta_2 \sum 1(\text{Property in neighbourhood i}) + \\
\beta_3 t + \beta_4 * postJuly2012 + \beta_5 t * Chinese + \beta_6 t * Chinese * postJuly2012
\end{aligned}
\tag{3}
$$

where t measures time since the beginning of the sample and Chinese is an indicator variable for high Chinese immigrant concentration census tracts as defined by Equation 1.

The model defined by 3 allows for separate linear trends for high- and low-concentration tracts before and after the announcement. A negative β_6 would indicate that the high immigrant concentration tracts underperformed post announcement.

4.6 Concentration Slope Analysis

The time dummy and linear trend analysis presented so far inevitably depend on the concentration cut-off levels used to define census tracts with high and low-concentration of immigrants. As we will point out below, our results are robust to a wide variation of these cut-off levels. Nonetheless, in what follows we present an alternative estimate of the immigration reform impact that does not require any cut-off level definitions.

Specifically, we consider the following model:

$$
\begin{aligned}
log(Price) = \beta_0 + \beta_1 Characteristics + \beta_2 \sum 1(\text{Property in neighbourhood i}) + \\
\beta_3 (\text{Chinese Concentration}) + \beta_4 postJuly2012 * (\text{Chinese Concentration})
\end{aligned}
\tag{4}
$$

The variable of primary interest is β_4 which captures the change in the impact of Chinese immigrant concentration post announcement. A negative β_4 would indicate that

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neighbourhoods with high immigrant concentration underperformed post announcement relative to their pre-announcement standing.

5   Data Sources and Variable Definitions

This paper combines data from three different sources. The transaction and property attribute data are from British Columbia Assessment (BCA), the province's tax assessment administrator, and include all residential properties and transactions registered with British Columbia's Land Title Office. Census tract data is from Statistics Canada's 2011 National Household Survey, which is similar to the American Community Survey. The third source is immigration data of immigrants to British Columbia by class of immigrant and source country from Citizenship and Immigration Canada and BC Stats. The individual property data from BCA is geocoded and then matched to census tracts.

The data from BCA is the universe of all properties in the Vancouver metropolitan area (Vancouver CMA). All properties are categorized by the primary structure or use of the lot, which for residential uses includes various categories of single detached, attached, town or row-house, and strata lot (condominium) properties. The characteristics data include lot size (for single family attached and detached units only), floor area, number of bedrooms, year built, number of full and part baths, whether the lot has a pool, and the presence and size of garages. Lot size, garage, and pool data are not available for townhouse and strata-lot (condo) units. The summary statistics for these variables are shown in Table 1, with detached units in the upper panel and townhouse and condo data in the lower panel.

BC Assessment (BCA) provided the universe of transactions and transaction prices for the period 2010 to 2014. BCA identifies approximately two-thirds of these as qualified transactions for their internal analytic purposes in estimating property market values. According to BCA the unqualified transactions are not arms length or appear to be outliers in some way based on their internal assessment of price distributions, unit characteristics, location, and transaction patterns. We perform the analysis using only qualified sales.

We apply the following filters to the data:

Single family:

- Floor area between 1,194 and 4,252 sq. ft., which excludes the top and bottom 5% of the floor area distribution

- Lot size between 2,640 and 11,389, which drops the bottom 1% and the top 10% of the lot size distribution

- Price between \$100,000 and \$3,500,000, which excludes the bottom 0.5% and the top 2% of transactions.

Condominium units:

- Floor area between 880 and 4,252 sq. ft, which excludes sizes below the median and above the top 5% of the distribution

- Price between \$50,000 and \$3,500,000, which excludes the top 0.2% of transactions

The single family filters described above isolate the homes we suspect to be of primary interest to investor immigrants. Specifically, immigrants who can afford homes above \$3,500,000 and above our size cut-offs would likely still be able to come to Canada under the Provincial Nomination Program, and were less affected by the change in the Investor Immigrant Program. As well, single family transactions are sensitive to the extreme right hand side-tail. The condominium filters were designed to capture condominium units relatively comparable to single family homes, although clearly this sample includes much smaller units than even the smallest single family homes.

All our results are very highly robust to choice of specific cut-offs. In particular, the lower price cut-offs for single family and condominium units can be completely eliminated. The upper cut-offs are important to the extent that it is very difficult to fit a model to homes that are multiple standard deviations above the median. Using an upper cut-off level of up to \$5,000,000, which excludes the upper 0.05% of condo transactions and the upper 0.6% of single family transactions, does not alter our results. Including observations above this does not change the coefficients substantially, but increases the standard errors for all estimates.

Census tract data are the values as reported in 2011 Canadian census or estimated tract values reported in the 2011 National Household Survey for the Vancouver Census Metropolitan Area (CMA). [11] We identify immigrant neighbourhoods among the 455 census tracts in the Vancouver metro area using the estimated number of recent immigrants from a given country that arrived in Canada 2006-11. [12] In the case of immigrants from Mainland China, the mean tract has 80 recent Chinese immigrants out

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[11] The 2011 NHS was the voluntary replacement for the Canadian long form census, the former was sent to thirty percent of households and the latter to twenty percent. The voluntary 2011 NHS is the source of some controversy as participation was not mandatory, unlike the prior long form. Nationally the non-weighted mean non-response rate was 31%, and tended to be higher in lower income tracts and less urbanized areas.

[12] Strictly recent immigrants in 2011 are those in the National Household Survey (NHS) who arrived since the last census in the summer of 2006.

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of a population of approximately 5,080 persons (90 when including Taiwan). [13] The distribution is not uniform; 37% of tracts have no recent Chinese immigrants and in nine tracts recent immigrants from China account for over 10% of the tract population. 98% of tracts have at least one recent immigrant, with the mean number of 341, or approximately 7% of tract residents.

The distribution of immigrant clusters throughout the Vancouver CMA reveals some interesting patterns. Figure 1 shows the distribution of the percentage recent Chinese immigrants that make up of a census tract's population. Though the highest percentages are in the cities of Vancouver and Richmond, there are nodes of concentration throughout the metro area. Figure 2 shows the same for all other immigrants. Here too non-Chinese recent immigrants are distributed throughout the CMA, though they have a particularly notable cluster in the suburb of Surrey, which is home to the CMA's largest South Asian community. Figures 3 and 4 convert these percentages to percentiles in the distribution of immigrant percentage by census tract. Both those above the median and the highest percentile tracts (> 80th percentile) are distributed throughout the CMA and not just clustered in a single area, though the largest clusters are in certain jurisdictions. For our empirical tests these distributions suggest that any results will not be a function of a particular neighbourhood, but will reflect broader geographic patterns.

Immigrants to Canada are admitted under a number of categories including refugee, family reunification, skilled worker, business, Canadian experience, live-in caregiver, and Provincial nominees. In 2010 approximately 281,000 immigrants were admitted to Canada. Of those, 4.8% were in the business category, which is overwhelmingly investor class immigrants. [14] Table 2 shows the breakdown of immigrants in Canada and British Columbia by immigrant class. British Columbia, with a population share in 2011 of 13.1% took in 15.7% of all immigrants, and for our purposes close to 50% of all investor class immigrants. In this period nearly 92% of immigrants to British Columbia settled in the Vancouver CMA.

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[13] The 2011 NHS survey estimates that in the Vancouver CMA, 40 percent of the mean tract population is non-native born, and of the mean tract population of 5,080 persons. Over twenty percent of these, 595, are from Greater China. The count of persons for whom the primary home language is a Chinese language is 560. The mean count of recent (last five years) immigrants is 340.

[14] The largest single class nationally is skilled worker, with a 42.5% share, family reunification accounted for 21.5% and refugees for 8.8%.

6   Empirical Results

Our baseline specification follows the estimating equation shown in (2). The definition of an investor immigrant tract is one with over the median percentage of recent Chinese immigrants as described by (1). The identification of the investor program suspension comes from the relative difference in house prices before and after the suspension between tracts with above the median number of recent Chinese immigrants as of 2011 and those below. In Table 3 we present results for varying window lengths from three to twenty four months around the July 2012 suspension of the investor immigrant program. The regression includes juridstiction fixed effects .

Relative to census tracts below the median number of recent Chinese immigrants, those with above the median concentration experienced price declines. The immediate post-announcement in column (1) for the three month windows shows a relative decline of 2.2%. This magnitude remains relatively unchanged up to the 12-month window, column (4), before becoming insignificant for the two-year window. These and all of the difference in differences regressions in the paper include standard hedonic controls, which with the exception of the number of bathrooms, all have the expected signs, and jurisdiction fixed effects. [15] [16]

The three month price reaction seems too quick for it to have come from a decline in demand by arriving investor immigrants. We postulate that the results reflect the immediate capitalization of the decline in future demand by local sellers and by developers seeking to purchase older homes to teardown and renovate for wealthy immigrants to purchase, in addition to a reduction in the inflow of investor immigrants from the suspension.

We further analyze the pre and post-event trends in Table 7 and the related discussion below. For the moment let us just mention that the effect disappears for the 24-moth window because the demand for destination neighbourhoods returns rather than a dispersion of the negative demand shock to non-immigrant neighbourhoods.

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[15] Hedonic controls are lot size and lot size squared, floor area and floor area squared, number of bedrooms, number of full and part bathrooms, unit aged and aged squared, and dummies for the presence of a pool, garage, and if the unit is fewer than ten years old.

[16] The number of recent immigrants from China is a positive co-variate with the number of single family detached houses in a census tract that are redevelopments on the site of an older teardown in regressions that also include tract population, median income, and the total number of recent immigrants, where the estimated coefficient on the latter is negative.

In Table 4, we run the same mean difference in difference regression that are shown in Table 3, but with different cut-offs defining what constitutes an investor immigrant tract. For the six month window before and after July 2012 we raise the definition of an immigrant investor tract from being those with above the median percentage of recent Chinese immigrants in the tract population, as used in Table 3, to as high as the 80th percentile. In all the cases the comparison group is tracts with below the median percentage of recent Chinese immigrants as of 2011. Consequently, for regressions (2) through (4) of Table 4 we exclude transactions from tracts with above the median percentage of recent Chinese immigrants but below the cut-off used in the particular regression. With stricter definitions of investor immigrant destination tracts as being those with a higher percentage of recent Chinese immigrants the house price effects of the suspension are stronger, peaking at 2.6% lower prices after the suspension for the tracts at the 80th percentile or higher percentage of recent Chinese immigrants. Since the number of observations drops as we increase the concentration cut-off (the concentration cut-off for non-immigrant tracts remains at 50th percentile), the significance level drops slightly. But the coefficients themselves tend to increase, and remain strongly significant. Our interpretation is that as we impose a stricter definition of a likely investor immigrant neighbourhood, the price effects from the program suspension are stronger.

Our designation of investor immigrant destination tracts as those with a higher than the median percentage of recent Chinese immigrants is imprecise. All else equal, we would expect investor immigrants to buy more expensive houses and choose more expensive neighbourhoods from among those in which Chinese immigrants choose to settle. To test for the higher house price effect, in Table 5 we estimate quantile regressions for five different percentile house values, instead of the mean regressions in Tables 3 and 4. In general, the negative effect of the suspension in the investor immigrant program is even stronger when estimating the value of units higher in the price percentile distribution. Comparing the 25th and 7th percentiles, the absolute value of the coefficient estimates for all time periods are higher end when trying to fit the regression to the 75th percentile. This difference declines in half or more within two years. The difference in prices for the lower two quantiles considered is smaller and generally not significant.

Table 6 limits the analysis to tracts with the median property value in the upper half of all tracts. The results are similar to the base specification, though the point estimates are larger in absolute values than in the base regression. As in the previous regressions, the price decline diminishes by half with time. The largest effects are in the first three months. Though the differences between coefficient estimates for different time windows are not statistically significant, the pattern of higher point estimates as we better target census tracts and units more likely to be the choice of wealthy investor immigrants is supportive of our conclusions that the price declines reflect market reaction to an expected decline in future demand.

Up to this point our specification just measures a mean difference in relative price levels between houses in likely investor immigrant destination census tracts and those in the remaining tracts before and after the July 2012 investor immigrant program suspension.

As an alternative test we use the model as specified by Equation 3 to allow for trend effects and test for differences in the different time paths of prices in the different tracts around the program change. These results are presented in Table 7. Again we find a clear statistically different than zero fall in house prices in the tracts where investor immigrants are likely to purchase homes. And again the effects dissipates over time. Though here in the case of the return calculation this happens within one year.

The time pattern of the coefficients on post-July 12 and on the post-July 12 investor immigrant tract reveal something of the pattern of the price effects. House prices in the investor immigrant tracts fall those in the other tracts, but the recovery to the pre-July 2012 ratios does not occur because prices fall in response in the other areas, but by recovery in the investor tracts. Thus we do not see a ripple or transmission of price shocks from one group of neighbourhoods to others. This is consistent with the argument that there is no native born flight from immigrant areas, otherwise prices in the other areas would have fallen as demand for location by native-born home buyers shifted back to the investor immigrants areas after the program suspension. More likely, immigrant-rich neighbourhoods experience a return of high demand because both buyers and sellers realized that the suspension of the program was a one-off event, rather than a first in a sequence of immigration tightening measures. More importantly, potential immigrants and their legal advisors in Canada discovered tjat there are other immigration channels that remained open.

We preform a number of robustness tests on the data that serve the role of falsification tests. The first two, in Table 8 and Table 9 report the estimation of Equation 2 exactly as above except for the condominium sample. Table 8 replicates Table 3 just with con-dominium sales prices. We believe that investor immigrants have a stronger preference for more expensive and luxurious single-family houses. If true, then the condominium sample offers a falsification test. All of the interaction coefficients reported in Table 8 are either insignificant or positive. None of them are negative and significant. The second falsification test in Table 9 replicates the 90th percentile quantile regressions in Table 5. As with Table 8, the results in Table 9 show no price declines even for higher priced condominium units. This suggests that it was specifically single family houses, and more expensive houses in particular, that were affected by the announcement, not the market in general. This is what we would expect to see from a policy targeted towards wealthy immigrants if indeed expectations of future demand were lowered by the suspension of the program.

The second set of robustness tests use the percentage of non-Chinese recent immigrants in place of the percentage of Chinese recent immigrants. The test is whether we are just identifying a general effect of immigrant arrivals on local house prices or something unique to recent Chinese immigrants who are dramatically more likely to have been admitted to Canada under the investor class program. Tables 10 and 11 report the estimation of Equation 3 exactly as above except using non-Chinese immigrants.[17] As noted above, immigrants from countries other than China and Taiwan represent

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[17] China accounts for 23% of all immigrants coming to British Columbia. Other countries

less than 20% of the investor immigrants. Thus, non-Chinese immigrant concentration offers a way to separate the effect of immigration in general from immigration through the specific investor immigrant program that was discontinued. This is an interesting falsification test because it verifies if some event about immigrants in general affected the real estate markets, rather than the suspension of the program itself.

Houses in census tracts with higher percentages of recent non-Chinese immigrants transact for lower prices but are experiencing faster price appreciation than is case census tracts with below the median percentage of immigrants in general. These regressions, which include the same set of co-variates as above including jurisdiction fixed effects, reveal some interesting insights. Houses in census tracts with above the median percentage of non-Chinese immigrants transact for 1.6 to 2.4% less than similar houses in the same jurisdiction but in tracts with below the median percentage of recent immigrants. Over this period, immigrants accounted for nearly 80% of the metro area's population growth. The tracts with more non-Chinese immigrants grew faster than did other tracts: the estimated coefficient on the interaction between post July 2012 and above the median percentage of non-Chinese immigrant in Table 10 ranges from 1.7% to 2.0%. While there may be a number of reasons for this positive relationship, the important point related to our work is that the interaction coefficient is not negative. In other words, it was specifically markets favored by investor immigrants that were negatively affected. None of the other markets we consider experienced a negative impact. It does also suggest a broader positive effect of immigration on house price appreciation. However, we lack an exogenous shock to effectively test this more general implication. In Table 11, there is generally no relationship between non-Chinese immigrants and prices at the 90th percentile quantile, so whatever the effect of immigration it is on lower values homes.

We have further performed numerous additional robustness tests, not reported in the paper. Our results are robust to moving the event date forward by one month to account for potential delay in transactions. Our results are also robust to various additional filtering of the data to exclude outliers and to windsorising the data at 1% level. We already employ t-statistics and confidence intervals robust to serial correlation and heteroscedasticity. We also do a panel difference in differences test on overall house prices in Australian cities, using Chinese immigrant destination cities Melbourne and Sydney as the treatment group. Australia received a similar number of Chinese immigrants as did Canada, between 2006 and 2011 146,000 for Canada and 135,000 Chinese immigrants for Australia. If the effect we observe is because of an internal China cause, then we would expect to see reduced housing demand from a drop in immigrants in those Australian cities favored by Chinese immigrants.[18] Following July 2012, the difference in

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with large immigration inflow into BC are the Philippines (17.3%) and India (14%). The remaining countries include Korea, USA, England, Iran, Taiwan, Japan, among others, all with a six percent or less share of total immigration.

[18] Australian immigration data is by state, not metropolitan area, but each state's cap-

house price appreciation between these two cities and other Australian cities was larger than it had been prior to July 2012. This suggests that what we observe in our data is more likely to be from a Canada effect than a change in the outflow from China.

7   Conclusion

We exploit a sudden and unexpected suspension of a popular investor immigrant program in Canada to study the effect of immigration on real estate prices. We find strong evidence that market segments favored by investor immigrants underperformed the rest of the market following the suspension announcement. This finding is highly robust to model specification and sample selection.

These results contribute to the discussion of the effects of both immigration and capital inflows on house prices because the group we study, investor immigrants, represents both. Unlike Saiz and Wachter (2011), our findings show that immigration can result in higher local house prices as demand from immigrants, at least wealthy immigrants, dominates any flight by native born. This is consistent with Ibraimovic and Masiero's (2014) work on immigration in Switzerland, that while locals prefer to locate away from immigrants, this effect attenuates with education level, which we take to be positively correlated with wealth. Therefore, our findings are possibly not generalizable to all immigrant groups, but apply to wealthy immigrants. We cannot determine if this is purely a wealth effect from capital immigrants bring or social-cultural effects as we cannot identify immigrants by country or by more refined household characteristics at the tract level.

Our results are unlikely to be entirely because of the declines in the number of arriving immigrants. The major share of the maximum price effect (73% in the base case) occurs within the first three months, well below the time period by which those who received their visa are required to enter Canada. We believe this reflects a change in the expectation of local sellers and developers who perceived the suspension of the investor immigrant program to be a negative shock to future demand, which became capitalized in lower relative prices immediately.

Beyond the immediate implications related to immigration, our work offers a measure of ownership demand elasticity. Our findings suggest that real estate prices are at least in part driven by total demand for ownership, rather than by asset pricing fundamentals. As we discussed above, the investor immigrant program is small relative to the size of the overall market and is therefore unlikely to change the economic realities of the area

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ital city metropolitan area has a dominant share of state population. Victoria and New South Wales have a 70% share of Chinese immigrants to Australia compared with a 49% share of non-Chinese immigrants.

and impact rents or discount rates. Instead, the program directly impacts demand for very specific assets, whose prices respond accordingly.

Finally, our findings speak to the overall income and wealth inequality and segregation in highly desirable cities. Those cities disproportionately attract the wealthiest individuals from all over the world, displacing lower-income locals, with all the potential social and economic consequences this trend generates.

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9 Figures and Tables

Fig. 1. The figure shows the concentration of recent Chinese immigrants as a prortion of total population by census tract in the Vancouver CMA.

Recent Other Immigrants
Proportion, Vancouver CMA (2011)

Legend:
- 0%
- 0.1 - 3.0%
- 3.4 - 6.7%
- 6.8 - 12.0%
- 12.1 - 22.1%
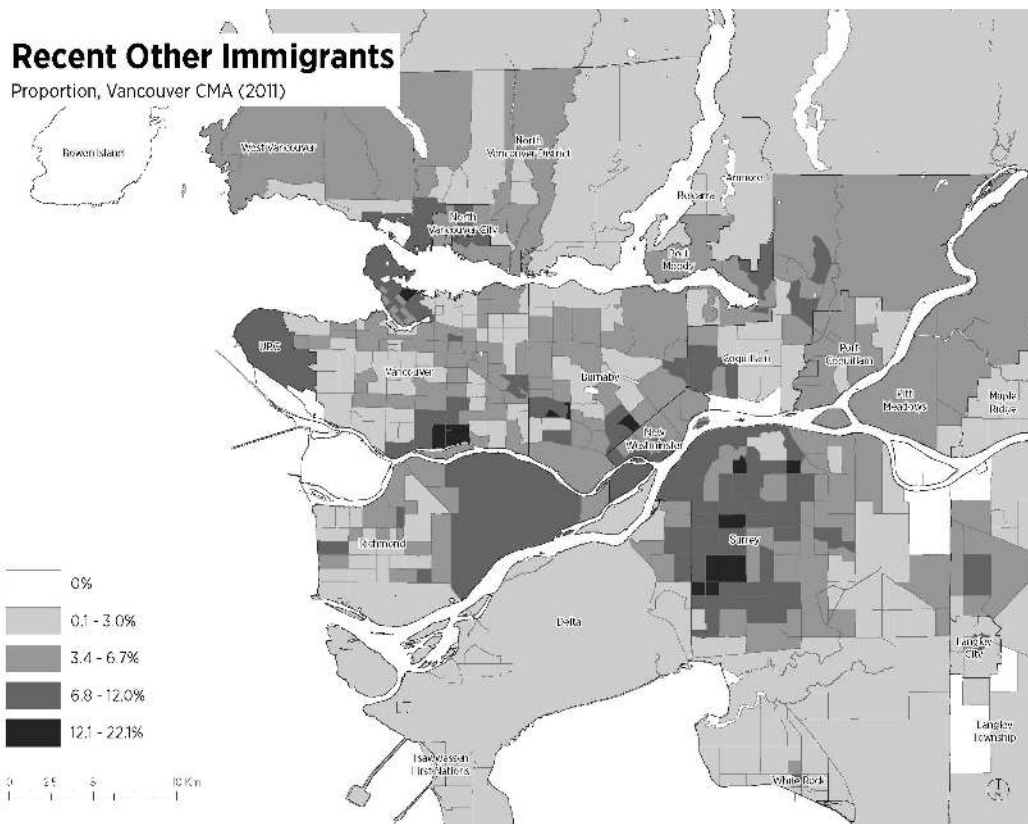
Fig. 2. The figure shows the concentration of recent immigrants other than Chinese as a prortion of total population by census tract in the Vancouver CMA.
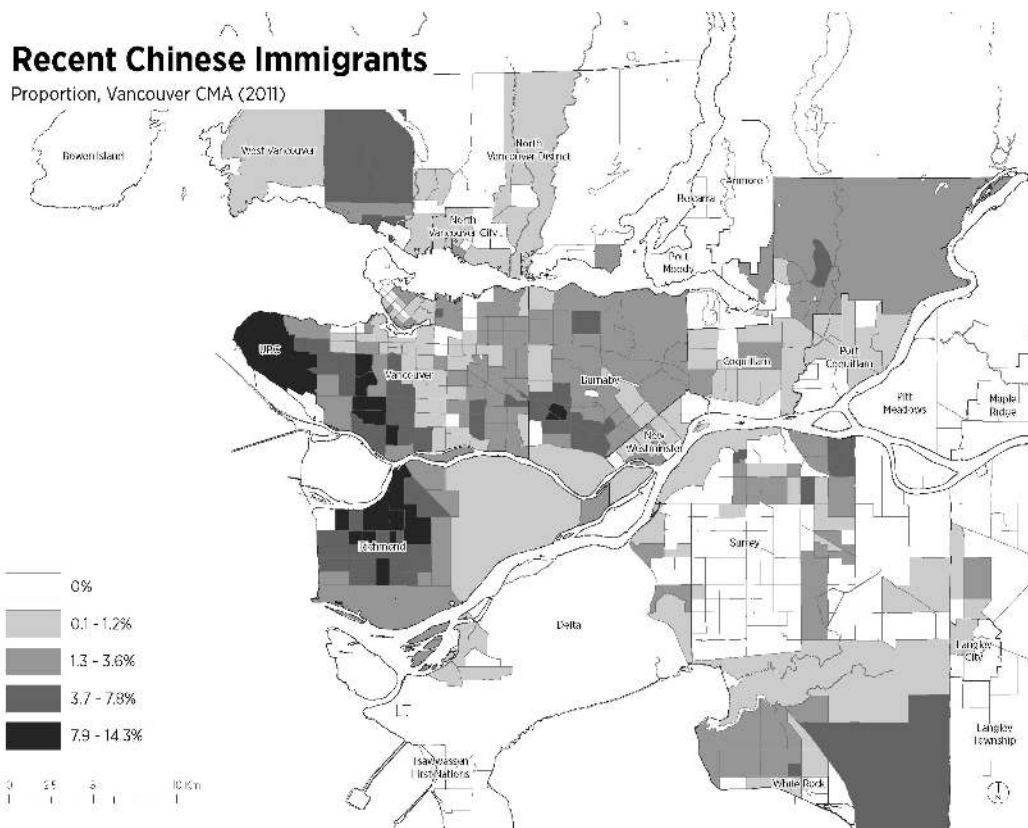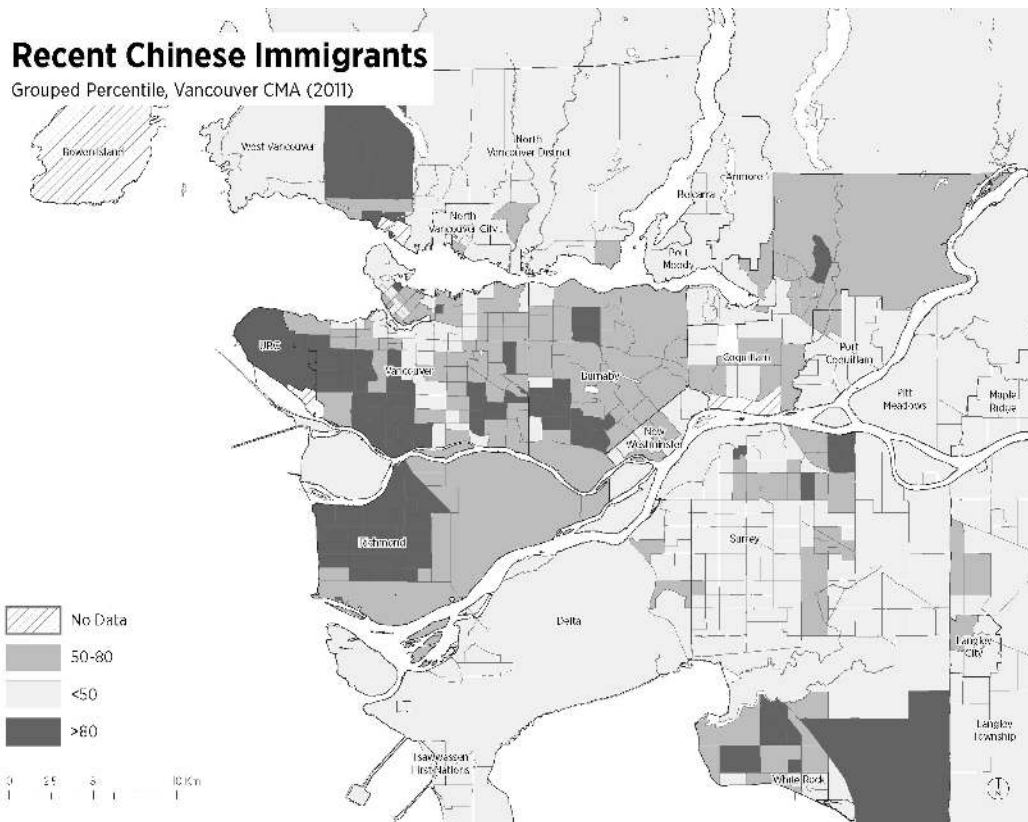
Fig. 3. The figure shows the percentile of recent Chinese immigrants as a prortion of total population by census tract in the Vancouver CMA.
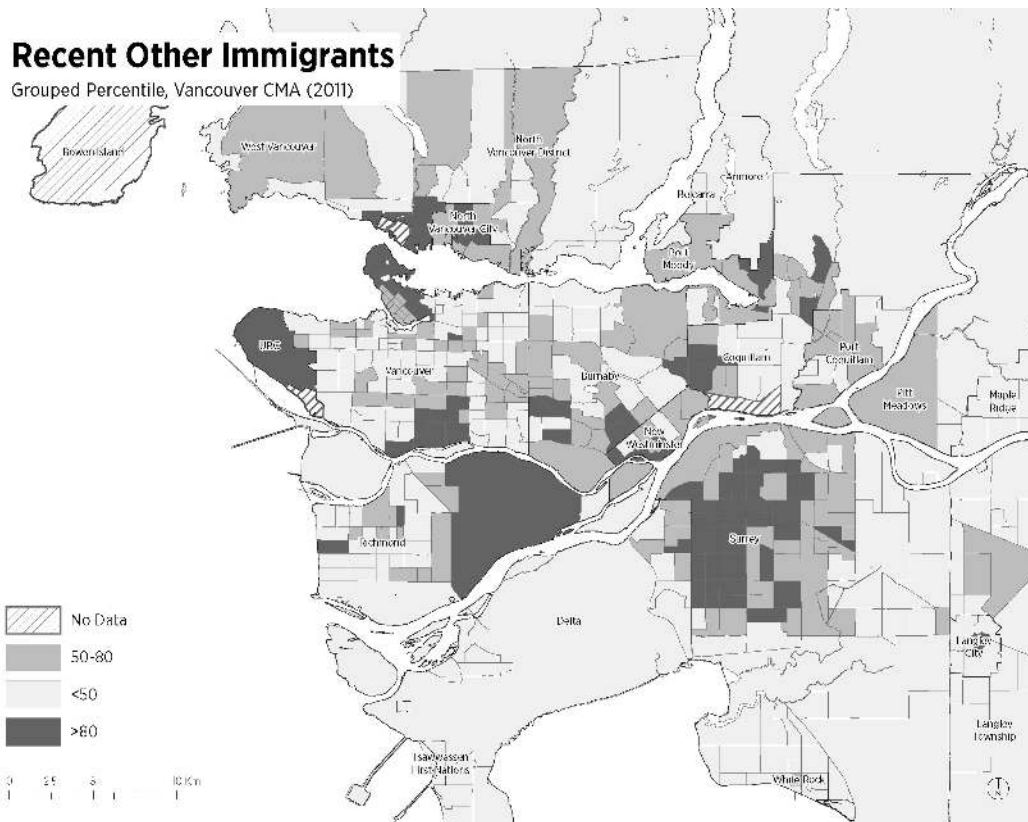
Fig. 4. The figure shows the percentile of recent non-Chinese immigrants as a prortion of total population by census tract in the Vancouver CMA.

	(1)	(2)	(3)	(4)	(5)
Single Family	N	mean	sd	min	max
Lot size 000sf	722,582.000	8.020	6.781	0.533	87.120
Finished area 000sf	722,987.000	2.424	0.954	0.264	9.994
Number of bedrooms	722,969.000	3.911	1.198	0.000	14.000
Pool	722,987.000	0.035	0.183	0.000	1.000
lnP	722,987.000	12.346	0.895	9.210	18.664
Number of bathrooms (full+half)	722,987.000	2.760	1.229	0.000	11.000
Garage (one or two stalls)	722,987.000	0.782	0.480	0.000	5.000
Age	662,936.000	14.961	14.062	0.000	106.000
Proportion Recent Chinese Immigrants	719,536.000	0.013	0.020	0.000	0.137
propRecentOther	719,536.000	0.042	0.030	0.000	0.221

	(1)	(2)	(3)	(4)	(5)
Multi-family	N	mean	sd	min	max
Finished area 000sf	428,107.000	0.910	0.293	0.251	8.750
Number of bedrooms	410,874.000	1.675	0.603	0.000	7.000
Pool	428,107.000	0.000	0.000	0.000	0.000
lnP	428,107.000	12.157	0.691	9.210	19.902
Number of bathrooms (full+half)	428,107.000	1.516	0.563	0.000	10.000
Garage (one or two stalls)	428,107.000	0.001	0.023	0.000	1.000
Age	427,443.000	9.147	9.612	0.000	87.000
Proportion Recent Chinese Immigrants	428,002.000	0.020	0.027	0.000	0.131
propRecentOther	428,002.000	0.064	0.031	0.000	0.214

Table 1

The table shows the summary statistics for the data by single family and multi-family properties. The proportion of recent Chinese immigrants and recent investor immigrants from all countries is computed as a ratio to total population in a census tract. Each real estate transaction is assigned this ratio based on its location.

Immigration Class	Canada	BC	BC Share (%)
Family	60,223	10,867	18
Refugee	24,697	1,667	6.7
Skilled Worker	119,357	16,661	14.0
Canadian Experience	3,917	572	14.6
Prov/Terr Nominee	36,430	4,900	13.5
Live-In Care Giver	13,911	2,884	20.7
Entrepreneur	1,087	234	21.5
Investor	11,715	5,510	47.0
Self-Employed	500	116	23.2
Other	8,853	777	8.8
Total	280,690	44,188	15.7
2011 Population (000)	33,477	4,400	13.1

Table 2
The table shows the breakdown of Canadian and British Columbia immigrants as of 2011.
Sources: Statistics Canada, BC Statistics, Citizenship and Immigration Canada

	(1)	(2)	(3)	(4)	(5)
VARIABLES	+/- 3 months	+/- 6 months	+/- 9 months	+/- 12 months	+/- 24 months
Lot size 000sf	0.093***	0.087***	0.088***	0.096***	0.096***
	(12.16)	(13.51)	(17.03)	(22.53)	(31.03)
Lot size squared	-0.005***	-0.004***	-0.004***	-0.005***	-0.004***
	(-8.30)	(-9.09)	(-11.08)	(-15.05)	(-20.05)
Pool	0.050**	0.048***	0.057***	0.058***	0.048***
	(2.52)	(3.15)	(5.09)	(7.01)	(8.54)
Finished area 000sf	0.205***	0.203***	0.187***	0.171***	0.173***
	(9.41)	(11.08)	(12.80)	(14.61)	(20.92)
Finished area squared	-0.014***	-0.013***	-0.010***	-0.008***	-0.008***
	(-3.53)	(-3.77)	(-3.73)	(-3.70)	(-5.26)
Number of bedrooms	-0.012***	-0.011***	-0.011***	-0.012***	-0.015***
	(-5.05)	(-5.28)	(-6.69)	(-9.19)	(-15.19)
Number of bathrooms (full+half)	-0.007**	-0.008***	-0.005**	0.001	0.003**
	(-2.16)	(-2.96)	(-2.34)	(0.56)	(1.97)
Garage (one or two stalls)	0.037***	0.040***	0.047***	0.045***	0.039***
	(7.48)	(9.83)	(14.57)	(17.72)	(21.48)
Age	-0.006***	-0.005***	-0.006***	-0.007***	-0.007***
	(-7.25)	(-7.80)	(-12.10)	(-17.47)	(-24.09)
Age Squared	0.000***	0.000**	0.000***	0.000***	0.000***
	(2.66)	(2.29)	(5.18)	(8.86)	(11.55)
Less than 10 years old	0.014	0.016**	0.011*	0.010**	0.018***
	(1.40)	(1.98)	(1.77)	(2.06)	(4.90)
postJuly2012	0.010**	0.006	0.006*	0.014***	0.064***
	(2.00)	(1.47)	(1.72)	(5.22)	(33.49)
Chinese Tract	0.026**	0.018**	0.022***	0.021***	0.013***
	(2.42)	(2.04)	(3.16)	(3.75)	(3.19)
postJuly2012 * Chinese Tract	-0.022**	-0.017**	-0.023***	-0.020***	0.003
	(-2.39)	(-2.27)	(-3.85)	(-4.32)	(1.00)
Constant	13.902***	13.928***	13.950***	13.944***	13.902***
	(258.38)	(326.56)	(418.89)	(523.74)	(724.22)
Observations	6,328	9,302	14,860	22,173	46,291
R-squared	0.865	0.868	0.866	0.868	0.852
Jurisdiction effects	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3

The table reports the results of a basic difference-in-difference model of log-transaction prices using only Chinese recent immigrant data. The coefficient estimate on variable "post-July, 2012" captures the change in overall prices following the suspension of the investor immigrant program. The coefficient estimate on the interaction variable "post-July, 2012 * Chinese neighbourhood" captures the marginal change in prices in Chinese neighbourhoods on top of the overall change. The table reports estimates for five different event windows: plus/minus 3, 6, 9, 12, and 24 months. The change in overall prices around the announcement is generally not significant. However, the marginal change in price for properties located in Chinese neighbourhoods, as captured by the interaction term, is strongly significant within 12 months of the annoucement. The effect dissipates for longer time frames.

VARIABLES	(1) 50th percentile	(2) 60th percentile	(3) 70th percentile	(4) 80th percentile
postJuly2012	0.006	0.007*	0.007*	0.007*
	(1.47)	(1.69)	(1.74)	(1.72)
Chinese Tract	0.018**	0.026**	0.044***	0.069***
	(2.04)	(2.36)	(2.75)	(3.82)
postJuly2012 * Chinese Tract	-0.017**	-0.019**	-0.020**	-0.026**
	(-2.27)	(-2.45)	(-2.01)	(-2.08)
Observations	9,302	8,553	7,559	6,931
R-squared	0.868	0.873	0.881	0.880
Jurisdiction and Hedonic effects	Yes	Yes	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4

The table reports the results of the same difference-in-difference model of log-transaction prices as reported in Table 3 for four definitions of a Chinese neighbourhood using the 50th, 60th, 70th, and 80th concentration percentiles. The cut-off for non-Chinese neighbourhood is held at the 50th percentile. The coefficient estimate on variable "post-July, 2012" captures the change in overall prices following the suspension of the investor immigrant program. The coefficient estimate on the interaction variable "post-July, 2012 * Chinese neighbourhood" capture the marginal change in prices in Chinese neighbourhoods on top of the overall change. Thus, observations between the two percentile cut-offs are excluded from the second, third, and forth models. The marginal change of transaction price for properties located in Chinese neighbourhoods, as captured by the interaction term, is strongly significant regardless of the specific cut-off level used to split the sample.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
10th perentile	-0.036** (-1.99)	-0.027 (-1.55)	-0.022 (-1.62)	-0.023** (-2.18)	0.014 (1.52)

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
25th perentile	-0.015 (-1.00)	-0.003 (-0.26)	-0.011 (-1.21)	-0.015** (-2.53)	0.007 (1.32)

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
50th perentile	-0.021*** (-2.81)	-0.018*** (-2.98)	-0.016*** (-3.45)	-0.017*** (-4.33)	0.000 (0.06)

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
75th perentile	-0.030*** (-3.78)	-0.021*** (-3.91)	-0.021*** (-4.54)	-0.020*** (-5.19)	-0.008*** (-2.90)

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
90th perentile	-0.028** (-2.44)	-0.026*** (-3.02)	-0.016** (-2.20)	-0.018*** (-3.23)	-0.013*** (-3.41)

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5

The table reports the results of the same difference-in-difference model of log-transaction prices as reported in Table 3 except using quantile regression for five separate quantiles and five time windows. The table reports the interaction term between Chinese neighbourhoods and post-July, 2012, the remaining coefficients are available upon request. The interaction between post-July and Chinese neighbourhood variables is negative and strongly significant for the 50th or higher percentiles. The interaction term is generally not significant for the 10th and 25th quantile. The effect dissipates for longer time frames.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
postJuly2012	0.021**	0.010	0.002	0.013**	0.080***
	(2.08)	(1.24)	(0.34)	(2.32)	(20.79)
Chinese Tract	-0.016	-0.015	-0.001	0.004	0.003
	(-0.95)	(-1.13)	(-0.06)	(0.46)	(0.38)
postJuly2012 * Chinese Tract	-0.034**	-0.024**	-0.030***	-0.025***	-0.017***
	(-2.32)	(-2.09)	(-3.19)	(-3.48)	(-3.27)
Observations	2,928	4,304	6,904	10,592	22,255
R-squared	0.836	0.842	0.830	0.833	0.813
Jurisdiction and Hedonic effects	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6

High Value Tracts ($pct50s_05 >= 50$) The table reports the results for the same difference-in-difference model of log-transaction prices as reported in Table 3 except using only transactions with above-average value. As in the case of Table 3 , the interaction between post-July and Chinese neighbourhood variables is negative and strongly significant for time windows up to +/- 24 months. The effect is smaller for the longer time windows.

	(1)	(2)	(3)	(4)
VARIABLES	+/- 3 months	+/- 6 months	+/- 9 months	+/- 12 months
t	0.005***	0.005***	0.002***	0.001***
	(3.22)	(5.03)	(4.69)	(3.68)
t * postJuly2012	-0.011**	-0.011***	-0.004***	-0.001
	(-1.98)	(-4.77)	(-4.09)	(-1.30)
t * Chinese Tract	0.001*	0.001*	0.001*	0.000
	(1.95)	(1.84)	(1.96)	(0.62)
t * postJuly2012 * Chinese Tract	-0.016**	-0.008***	-0.005***	-0.001*
	(-2.25)	(-2.74)	(-3.30)	(-1.65)
Observations	6,328	9,302	14,860	22,173
R-squared	0.865	0.869	0.866	0.868
Jurisdiction and Hedonic effects	Yes	Yes	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7

The table reports the estimates from a piece-wise linear model with a break on July, 2012 using Chinese immigrant data. The coefficient estimates for time capture the baseline trend in prices before the announcement event. The coefficient estimate for "time * postJuly2012" captures the marginal change in baseline trend after the announcement event. The coefficient estimate for variable "time * Chinese" captures the marginal trend, in addition to the base trend, for Chinese neighbourhoods before the announcement. Finally, the coefficient estimate for the interaction term "t * postJuly2012 * Chinese" captures the marginal post-announcement trend for Chinese neighbourhoods. All estimates are reported for four separate time windows: plus/minus 3, 6, 9, and 12 months. The marginal trend for Chinese neighbourhoods post announcement is negative and significant for all event windows considered.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	+/- 3 months	+/- 6 months	+/- 9 months	+/- 12 months	+/- 24 months
Finished area 000sf	1.388***	1.448***	1.398***	1.404***	1.365***
	(23.76)	(23.50)	(27.62)	(32.43)	(41.70)
Finished area squared	-0.174***	-0.194***	-0.184***	-0.182***	-0.162***
	(-8.98)	(-9.06)	(-10.21)	(-11.57)	(-13.47)
Number of bedrooms	-0.003	-0.005	0.002	-0.002	-0.007**
	(-0.34)	(-0.69)	(0.30)	(-0.53)	(-2.15)
Number of bathrooms (full+half)	0.025***	0.019***	0.018***	0.013***	0.004
	(3.16)	(2.82)	(3.60)	(3.19)	(1.45)
Age	-0.030***	-0.029***	-0.028***	-0.029***	-0.028***
	(-17.41)	(-21.85)	(-29.65)	(-34.49)	(-52.75)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***
	(9.15)	(11.53)	(15.23)	(17.83)	(27.06)
Less than 10 years old	-0.055***	-0.041***	-0.035***	-0.034***	-0.028***
	(-3.32)	(-3.11)	(-3.54)	(-4.16)	(-5.07)
postJuly2012	-0.022***	-0.029***	-0.010*	-0.012***	0.004
	(-2.66)	(-4.24)	(-1.86)	(-2.69)	(1.38)
Chinese	0.003	0.012	0.013**	0.011**	0.008**
	(0.31)	(1.48)	(2.09)	(1.99)	(2.06)
postJuly2012 * Chinese	0.010	0.005	-0.006	0.007	0.023***
	(0.85)	(0.57)	(-0.87)	(1.24)	(5.78)
Constant	12.557***	12.519***	12.465***	12.460***	12.481***
	(213.39)	(221.52)	(260.77)	(306.39)	(444.17)
Observations	3,506	5,307	8,903	12,678	26,386
R-squared	0.930	0.926	0.922	0.919	0.914
Jurisdiction effects	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8
The table reports the same estimation as the one reported in Table 3, except for condominium units. Condominium units are typically less desirable for Chinese immigrants, especially the ones with sufficient wealth to qualify for the investment immigrant program. As such, the condominium sample serves as a falsification test. As expected, the marginal change in post-July, 2012 prices in Chinese neighbourhoods is indistinguishable from zero or positive.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
postJuly2012	-0.034**	-0.040***	-0.003	-0.013	0.006
	(-1.98)	(-2.97)	(-0.25)	(-1.58)	(1.06)
Chinese Tract	0.000	0.012	0.010	0.004	0.006
	(0.01)	(0.83)	(0.78)	(0.37)	(0.90)
postJuly2012 * Chinese	0.022	0.025	-0.008	0.018*	0.032***
	(1.02)	(1.48)	(-0.59)	(1.70)	(4.28)
Observations	3,506	5,387	8,903	12,678	26,386
Jurisdiction and Hedonic effects	Yes	Yes	Yes	Yes	Yes

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9
The table reports the results of the same difference-in-difference model of log-transaction prices for condominium units as reported in Table 8 except using quantile regression at the 90th percentile of property values. As in the case of Table 8, the interaction between post-July and Chinese neighbourhood variables is not significant or positive for all event windows considered.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months
postJuly2012	-0.006	-0.007	-0.010***	-0.001	0.057***
	(-0.98)	(-1.51)	(-2.70)	(-0.41)	(27.35)
Other Immigrant Tract	-0.024***	-0.020***	-0.016***	-0.017***	-0.021***
	(-2.98)	(-2.98)	(-3.14)	(-3.78)	(-6.53)
postJuly2012 * Other Immigrant Tract	0.019**	0.017**	0.017***	0.018***	0.020***
	(2.20)	(2.42)	(3.01)	(3.97)	(6.16)
Observations	6,328	9,302	14,860	22,173	46,291
R-squared	0.865	0.868	0.866	0.868	0.852
Jurisdiction and Hedonic effects	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10
The table reports the same estimation results as Table 3, except for all non-Chinese immigrants. Non-Chinese immigrants are less likely to be impacted by the suspension of the immigrant program, and/or are less likely to have an impact on the real estate markets. The coefficient estimate on variable "post-July, 2012" captures the change in overall prices following the suspension of the investor immigrant program. The coefficient estimate on the interaction variable "post-July, 2012 * Other neighbourhood" captures the marginal change in prices in non-Chinese immigrant neighbourhoods on top of the overall change. The table reports estimates for five different event windows: plus/minus 3, 6, 9, 12, and 24 months. The change in overall prices around the announcement is generally not significant. However, the marginal change in price for properties located in non-Chinese immigrant neighbourhoods, as captured by the interaction term, is actually positive regardless of the specific event window. In other words, high non-Chinese immigrant concentration neighbourhoods did not experience a price decline around the time of the investor program suspension.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	+/- 3 months	+/- 6 months	+/- 9 months	+/- 12 months	+/- 24 months
postJuly2012	-0.005	-0.012**	-0.006	0.000	0.038***
	(-0.72)	(-2.05)	(-1.38)	(0.13)	(16.01)
Other Immigrant Tract	-0.022**	-0.025***	-0.024***	-0.023***	-0.022***
	(-2.32)	(-3.19)	(-3.85)	(-4.14)	(-6.05)
postJuly2012 * Other Immigrant Tract	-0.012	-0.006	0.004	0.010*	0.010***
	(-1.10)	(-0.70)	(0.52)	(1.80)	(2.69)
Observations	6,328	9,302	14,860	22,173	46,291
Jurisdiction and Neighborhood effects	Yes	Yes	Yes	Yes	Yes

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11
The table reports the results of the same difference-in-difference model of log-transaction prices for other immigrants as reported in Table 10 except using quantile regression at the 90th percentile of property values. As in the case of Table 10, the interaction between post-July and Chinese neighbourhood variables is not significant or is positive for all event windows considered.