Immigration and Real Estate Returns

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Abstract

We exploit a surprise suspension and subsequent closure of a popular investor immigration program in Canada to assess the impact of immigration and capital inflows on local real estate markets. Using transaction data from the Greater Vancouver area, we find that the closure of the program had a significant negative impact on the neighborhoods and market segments most favored by the investor immigrants. The negative impact we document was quick and persistent, reflecting both a change in seller expectations and subsequent drop in demand. However, within two years the effects the program suspension and then closure had dissipated and the immigrants and units most favoured by wealthier immigrants had returned to their relative price premium. The effects are strongest for the most expensive units in the target neighbourhoods. Our findings suggest that the mix of wealthy immigrants and capital flows impacts real estate primarily through changes in demand for space it causes. None of our findings hold for property types not likely to be favored by investor immigrants. Comparing our findings with the existing literature these results indicate that in assessing the effects of immigration on housing markets immigrant type matters. They also support the argument that capital inflows in real estate raise prices more in the destination neighbourhoods than they raise the overall level of house prices.

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1 Introduction

International flows of wealth to residential real estate are being blamed for house price appreciation in select cities worldwide. Not matched by growth in local wages, money inflows from China, the Middle East, and Russia have been cited in the popular press as the driving force behind worsening affordability in cities such as Hong Kong, London, New York, San Francisco, Seattle, Singapore, Sydney, Toronto, and Vancouver. [1] In response, countries such as Singapore and the UK have taken recent action to limit foreign investment through restrictions on purchases and higher taxes on non-resident owners. [2] While the attention in the press has been on non-resident buyers, wealth can come with people as well. Countries such as Australia, France, Germany, the UK and the US have visa programs that provide residency for those with wealth investing a proscribed amount in the local economy. The question we seek to understand is the relationship between wealth, immigration, and local housing markets. This is relevant for policy makers seeking to address complaints about the contribution of foreign capital to the double digit price appreciation and problems with housing affordability in cities identified as destinations for international investment in residential real estate.

In this paper, we exploit the surprise suspension and subsequent closure of Canada's investor immigration program to assess the extent to which wealthy immigrants have a distinct effect on house price appreciation. [3] Using house transaction data from 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 for the period immediately preceding and following the July 2012 announcement of the program suspension. This difference in difference approach identifies the extent to which capital

[1] 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

[2] 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

[3] The progam 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

inflows linked to immigrants affect particular neighbourhoods or are diffused throughout a market. If wealth inflows have a larger effect on house prices in target high-end neighbourhoods, then the implications of house and condo purchases by wealthy buyers on the overall levels of affordability are more limited.

We find that the suspension of the program resulted in lower house price appreciation in the investor destination census tracts compared with other tracts relative to the period prior. The negative impact we document was quick and persistent. In contrast, we document no differential across the program suspension on market segments not favored by investor immigrants. These results shed light on two areas. First, unlike findings in the previous literature, here we do find that immigration raises housing prices in destination neighbourhoods, at least in the case of wealth immigrants. Second, the clear neighbourhood specific effects from expected and then actual changes in the inflow of the combination of people and wealth are not in the short-run wholly diffused into the over-all housing market. The implication is that while wealthy buyers may be driving up prices in distinct neighbourhoods, they may not be having as large an effect on overall rates of house price appreciation in those cities experiencing rapid house price growth.

We proceed as follows. Section 2 provides the theoretical construct for the relationship between wealth, immigration and house prices, Section 3 reviews the existing literature on the impact of immigration and capital flows on real estate values. 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, Capital Flows, and House Prices

Immigration and wealth effect demand for real estate through three channels: changes in aggregate market-wide demand, effects on expected future rents, and preferences for location. The effects on price levels depends on city specific urban form and supply elasticities. For immigration endured increases in demand to translate into higher house prices, then it must also be true that in the market in question the land rent gradient is negatively sloped. If not, the increased demand for space results entirely in new supply at the urban fringe rather than higher values at locations in the interior of the urban area. As well, there needs to be either a distinct preference for land in consumers' utility functions or the supply of structure must be at least somewhat inelastic.

Both immigration and capital inflows should increase aggregate demand for real estate. 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 aggregate demand if it is purchases by non-residents. If the wealth of existing residents increases then demand per household will shift out from consumption out of wealth or through a portfolio desire to hold residential real estate that increases with wealth. In our case, immigrants with wealth increase the number of households and result in increased demand per household

The second way that immigration and capital inflows can affect current real estate values is through the capitalization of future rents into current house prices. If immigration induced changes in labor supply or capital inflow generated investment increase productivity growth, then they both will increase future demand for real estate. These higher future expected rents will be capitalized today as increases in current real estate prices.

If immigrants or investors prefer distinct neighbourhoods, or alternatively, if non-immigrant residents prefer to not live near immigrants, then the flow of people and money can result in changes in the relative price of housing across different neighborhoods in a metropolitan area. In both cases, the extent to which prices change in a particular area depends on the degree of cross-substitution across 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 will not change prices in other areas of the city.

The difference in differences empirical methodology we employ in this paper will separate out metropolitan area wide effects from those in specific neighbourhoods. A metropolitan wide change in aggregate demand of future expected rent growth will have the same effect on all areas before and after the policy shock, resulting in a null result. If cross neighborhood demand is not perfectly elastic and there is a preference on the part of immigrants or capital for certain neighborhoods, then house price changes in these areas should differ following the shock from metropolitan area wide price patterns. They will rise if the increase in demand from immigrants dominates any distaste for immigrants by existing residents, or if none of the latter is present.

3 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. Immigration is truly defined by the physical presence of immigrants in the host country. While most of the literature on the impact of immigration has focused on the labor market (e.g., Scheve and Slaughter, 2003; Mayda, 2006), real estate markets offer more direct measures of the social and economic impact of immigration.

Within metropolitan area price appreciation variation has been used to isolate the effect of immigration on current demand, both in the aggregate and in specific neighborhoods. In a paper most aligned with the question we address here, Saiz and Wachter (2011) use a geographic diffusion model to represent the growth of immigrant density of a neighborhood. Their main conclusion is that growing immigrant density appears to cause native flight and slower appreciation. This finding appears to support a segregation equilibrium theoretically developed by Benabou (1993).

As described above, our findings lead to an opposite conclusion the expectaion of a reduction in immigrant flow leads to slower price appreciation. Most likely, we reach different conclusions because of the type of immigrants we study. As Saiz and Wachter point out, immigrant neighborhoods 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. In our data non-Chinese recent immigrants are more likely to be in census tracts with lower house values, while for recent Chinese immigrants the opposite is true.

A number of other studies focus on the correlation between immigration and real estate values using country- or metropolitan-level data. Burnley and Murphy (1994) find that there are 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. Gyimah, Walters, and Phythian (2005) illustrate that ethnicity has had a strong effect on home owner-

ship in Toronto. They find that compared to non-visible minorities, principal household maintainers who are Chinese are 80 percent more likely to own their homes. Ley and Tutchener (2001) indicate that immigration to Vancouver contributed 54 percent to net population growth between 1986 and 1991, and 79 percent during the first half of the 1990s. Using a regression model, they also claim that the population growth and the associated rise in the housing demand in the Greater Vancouver area are the results of immigration.

Only a handful studies have focused on immigration and real estate using within-city variation. Moos and Skaburskis (2010) study the effect of immigration on the residential housing market of Vancouver. They mainly concentrate on how housing consumption is linked to the income characteristics of the household and how this relationship differs between recent immigrants and the rest of the population in the metropolitan area of the city. In order to conduct the analysis, they look at the shifts in the data between the 1981 census and the 2001 census using Statistics Canada tract sets, and divide the greater Vancouver into 4 distinct areas: Inner City, Old Suburbs, New Suburbs, Exurbs. They utilize multivariate regression models of housing consumption to determine the relationship between the households income and housing demand, and conclude that the recent immigrants consumed more housing, given incomes, than did native born residents or older waves of immigrants. Moos and Skaburskis generate results consistent with the claim that that in the post-1990 period, immigrants, particularly from Asia, increasingly arrived with established wealth and many were known to continue earning income outside the country. Their conclusions is based on indirect evidence: at the census tract level the correlation between recent immigrant status and higher dwelling value appreciation is positive even after other factors that affect dwelling value change are considered. This finding is more noticeable in the inner city and old suburbs, than in the new suburbs. Another Canadian study conducted by Akbari and Aydede (2012) using a first difference model applied to a panel of census data from 1996, 2001, and 2006, concludes that the impact of immigration on prices of privately owned dwelling in Canada is statistically significant but minor. They believe that this could be because of the out migration of the native born from the areas where recent immigrants reside or the increase in supply of housing due to the expectation of higher demand. The study focuses on the country as a whole.

Different in methodology but similar to our approach, Gonzalez and Ortega (2013) provide casual estimates of the effects of immigration on the prices in Spain between 2000 and 2010. Relying on instrumental variables and a two-stage least squares regression analysis, and after partitioning the provinces into 9 regions, they conclude that immigration leads to increase in the working population and that will lead to increase in housing prices.

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 Canadian investor immigrant program focused on high net worth 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. Liao, et.al. (2014) identify the transmission in Singapore of shocks to sales to foreigners and price increases in the prices of units sold to local buyers, but this effect is small: a one percent increase in the volume of sales to non-residents results in a 0.027 percent increase in prices in the domestic market, the price effects in the non-resident market are five times as large. Cvijanovic and Spaenjers (2015) study non-resident demand in Paris. They find capital inflows concentrate in the most desirable neighbourhoods and affect prices more genrally. Their effects re twice those of Liao, et. al, a 1 percent increase in non-resident purchases leading to a 0.05 percent in overall Paris prices. Finally, Badarinza and Ramadorai (2015) find evidence that risk driven capital flight can explain short-term movements in London property prices, as prices rise relatively faster in immigrant concentrated neighborhoods as risk increases in said

immigrants home country.

Our contribution to this litertaure on immigration and capital flow is to highlight a number patterns. First, immigrant destination neighborhoods are not close substitutes for all other areas, as demand shocks are only partly transmitted in the short run. Second, effects, at lest 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.

4 The Canadian Investor Immigrant Program

The investor immigrant program to Canada started in 1986, and at the same time Quebec started a similar program. [4] 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 they 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. [5] 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. In contrast, Canadian banks would loan about 80 percent of the funds for an investor, holding the government promissory note as collateral and requiring the remaining 20% of funds be held in their bank.

In a surprise move, 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 system were processed following the July, 2012 suspension, it was widely accepted that the program had de facto ended. Its formal closure in February, 2014 was not a surprise (the Globe and Mail, February 11, 2014). This shock to wealthy immigrants offers an excellent opportunity to investigate the impact of immigration on real estate markets. That it was a shock seems very likely as 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.

One issue is whether this had an actual effect on the flow of people and money from China to Canada. Immigrants to Canada, especially from China, typically use immigration consultants in China to advise them on which programs to use and how to

[4] 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.

[5] Currently the exchange rate is $C 1.00 = $US 0.75.

apply. [6] Consultants would typically earn $C25k per successful application. After the suspension of the Federal investor 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 identified. The choices seemed to be using the Quebec investor program, which had 1,250 slots in 2014, 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 decline in the number of available visa slots limited exclusively to wealthy immigrants. While wealthy immigrants may have found other mechanisms to continue to immigrate to Canada, the suspension and closing of the Federal program disrupted the flow of 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. [7]

The Vancouver housing market offers an excellent location to test the effects of immigration and wealth on housing markets. Immigrants made up 79 percent of the change in metropolitan area population between 2006 and 2011, and 56 percent between 1986 and 2011. At the same time, when the program was operational, Vancouver attracted approximately half of all immigrant investors coming into Canada: in 2010 5,500 mostly ethnic Chinese investors immigrants entered BC out of a national total of 11,700. [8]

While the Vancouver metropolitan area covers a large region and is a home to over two and a half million people, immigrants do not distribute themselves uniformly throughout the region. In 2011 recent (past five years) immigrants made of 3.6 percent or less of the population in 25 percent of the 454 census tracts in the Vancouver CMA. Recent immigrant population share exceeded 8.9 percent for the upper quartile, and in three

[6] The information in this section is a result of conversations with immigration lawyers in vancouver about the investor immigrant program.

[7] In February of 2014 the government simplified the application process for multiple entry 10 year tourist visas, which since their introduction in mid-2011 had become very popular with Chinese nationals

[8] Between 2007 and 2011 66 percent of the investor immigrants to BC (over 95 percent of whom settle in the Vancouver metropolitan area) were from China and 15 percent from Taiwan

tracts 22 percent of the population was recent immigrants. Recent 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 neighborhoods for their own use, immediately or in the future is consistent with these correlations. In other words, the impact of the immigrant investor program over the entire metropolitan area is modest in terms of both population and income growth; however, 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 neighborhoods, we can use the difference in appreciation rates between neighborhoods to measure the impact of the suspension. Specifically, we identify neighborhoods 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 neighborhoods with high and low concentration of recent Chinese immigrants.

The data do not let us identify tract level variation in who entered who entered Canada under what immigration program. However, the program is dominated by Chinese immigrants. 80 percent of all investor immigrants between 2007 and 2011 were from China or Taiwan. Investor immigrants made up 36 percent of immigrants from these countries. In contrast, investor immigrants were only 3 percent of immigrants from all other countries. While using all Chinese immigrants to proxy for wealthy immigrants, is likely to overestimate the volume of wealthy immigrants, and underestimate their specific wealth effects, we are not excluding many investor immigrants using this definition. In particular, non-Chinese immigrants were much more likely to enter Canada under family reunification or as refugees.

An important caveat is that the suspension of the program did not immediately stop immigrants under the program. Those who had received their visas continued to arrive after July 2012, but in significantly diminishing numbers. However, knowledge of the policy change, which was headline news in the local media, almost certainly changed sellers' expectations.

Our main finding is that following the suspension of the immigrant investor program neighborhoods with high concentration of recent Chinese immigrants significantly underperformed the rest of the metropolitan area in terms of price appreciation. The underperformance starts in the month following the announcement, and extends over the following 12 months. This result is robust to various model specifications and variable definitions.

While there may have been other factors that contributed to the differential performance, our findings are strongly suggestive of a causal relationship. The effects of any other events that affect the entire metropolitan-area are netted out in our difference-in-difference methodology. Furthermore, we document no differential performance for market segments less favored by investor immigrants, such as condominium units.

Our findings offer unique support for the first channel through which immigration affects real estate, namely population growth. It also suggests that the desire for local residents to segregate is not detectable, if it exists at all. In other words, wealthy immigrants like to locate in tracts with high concentration of immigrants of similar ethnicity, and are willing to pay a premium to do so. This makes prices in immigrant-dominated neighborhoods sensitive to immigration policy. Local residents, whether of foreign descent or not, have little or no desire to segregate and purchase homes wherever they can find good value. This suggests a moderate spillover effect from immigrant to non-immigrant neighborhoods both in terms of price and number of transactions. This spillover effect does not prevent us from detecting a statistically different price performance in the two types of tracts.

While our findings are highly robust to model specification, they are potentially limited to the impact of relatively well-off immigrants. The immigrants who took advantage of the investor program are wealthier than most local residents. Therefore, our findings

may not generalize to the impact of less fortunate immigrants on real estate markets.

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 tax assessment administrator, and include all residential properties and transactions registered with British Columbias Land Title Office. Census tract data is from Statistics Canadas 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. Property data is geocoded and then matched to census tract.

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 rowhouse, 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. For units that have been renovated since they were first built there is also an estimated vintage, which is not the same as the year of renovation. Lot size is not available for townhouse and strata-lot (condo) units, nor is the garage variable for the latter. 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. The concentration of recent immigrants from China is small because they are computed as a proportion of total population in each tract. Nonetheless, the variation is substantial, with some tracts receiving new immigrants, the number who arrived in the five years since the previous census, at the rate of 13 percent of the entire tract population. Even the mean of 1.7 percent for Chinese immigrants is substantial.

BC Assessment (BCA) provided the universe of transactions and transaction prices for the period 2008 to 2014. BCA identifies approximately one third of these as not

valid transactions for their use to estimate property values, because they are not arms length or appear to be outliers in some way based on their internal assessment of price distributions and transaction patterns. We perform the analysis using only qualified sales.

We apply the following filters to the data in order to focus as much as possible on properties of interest to investor immigrants:

Single family:

- Floor area between 1194 and 4252 sq. ft., which excludes the top and bottom 5% of the floor area distribution
- Lot size between 2640 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.

Condominium units:

- Floor area between 880 and 4252 sq. ft, which excludes sizes below the median and above the top 5% percent of the distribution
- Price between $5,000 and $3,500,000

The single family filters described above isolate the homes 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.

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 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 2011 National Household Survey. [9] 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. [10] In the case of immigrants from Mainland China, the mean tract has 80 Chinese immigrants out of a population of approximately 5,000 persons. [11] The distribution is not uniform, 37 percent of tracts have no recent Chinese immigrants and in nine tracts recent immigrants from China account for over 10 percent of the tract population. For immigrants in general 98 percent of tracts have at least one recent immigrant, with the mean number of 341, approximately 7 percent of tract residents.

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 these 4.8 percent were in the business category, overwhelmingly investor class immigrants. [12] Table 2 shows the breakdown of immigrants in Canada and British

[9] The 2011 NHS was the voluntary replacement for the Canadian long form census, the former was sent to 30 percent of households and the latter to 20 percent. both of which we sent to approximately 20 percent of households. 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 percent, and tended to be higher in lower income tracts and less urbanized areas.
[10] Strictly recent immigrants in 2011 are those in the National Household Survey (NHS) who arrived since the last census in the summer of 2006.
[11] The number of immigrants is an estimate based on responses to the 2011 NHS and not a complete census.
[12] The largest single class nationally is skilled worker, with a 42.5 percent share, family reunification accounted for 21.5 percent and refugees for 8.8 percent.

Columbia by immigrant class. British Columbia, with a population share in 2011 of 13.1 percent took in 18.5 percent of all immigrants, and for our purposes close to 50 percent of all investor class immigrants, and over 90 percent of immigrants to British Columbia settle in the Vancouver metro area. In British Columbia from 2006 to 2011 there were 24,509 investor immigrants and their dependents. Of these, 66 percent were from Mainland China and another 15 percent from Taiwan.

We analyze the effect of the suspension of the investor program using both recent immigrants from Mainland China in a census tract and the estimated number of investor immigrants in a tract. To identify investor destination neighbourhoods we combine the census tract level data on recent immigrants by country with the provincial data on investor immigrants by source country. The estimated number of investor immigrants in a census tract is the cross product of recent immigrants by country, the number in the 2011 NHS who arrived since the last census in 2006, by the probability that an immigrant from that country came in under the investor program. China was the leading home country for immigrants to BC over this period with over 23 percent of all immigrants to BC arriving from China, and of these 36 percent came under the investor program. In contrast, for the next two largest source countries for immigrants to BC, the Philippines and India (17 and 14 percent shares of immigration respectively), only 0.6 and 0.4 percent of immigrants came in under the investor program. Investors made up 43 percent of immigrants from Taiwan, but only 4.4 percent shares of total immigration to BC over this period. [13]

6 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,

[13] Recent immigrants from China make up at least 3 percent of the tract population in 17 percent of the Vancouver CMA census tracts. For recent immigrants from Taiwan there is only one tract.

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 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 there close to 20 percent of investor immigrants are not Chinese and 64 percent 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, whihc should be more likely to be bought by investor immigrants than those who entered by other programs, and find results consistent with our more general findings.

6.1 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, neighborhood 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.

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

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

6.2 Linear Trend Analysis

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

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

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.

6.3 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:

$$log(Price) = \beta_0 + \beta_1 Characteristics + \beta_2 \sum 1(\text{Property in Neighborhood i}) + \beta_3(\text{Chinese Concentration}) + \beta_4 postJuly2012 * (\text{Chinese Concentration}) \quad (4)$$

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

7 Empirical Results

Our baseline specification follows the estimating equation shown in 3. The definition of an investor immigrant tract is one with over the median number of recent Chinese immigrants as described by 1. In Table 3 we present results for varying window lengths from three to twelve months around the July 2012 suspension of price changes, with the identification coming from the relative difference in price changes before and after the suspension between tracts with above the median number of recent Chinese immigrants as of 2006 and those below. Relative to census tracts below the median number of recent Chinese immigrants, those with above the median concentration experienced price declines. The difference ranges between a decline of 1.7 to 2.2 percent lower.

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 nine month window before and after July 2012 we raise the definiton 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 2006. Consequently, for regressions (2) through (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 percent 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 identification of investor immigrant destination tracts as those with a higher than the median percentage of recent Chinese immigrants is rough. All else being equal we would expect investor immigrants to buy more expensive houses and choose more expensive neighbourhoods from among those receiving Chinese immigrants in general. To test for the higher house price effect in Table 5 we run quantile regressions for the 90th percentile house by value, instead of the mean regressioons in Tables 3 and 4. The negative effect of the suspension in the investor immigrant program is even stronger for these higher priced units, with prices lower by 4 percent immediately following the suspension. This difference dissipates completely within two years as prices at the 90th percentile in the predicted investor immigrant destination neighborhoods are no longer discounted compared to other census tracts relative to their price difference before the program suspension.

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 slightly larger in absolute values than in the base regression. As in the previous regressions the price decline attenuates with time. The largest effects are in the first three months.

To better address the time path of the effect on prices we use the model as specified by Equation 3 to allow for trend effects. The 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, 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 relative to 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 neighborhoods 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. It does suggest

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 3 exactly as above except for the condominium sample. Table 8 replicates Table 3 just with condominium sales prices. Table 9 replicates the 90th percentile quantile regressions in Table 5. 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. None of the interaction coefficients reported in Tables 8 are distinguishable from zero, and those in Table 9 are inconsistent. This suggests that it was specifically single family houses that were affected by the announcement, not the market in general.

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. China accounts for 23% of all immigrants coming to British Columbia, with over 36% investor immigrants. Other countries 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 6% or less of total immigration. Immigrants form countries other than China represent a small portion of the investor immigrants. China represents 65.6% of all 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 in-

teresting 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. The coefficients on the interaction between post July 2012 and above the median percentage of non-Chinese immigrant Table 10 suggest a positive interaction between non-Chinese immigrant concentration and July, 2012. 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. In Table 11, there is no relationship between non-Chinese immigrants and 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 one percent level. We already employ t-statistics and confidence intervals robust to serial correlation and heteroscedasticity.

8 Conslusion

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 significantly and substantially underperformed the rest of the market following the suspension announcement. This finding is highly robust to model specification and sample selection.

First and foremost, our findings show that immigration substantially impacts local real estate values. This has implications for future immigration policy. for city planning, and for real estate developer and investor decision-making. This is especially important for cities, such as Vancouver, whose local economies cannot possibly support current real estate valuations. In the short run, such cities face affordability issues. In the longer

run, these cities face heightened risk of market volatility.

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

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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10 Figures and Tables

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) 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

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) 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

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months	(6) +/- 36 months
Lot size 000sf	0.093***	0.117***	0.117***	0.122***	0.121***	0.120***
	(12.16)	(10.52)	(13.24)	(17.51)	(24.98)	(26.86)
Lot size squared	-0.005***	-0.006***	-0.005***	-0.006***	-0.006***	-0.006***
	(-8.30)	(-6.86)	(-8.34)	(-11.35)	(-16.13)	(-17.44)
Pool	0.050**	0.060**	0.068***	0.066***	0.044***	0.045***
	(2.52)	(2.56)	(3.60)	(5.07)	(5.13)	(5.56)
Finished area 000sf	0.205***	0.170***	0.170***	0.152***	0.167***	0.179***
	(9.41)	(5.63)	(7.06)	(8.13)	(12.50)	(14.38)
Finished area squared	-0.014***	-0.006	-0.007	-0.004	-0.007***	-0.010***
	(-3.53)	(-1.17)	(-1.61)	(-1.27)	(-3.01)	(-4.44)
Number of bedrooms	-0.012***	-0.016***	-0.015***	-0.016***	-0.019***	-0.020***
	(-5.05)	(-5.49)	(-6.50)	(-8.65)	(-13.57)	(-15.38)
Number of bathrooms (full+half)	-0.007**	-0.010**	-0.008**	-0.002	0.002	0.006***
	(-2.16)	(-2.33)	(-2.19)	(-0.84)	(1.21)	(3.37)
Garage (one or two stalls)	0.037***	0.031***	0.041***	0.044***	0.037***	0.038***
	(7.48)	(4.63)	(7.76)	(10.48)	(12.13)	(13.24)
Age	-0.006***	-0.006***	-0.006***	-0.007***	-0.007***	-0.007***
	(-7.25)	(-6.81)	(-8.75)	(-13.23)	(-17.96)	(-17.21)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(2.66)	(3.07)	(4.38)	(7.69)	(10.26)	(9.01)
Less than 10 years old	0.014	0.011	0.015	0.015*	0.024***	0.023***
	(1.40)	(0.85)	(1.50)	(1.92)	(4.41)	(4.65)
1.postJuly2012	0.010**	0.010	0.002	0.013**	0.080***	0.104***
	(2.00)	(1.24)	(0.34)	(2.32)	(20.79)	(29.83)
1.Chinese	0.026**	-0.015	-0.001	0.004	0.003	-0.012*
	(2.42)	(-1.13)	(-0.06)	(0.46)	(0.38)	(-1.85)
1.postJuly20121.Chinese	-0.022**	-0.024**	-0.030***	-0.025***	-0.017***	0.005
	(-2.39)	(-2.09)	(-3.19)	(-3.48)	(-3.27)	(1.14)
Constant	13.902***	13.931***	13.914***	13.919***	13.845***	13.798***
	(258.38)	(231.64)	(288.73)	(370.50)	(510.47)	(542.40)
Observations	6,328	4,304	6,904	10,592	22,255	27,702
R-squared	0.865	0.842	0.830	0.833	0.813	0.797
Neighborhood effects	Yes	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 neighborhood" captures the marginal change in prices in Chinese neighborhoods on top of the overall change. The table reports estimates for six different event windows: plus/minus 3, 6, 9, 12, 24, and 36 months. The change in overall pricse around the anouncement is generally not significant. However, the marginal change in price for properties located in Chinese neighborhoods, as captured by the interaction term, is strongly significant within 12 months of annoucment. The effect dissipates for longer time frames.

VARIABLES	(1) 50th percentile	(2) 60th percentile	(3) 70th percentile	(4) 80th percentile
Lot size 000sf	0.087***	0.093***	0.093***	0.093***
	(13.51)	(14.19)	(13.18)	(12.79)
Lot size squared	-0.004***	-0.005***	-0.005***	-0.005***
	(-9.09)	(-9.98)	(-9.38)	(-9.21)
Pool	0.048***	0.044***	0.035**	0.042***
	(3.15)	(2.91)	(2.23)	(2.99)
Finished area 000sf	0.203***	0.206***	0.215***	0.215***
	(11.08)	(10.99)	(10.54)	(10.49)
Finished area squared	-0.013***	-0.014***	-0.015***	-0.016***
	(-3.77)	(-3.95)	(-4.03)	(-4.15)
Number of bedrooms	-0.011***	-0.010***	-0.010***	-0.009***
	(-5.28)	(-4.75)	(-4.30)	(-3.61)
Number of bathrooms (full+half)	-0.008***	-0.009***	-0.010***	-0.010***
	(-2.96)	(-3.21)	(-3.34)	(-3.03)
Garage (one or two stalls)	0.040***	0.043***	0.046***	0.049***
	(9.83)	(10.01)	(10.07)	(10.78)
Age	-0.005***	-0.005***	-0.005***	-0.005***
	(-7.80)	(-7.91)	(-7.29)	(-6.71)
Age Squared	0.000**	0.000***	0.000***	0.000**
	(2.29)	(2.74)	(2.59)	(1.96)
Less than 10 years old	0.016**	0.023***	0.029***	0.029***
	(1.98)	(2.78)	(3.42)	(3.32)
1.postJuly2012	0.006	0.007*	0.007*	0.007*
	(1.47)	(1.69)	(1.74)	(1.72)
1.Chinese	0.018**	0.026**	0.044***	0.069***
	(2.04)	(2.36)	(2.75)	(3.82)
1.postJuly20121.Chinese	-0.017**	-0.019**	-0.020**	-0.026**
	(-2.27)	(-2.45)	(-2.01)	(-2.08)
Constant	13.928***	13.897***	13.868***	13.844***
	(326.56)	(316.49)	(297.29)	(279.63)
Observations	9,302	8,553	7,559	6,931
R-squared	0.868	0.873	0.881	0.880
Neighborhood 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 definitons of a Chinese neighborhood using the 50th, 60th, 70th, and 80th concentration percentiles. The cut-off for non-Chinese neighborhood 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 neighborhood" capture the marginal change in prices in Chinese neighborhoods on top of the overall change. Thus, observations between the two percentile cut-offs are excluded fromt he second, third, and forth models. The marginal change of transaction price for properties located in Chinese neighborhoods, 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	(6) +/- 36 months
Lot size 000sf	0.111***	0.109***	0.103***	0.120***	0.098***	0.094***
	(12.27)	(15.55)	(17.11)	(13.92)	(29.07)	(30.85)
Lot size squared	-0.005***	-0.005***	-0.005***	-0.005***	-0.004***	-0.004***
	(-8.13)	(-10.02)	(-10.51)	(-7.91)	(-16.84)	(-17.48)
Pool	0.071***	0.067***	0.068***	0.062***	0.058***	0.063***
	(3.38)	(4.21)	(5.18)	(3.70)	(8.28)	(9.96)
Finished area 000sf	0.156***	0.163***	0.136***	0.125***	0.147***	0.149***
	(6.02)	(8.09)	(7.88)	(4.89)	(15.19)	(16.96)
Finished area squared	-0.006	-0.007**	-0.003	-0.001	-0.005***	-0.006***
	(-1.38)	(-2.08)	(-0.88)	(-0.22)	(-2.83)	(-3.57)
Number of bedrooms	-0.012***	-0.012***	-0.011***	-0.011***	-0.013***	-0.012***
	(-4.12)	(-5.43)	(-6.18)	(-4.65)	(-12.27)	(-13.09)
Number of bathrooms (full+half)	0.004	0.004	0.003	0.004	0.005***	0.007***
	(1.10)	(1.54)	(1.21)	(1.23)	(3.88)	(5.52)
Garage (one or two stalls)	0.021***	0.021***	0.026***	0.027***	0.028***	0.031***
	(3.15)	(4.11)	(5.98)	(4.35)	(11.47)	(13.72)
Age	-0.015***	-0.015***	-0.016***	-0.016***	-0.016***	-0.016***
	(-16.08)	(-21.80)	(-26.43)	(-21.42)	(-50.36)	(-53.81)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(12.40)	(17.77)	(21.30)	(19.31)	(42.01)	(44.76)
Less than 10 years old	0.017	0.014	0.007	0.021*	0.000	-0.001
	(1.30)	(1.44)	(0.83)	(1.94)	(0.10)	(-0.25)
1.postJuly2012	-0.004	-0.005	0.002	0.002	0.047***	0.064***
	(-0.61)	(-1.03)	(0.43)	(0.27)	(18.76)	(28.44)
1.Chinese	0.012	0.011	0.012	-0.017	0.015***	0.006
	(1.05)	(1.30)	(1.56)	(-1.42)	(3.36)	(1.39)
1.postJuly20121.Chinese	-0.028**	-0.026***	-0.016**	-0.016	-0.013***	0.001
	(-2.44)	(-3.02)	(-2.20)	(-1.62)	(-3.41)	(0.36)
Constant	14.226***	14.219***	14.307***	14.252***	14.278***	14.268***
	(254.51)	(327.21)	(386.49)	(284.20)	(677.88)	(739.48)
Observations	6,328	9,302	14,860	10,592	46,291	58,433
Neighborhood effects	Yes	Yes	Yes	Yes	Yes	Yes

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 at the 90th percentile of property values. As in the case of Table 3 , the interaction between post-July and Chinese neighborhood variables is negative and strongly significant for time windows up to +/- 9 months. The effect dissipates for longer time frames.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months	(6) +/- 36 months
Lot size 000sf	0.104***	0.117***	0.117***	0.122***	0.121***	0.120***
	(7.90)	(10.52)	(13.24)	(17.51)	(24.98)	(26.86)
Lot size squared	-0.005***	-0.006***	-0.005***	-0.006***	-0.006***	-0.006***
	(-4.83)	(-6.86)	(-8.34)	(-11.35)	(-16.13)	(-17.44)
Pool	0.061*	0.060**	0.068***	0.066***	0.044***	0.045***
	(1.95)	(2.56)	(3.60)	(5.07)	(5.13)	(5.56)
Finished area 000sf	0.195***	0.170***	0.170***	0.152***	0.167***	0.179***
	(5.38)	(5.63)	(7.06)	(8.13)	(12.50)	(14.38)
Finished area squared	-0.011*	-0.006	-0.007	-0.004	-0.007***	-0.010***
	(-1.75)	(-1.17)	(-1.61)	(-1.27)	(-3.01)	(-4.44)
Number of bedrooms	-0.012***	-0.016***	-0.015***	-0.016***	-0.019***	-0.020***
	(-3.43)	(-5.49)	(-6.50)	(-8.65)	(-13.57)	(-15.38)
Number of bathrooms (full+half)	-0.013***	-0.010**	-0.008**	-0.002	0.002	0.006***
	(-2.58)	(-2.33)	(-2.19)	(-0.84)	(1.21)	(3.37)
Garage (one or two stalls)	0.025***	0.031***	0.041***	0.044***	0.037***	0.038***
	(3.12)	(4.63)	(7.76)	(10.48)	(12.13)	(13.24)
Age	-0.007***	-0.006***	-0.006***	-0.007***	-0.007***	-0.007***
	(-6.30)	(-6.81)	(-8.75)	(-13.23)	(-17.96)	(-17.21)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(3.28)	(3.07)	(4.38)	(7.69)	(10.26)	(9.01)
Less than 10 years old	-0.001	0.011	0.015	0.015*	0.024***	0.023***
	(-0.09)	(0.85)	(1.50)	(1.92)	(4.41)	(4.65)
1.postJuly2012	0.021**	0.010	0.002	0.013**	0.080***	0.104***
	(2.08)	(1.24)	(0.34)	(2.32)	(20.79)	(29.83)
1.Chinese	-0.016	-0.015	-0.001	0.004	0.003	-0.012*
	(-0.95)	(-1.13)	(-0.06)	(0.46)	(0.38)	(-1.85)
1.postJuly20121.Chinese	-0.034**	-0.024**	-0.030***	-0.025***	-0.017***	0.005
	(-2.32)	(-2.09)	(-3.19)	(-3.48)	(-3.27)	(1.14)
Constant	13.945***	13.931***	13.914***	13.919***	13.845***	13.798***
	(189.46)	(231.64)	(288.73)	(370.50)	(510.47)	(542.40)
Observations	2,928	4,304	6,904	10,592	22,255	27,702
R-squared	0.836	0.842	0.830	0.833	0.813	0.797
Neighborhood effects	Yes	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 neighborhood variables is negative and strongly significant for time windows up to +/- 24 months. The effect dissipates for longer time frames.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months
Lot size 000sf	0.093***	0.087***	0.088***	0.096***
	(12.18)	(13.66)	(17.08)	(22.50)
Lot size squared	-0.005***	-0.004***	-0.004***	-0.005***
	(-8.29)	(-9.21)	(-11.10)	(-15.02)
Pool	0.048**	0.048***	0.057***	0.058***
	(2.43)	(3.16)	(5.06)	(7.01)
Finished area 000sf	0.207***	0.205***	0.188***	0.171***
	(9.49)	(11.24)	(12.87)	(14.61)
Finished area squared	-0.015***	-0.013***	-0.010***	-0.008***
	(-3.63)	(-3.93)	(-3.81)	(-3.68)
Number of bedrooms	-0.012***	-0.011***	-0.011***	-0.012***
	(-5.07)	(-5.33)	(-6.73)	(-9.16)
Number of bathrooms (full+half)	-0.007**	-0.008***	-0.005**	0.001
	(-2.07)	(-2.83)	(-2.27)	(0.49)
Garage (one or two stalls)	0.037***	0.040***	0.047***	0.045***
	(7.50)	(9.83)	(14.54)	(17.67)
Age	-0.006***	-0.005***	-0.006***	-0.007***
	(-7.24)	(-7.93)	(-12.12)	(-17.46)
Age Squared	0.000***	0.000**	0.000***	0.000***
	(2.65)	(2.41)	(5.19)	(8.81)
Less than 10 years old	0.014	0.016**	0.012*	0.010*
	(1.44)	(2.00)	(1.82)	(1.95)
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	0.001*	0.001*	0.001*	0.000
	(1.95)	(1.84)	(1.96)	(0.62)
t_postJuly2012_Chinese	-0.016**	-0.008***	-0.005***	-0.001*
	(-2.25)	(-2.74)	(-3.30)	(-1.65)
Constant	13.815***	13.849***	13.928***	13.942***
	(230.20)	(309.82)	(418.54)	(523.89)
Observations	6,328	9,302	14,860	22,173
R-squared	0.865	0.869	0.866	0.868
Neighborhood 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 variable "t" capture the baseline trend in prices before the annoucement event. The coefficient estimate for "t.postJuly2012" captures the marginal change in baseline trend after the annoucement event. The coefficient estimate for variable "t.Chinese" captures the marginal trend, in addition to the base trend, for Chinese neighborhoods before the annoucement. Finally, the coefficeint estimate for the interaction term "t.postJuly2012 and Chinese" captures the marginal post-announcement trend for Chinese neighborhoods. All estimates are reported for four separate time windows: plus/minus 3, 6, 9, and 12 months. The marginal trend for Chinese neighborhoods post annoucement is negative and significant for all event windows considered.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months	(6) +/- 36 months
Finished area 000sf	1.388***	1.453***	1.398***	1.404***	1.365***	1.391***
	(23.76)	(23.93)	(27.62)	(32.43)	(41.70)	(43.36)
Finished area squared	-0.174***	-0.195***	-0.184***	-0.182***	-0.162***	-0.176***
	(-8.98)	(-9.23)	(-10.21)	(-11.57)	(-13.47)	(-15.06)
Number of bedrooms	-0.003	-0.006	0.002	-0.002	-0.007**	-0.007***
	(-0.34)	(-0.84)	(0.30)	(-0.53)	(-2.15)	(-2.78)
Number of bathrooms (full+half)	0.025***	0.020***	0.018***	0.013***	0.004	0.004*
	(3.16)	(2.88)	(3.60)	(3.19)	(1.45)	(1.78)
Age	-0.030***	-0.029***	-0.028***	-0.029***	-0.028***	-0.026***
	(-17.41)	(-21.87)	(-29.65)	(-34.49)	(-52.75)	(-58.58)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(9.15)	(11.48)	(15.23)	(17.83)	(27.06)	(29.62)
Less than 10 years old	-0.055***	-0.040***	-0.035***	-0.034***	-0.028***	-0.008*
	(-3.32)	(-3.06)	(-3.54)	(-4.16)	(-5.07)	(-1.65)
1.postJuly2012	-0.022***	-0.028***	-0.010*	-0.012***	0.004	0.022***
	(-2.66)	(-4.18)	(-1.86)	(-2.69)	(1.38)	(7.94)
1.Chinese	0.003	0.011	0.013**	0.011**	0.008**	0.003
	(0.31)	(1.41)	(2.09)	(1.99)	(2.06)	(0.91)
1.postJuly20121.Chinese	0.010	0.006	-0.006	0.007	0.023***	0.039***
	(0.85)	(0.70)	(-0.87)	(1.24)	(5.78)	(11.03)
Constant	12.557***	12.515***	12.465***	12.460***	12.481***	12.424***
	(213.39)	(224.46)	(260.77)	(306.39)	(444.17)	(481.60)
Observations	3,506	5,387	8,903	12,678	26,386	37,222
R-squared	0.930	0.926	0.922	0.919	0.914	0.908
Neighborhood effects	Yes	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. Condomenium units are typically less desirable for Chinese immigrants, especially the ones with sufficient wealth to qualify for the investment immigrant program. As such, the Condomenium sample serves as a falsification test. As expected, the marginal change in post-July, 2012 prices in Chinese neighborhoods is indistinguishable from zero.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months	(6) +/- 36 months
Finished area 000sf	1.559***	1.490***	1.484***	1.517***	1.495***	1.453***
	(16.42)	(19.86)	(22.81)	(30.50)	(41.02)	(51.75)
Finished area squared	-0.195***	-0.175***	-0.168***	-0.171***	-0.166***	-0.156***
	(-6.41)	(-7.39)	(-8.02)	(-10.65)	(-13.68)	(-16.94)
Number of bedrooms	-0.014	-0.000	-0.009	-0.015**	-0.023***	-0.024***
	(-0.96)	(-0.00)	(-0.99)	(-2.06)	(-4.73)	(-6.02)
Number of bathrooms (full+half)	0.040***	0.026***	0.025***	0.009	0.001	0.002
	(3.18)	(2.60)	(2.98)	(1.51)	(0.15)	(0.47)
Age	-0.029***	-0.029***	-0.031***	-0.032***	-0.033***	-0.032***
	(-10.10)	(-12.51)	(-16.90)	(-22.67)	(-36.38)	(-42.44)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(6.52)	(7.78)	(11.08)	(15.34)	(24.12)	(28.26)
Less than 10 years old	-0.049*	-0.044*	-0.049***	-0.043***	-0.040***	-0.028***
	(-1.69)	(-1.87)	(-2.60)	(-3.00)	(-4.22)	(-3.66)
1.postJuly2012	-0.034**	-0.040***	-0.003	-0.013	0.006	0.024***
	(-1.98)	(-2.97)	(-0.25)	(-1.58)	(1.06)	(4.92)
1.Chinese	0.000	0.012	0.010	0.004	0.006	0.004
	(0.01)	(0.83)	(0.78)	(0.37)	(0.90)	(0.66)
1.postJuly20121.Chinese	0.022	0.025	-0.008	0.018*	0.032***	0.042***
	(1.02)	(1.48)	(-0.59)	(1.70)	(4.28)	(6.80)
Constant	12.508***	12.548***	12.578***	12.601***	12.578***	12.540***
	(103.66)	(127.43)	(153.55)	(199.71)	(282.48)	(337.83)
Observations	3,506	5,387	8,903	12,678	26,386	37,222
Neighborhood effects	Yes	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 condomenium 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 neighborhood 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	(6) +/- 36 months
Lot size 000sf	0.092***	0.117***	0.117***	0.121***	0.121***	0.120***
	(12.10)	(10.48)	(13.21)	(17.45)	(24.94)	(26.84)
Lot size squared	-0.005***	-0.006***	-0.005***	-0.006***	-0.006***	-0.006***
	(-8.25)	(-6.83)	(-8.32)	(-11.31)	(-16.10)	(-17.43)
Pool	0.049**	0.060**	0.068***	0.066***	0.043***	0.045***
	(2.45)	(2.57)	(3.61)	(5.09)	(5.08)	(5.58)
Finished area 000sf	0.200***	0.170***	0.169***	0.152***	0.167***	0.180***
	(9.15)	(5.60)	(7.02)	(8.10)	(12.52)	(14.42)
Finished area squared	-0.013***	-0.006	-0.007	-0.004	-0.007***	-0.010***
	(-3.32)	(-1.15)	(-1.58)	(-1.26)	(-3.03)	(-4.48)
Number of bedrooms	-0.012***	-0.016***	-0.015***	-0.016***	-0.019***	-0.020***
	(-5.02)	(-5.45)	(-6.48)	(-8.62)	(-13.53)	(-15.41)
Number of bathrooms (full+half)	-0.007**	-0.010**	-0.008**	-0.002	0.002	0.006***
	(-2.01)	(-2.39)	(-2.20)	(-0.85)	(1.20)	(3.37)
Garage (one or two stalls)	0.037***	0.032***	0.041***	0.044***	0.037***	0.038***
	(7.57)	(4.75)	(7.85)	(10.51)	(12.18)	(13.25)
Age	-0.006***	-0.006***	-0.006***	-0.007***	-0.007***	-0.007***
	(-7.06)	(-6.75)	(-8.64)	(-13.18)	(-17.94)	(-17.21)
Age Squared	0.000**	0.000***	0.000***	0.000***	0.000***	0.000***
	(2.51)	(3.00)	(4.27)	(7.63)	(10.23)	(9.02)
Less than 10 years old	0.015	0.012	0.016	0.015*	0.024***	0.023***
	(1.53)	(0.94)	(1.56)	(1.95)	(4.45)	(4.72)
1.postJuly2012	-0.006	-0.009	-0.022***	-0.007	0.065***	0.105***
	(-0.98)	(-1.14)	(-3.53)	(-1.60)	(20.00)	(35.16)
1.Other	-0.024***	-0.003	-0.006	-0.007	-0.008	0.001
	(-2.98)	(-0.29)	(-0.77)	(-1.03)	(-1.54)	(0.17)
1.postJuly20121.Other	0.019**	0.014	0.019**	0.015**	0.015***	0.007
	(2.20)	(1.27)	(2.04)	(2.06)	(2.91)	(1.53)
Constant	13.937***	13.914***	13.909***	13.920***	13.847***	13.786***
	(263.78)	(236.18)	(295.24)	(379.20)	(527.88)	(561.40)
Observations	6,328	4,304	6,904	10,592	22,255	27,702
R-squared	0.865	0.842	0.830	0.832	0.813	0.797
Neighborhood effects	Yes	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 neighborhood" captures the marginal change in prices in non-Chinese immigrant neighborhoods on top of the overall change. The table reports estimates for four different event windows: plus/minus 3, 6, 9, and 12 months. The change in overall pricse around the anouncement is generally not significant. However, the marginal change in price for properties located in non-Chinese immigrant neighborhoods, as captured by the interaction term, is actually positive regardless of the specific event window. In other words, high non-Chinese immigrant concentration neighborhoods did not decline around the time of the investor program suspension.

VARIABLES	(1) +/- 3 months	(2) +/- 6 months	(3) +/- 9 months	(4) +/- 12 months	(5) +/- 24 months	(6) +/- 36 months
Lot size 000sf	0.112***	0.109***	0.102***	0.120***	0.098***	0.094***
	(12.62)	(14.88)	(17.65)	(14.28)	(29.89)	(30.52)
Lot size squared	-0.005***	-0.005***	-0.005***	-0.005***	-0.004***	-0.004***
	(-8.43)	(-9.65)	(-10.90)	(-7.99)	(-17.46)	(-17.25)
Pool	0.066***	0.064***	0.067***	0.054***	0.057***	0.062***
	(3.25)	(3.89)	(5.28)	(3.27)	(8.25)	(9.74)
Finished area 000sf	0.152***	0.153***	0.136***	0.114***	0.143***	0.149***
	(6.03)	(7.30)	(8.17)	(4.57)	(15.07)	(16.80)
Finished area squared	-0.006	-0.006	-0.003	0.001	-0.004**	-0.005***
	(-1.26)	(-1.52)	(-0.95)	(0.13)	(-2.42)	(-3.48)
Number of bedrooms	-0.011***	-0.011***	-0.011***	-0.011***	-0.012***	-0.012***
	(-3.84)	(-4.95)	(-5.96)	(-4.41)	(-12.09)	(-12.45)
Number of bathrooms (full+half)	0.004	0.004	0.003	0.005	0.005***	0.007***
	(1.08)	(1.35)	(1.44)	(1.50)	(3.76)	(5.36)
Garage (one or two stalls)	0.021***	0.021***	0.028***	0.026***	0.028***	0.030***
	(3.26)	(4.03)	(6.52)	(4.29)	(11.63)	(13.37)
Age	-0.015***	-0.015***	-0.015***	-0.016***	-0.016***	-0.016***
	(-16.58)	(-20.70)	(-26.79)	(-21.86)	(-51.88)	(-53.50)
Age Squared	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(12.92)	(16.88)	(21.57)	(19.65)	(43.53)	(44.56)
Less than 10 years old	0.017	0.015	0.009	0.018*	-0.000	-0.000
	(1.37)	(1.50)	(1.10)	(1.71)	(-0.10)	(-0.05)
1.postJuly2012	-0.005	-0.012**	-0.006	-0.011*	0.038***	0.060***
	(-0.72)	(-2.05)	(-1.38)	(-1.88)	(16.01)	(26.89)
1.Other	-0.022**	-0.025***	-0.024***	-0.010	-0.022***	-0.022***
	(-2.32)	(-3.19)	(-3.85)	(-1.07)	(-6.05)	(-6.53)
1.postJuly20121.Other	-0.012	-0.006	0.004	0.007	0.010***	0.010***
	(-1.10)	(-0.70)	(0.52)	(0.74)	(2.69)	(2.72)
Constant	14.259***	14.260***	14.313***	14.243***	14.307***	14.288***
	(266.79)	(321.76)	(409.28)	(297.92)	(708.55)	(752.61)
Observations	6,328	9,302	14,860	10,592	46,291	58,433
Neighborhood effects	Yes	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 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 neighborhood variables is not significant or is positive for all event windows considered.