

Real Estate Transaction Taxes on Foreign Buyers in Greater Vancouver
and Toronto and Their Effect on the Housing Market

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Abstract

This paper uses housing price and transaction data to examine the effects of the Foreign Buyers Tax and Non-Resident Speculation Tax on the affected housing markets. These taxes were found to impact both housing prices and the number of transactions in the regions they applied. The Foreign Buyers Tax was found to initially decrease the monthly percentage change in housing prices by 1.73 percentage points, and later by 1.43 percentage points. This later effect is estimated when the scope of the tax was expanded, and the rate increased. The Non-Resident Speculation Tax was found to decrease the monthly percentage change in housing prices by 3.94 percentage points. The number of monthly transactions was also impacted by the taxes. The Foreign Buyers Tax decreased monthly transactions by 24 percent, and later by 30 percent. The equivalent effect was estimated at 38 percent for the Non-Resident Speculation Tax. These estimates should be interpreted as the short-run impact of the taxes within the year the tax was imposed.

Keywords: Real estate transfer tax, foreign buyers, Vancouver, Toronto, Foreign Buyers Tax, Non-Resident Speculation Tax

1. Introduction

Over the past decade, Vancouver and Toronto have proven themselves to be Canada's most expensive and fastest appreciating housing markets. A 2018 Canada Mortgage and Housing Corporation (CMHC) report found that over the 2010-2016 period, housing prices had increased by 48 percent in Vancouver and 40 percent in Toronto. Conventional determinants of housing demand, namely higher disposable incomes, positive population growth, and low mortgage rates were estimated to be responsible for 75 percent of this price increase in Vancouver, and 40 percent in Toronto. Additionally, 52 percent of buyers who purchased homes in those cities indicated that they believed foreign buyers were contributing towards increasing the price of homes.

As housing prices continued to increase, both Vancouver and Toronto introduced new real estate transfer taxes that targeted foreign buyers. These taxes are known as the Foreign Buyers Tax (FBT) and Non-Resident Speculation Tax (NRST) respectively. The FBT was made public on July 25th, 2016 and came into effect only three business days later on August 2nd. The tax rate was initially 15 percent (henceforth FBT 1) and it applied to the sale price of any home sold within the Great Vancouver Area, herein referred to as Vancouver. This rate was later increased to its current 20 percent rate (FBT 2) on February 21st, 2018, and the scope of the tax was expanded to include additional regions in close proximity.¹ Similarly, the NRST was introduced to the public on April 20th, 2017 and came into effect the following day. The tax rate is 15 percent which applies to the sale price of any home sold within the Greater Golden Horseshoe Area, which includes the Greater Toronto Area and surrounding cities. The use of Toronto herein refers to the Greater Toronto Area. For both the FBT and NRST, a foreign individual is classified as anyone who is not a Canadian citizen or permanent resident.

The research conducted here estimates the short-run effect of these taxes on the affected housing markets. This effect will depend on the level of foreign activity in these housing markets and the price elasticity of demand of these buyers, though not exclusively. If the increase in housing prices in these markets was being driven mainly by domestic buyers, then one might expect the taxes to have little effect on housing prices and the number of transactions. The analysis on overall housing

¹ These additional regions, all located in British Columbia, are: Central Okanagan, Fraser Valley, Vancouver Island, and Victoria.

prices is further complimented by a breakdown of which housing types are affected most, and whether the quantity of houses sold is impacted.

Data on housing prices and the quantity of houses sold is provided by the Canadian Real Estate Association (CREA). Housing price data is provided in the form of a composite measure incorporating all residential housing types, and prices for five different housing types.² On the other hand, data on the number of houses sold is provided only as an aggregate measure including all housing types. The sample of data used in estimation is monthly in frequency and spans the period January 2009 to December 2019. Additional control variables of population and the unemployment rate are provided by Statistics Canada.

To estimate the effect of the FBT and NRST on housing prices and the number of transactions, a difference-in-differences model is specified. Vancouver, Toronto and the additional Census Metropolitan Areas (CMAs) in British Columbia and Ontario in which the tax applies are designated as treatment regions, while eight other CMAs serve as control regions in the estimation procedure. All CMAs are defined by Statistics Canada and are analogous to major cities. Both CMA-year and month-year fixed effects are incorporated into the model to deal with pre-trends in the data.

The results of the analysis indicate that both taxes negatively impacted home prices and the number of transactions. The impact of the taxes on composite housing prices describes how overall housing prices were affected. In Vancouver, both FBT 1 and FBT 2 negatively effected composite prices. These taxes were found to decrease the monthly percentage change in housing prices, on average, by 1.73 and 1.43 percentage points respectively. The effect of the NRST on housing prices in Toronto was more substantial. The tax decreased the monthly percentage change in housing prices by 3.94 percentage points, on average. Because the estimation strategy relies on deviations from CMA-year-specific trends, these estimates should be interpreted as the short-run impact of each tax within the year of its introduction.

The effect of these taxes on housing prices also differed by housing type. Prices of one-storey homes and apartments appear to be affected most. The results indicate that FBT 1 and the NRST decreased the monthly percentage change in prices of one-storey homes, on average, by 2.79 and

² These housing types, defined by CREA, are single family, one-storey, two-storey, townhouse, and apartment.

4.24 percentage points respectively. Interestingly, the prices of apartments in Vancouver were affected most by FBT 2. This category of housing includes condominiums. The tax was found to decrease the monthly percentage change in prices of this housing type by 3.64, on average. Prices of apartments were also least impacted by FBT 1 and the NRST, indicating a potential strong demand for this housing type even when transactions involving international buyers are taxed at a 15 percent rate.

Most striking was the impact of the FBT and NRST on housing market activity. Both taxes had a significant negative impact on the number of houses sold. In Vancouver, both FBT 1 and FBT 2 negatively impacted the number of transactions. These taxes lowered monthly transactions, on average, by 24 and 30 percent. The effect of the NRST on the number of home sales was larger in Toronto and the other nearby CMAs treated by this tax. The tax was found to lower monthly transactions by 38 percent, on average. These estimates indicate that a potentially large share of real estate transactions in these CMAs involved international buyers, who were subsequently dissuaded from purchases of real estate by these taxes.

The research conducted here belongs to the small body of literature that studies real estate transfer taxes targeting foreign buyers. Chao and Yu (2015) made an important contribution to this field in their work. These authors take a theoretical approach to determine the optimal transfer tax policy against foreign buyers to stabilize housing prices. Their analysis finds that the first-best policy for an open economy with foreign buyers is to impose a transfer tax on these buyers, and use the revenue generated to subsidize middle- and lower-income purchasers of real estate. A lack of empirical research on this specific type of real estate transfer tax means that their causal impact on the housing market is not well understood. The results here contribute to the literature by quantitatively demonstrating the causal impact of a real estate transfer tax targeting foreign buyers on housing prices and housing market activity in the areas the tax applies.

A closely related body of literature researches real estate transactions taxes that apply to all sales of real estate, regardless if international buyers are involved (Best and Kleven, 2018; Dachis et al., 2012; and Fritzsche and Vandrei, 2019).³ The results of this literature are intuitive in their nature: real estate transaction taxes are known to decrease both housing prices and the number of

³ These transaction taxes exist in Canada at the provincial and municipal levels, but all were in place before the sample period. No changes were made to these transaction taxes over the sample period.

transactions in the market. In the Canadian context, Dachis et al. (2012) estimate that the municipality of Toronto's 1.1 percent transfer tax decreased the number of transactions and housing prices by 15 percent.⁴ The results presented here expand on this knowledge by quantitatively assessing the impact of a transfer tax targeted towards a specific set of purchasers in the market.

2. Background

The phenomenon of rapidly appreciating housing prices is not one that is unique to Vancouver and Toronto. Throughout the world, there are cities that have experienced similar trends since the turn of the 21st century. Examples of these cities include Auckland, Beijing, Hong Kong, Melbourne, Shanghai, Singapore, and Sydney. In Hong Kong the increase in housing prices has been especially sharp, increasing by 76 percent over the 2008 to 2013 period. The openness of capital markets, which helps lower the transaction costs of real estate purchases for international buyers in particular, is often blamed as a contributing factor to this price increase (Chao and Yu, 2015).

Price increases of the magnitude seen in these cities are likely the result of a combination of factors coming together at once. This can include both traditional factors that increase housing prices, and others that are harder to quantify. Traditional factors that tend to increase housing prices are generally agreed to be growth of income, population, employment, inflation, housing construction costs and low mortgage rates (Algieri 2013; Borowiecki, 2009; Potepan, 1996; and Reichert, 1990). Factors that are harder to quantify include the level of foreign activity, bank lending practices, and changes in investment patterns away from capital markets and towards real estate.

In Auckland, Hong Kong, Melbourne, Singapore, and Sydney, it appears that policy makers were concerned with the level of foreign activity in the housing market. All these cities have rules that directly or indirectly restrict international buyers' level of activity in the market. These rules are often imposed at the national level. Due to the price increases in Melbourne and Sydney, Australia banned foreign buyers from purchasing existing houses and only allows the purchase of newly constructed housing. Similarly, New Zealand banned all purchases of real estate by international

⁴ The municipality, or city of Toronto, is one of the five cities that make up the Greater Toronto Area. These five cities are Durham, Halton, Peel, Toronto, and York.

buyers after housing prices had spiraled out of control in Auckland. In both cases, there are some exceptions to these rules.⁵

Rather than banning foreign purchases of real estate altogether, Hong Kong and Singapore decided to take an indirect approach and tax these purchases. These taxes were imposed in 2012 and 2011 respectively, and both applied to the sale price of the home. In Hong Kong the rate of the tax has remained steady at 15 percent. In Singapore, the tax rate began at 10 percent and has gradually been increased to its current 20 percent rate. These taxes have likely dissuaded some portion of international buyers from purchasing real estate in these two markets. Perhaps also fearing that foreign buyers were contributing towards driving up housing prices, policy makers in Vancouver and Toronto also implemented real estate transaction taxes on foreign buyers.

While little historical data is available on purchases of real estate by international buyers, a good portion of data is available on the current stock of Canadian real estate owned by this group. In a 2017 report by Statistics Canada, the average values and types of homes owned by foreign individuals in Canada is examined. The report indicates that of the total share of residential properties in Vancouver and Toronto Census Metropolitan Areas (CMAs), non-residents own 4.8 and 3.4 percent of these properties respectively. These statistics are also broken down by four different housing types.⁶ The data indicate that most non-residents are purchasing condominium apartments, and these condominiums tend to be higher in value than resident owned condominiums. Of all the condominiums in Vancouver and Toronto, 7.9 and 7.2 percent of these units are owned by foreign individuals. Viewed from another perspective, the data indicate that of all foreign owned properties in Vancouver and Toronto, 53 and 44 percent of these are condominiums. The average value of these units owned by non-residents is \$161,200 and \$33,800 higher than resident owned units respectively.

The greatest difference in house values between non-residents and residents of Canada exists for single-detached homes. While the difference is modest in Toronto, in Vancouver it is quite large. The average value of a single-detached home owned by a non-resident is \$707,800 and \$103,500 higher in Vancouver and Toronto, than the average value of homes of the same type owned by

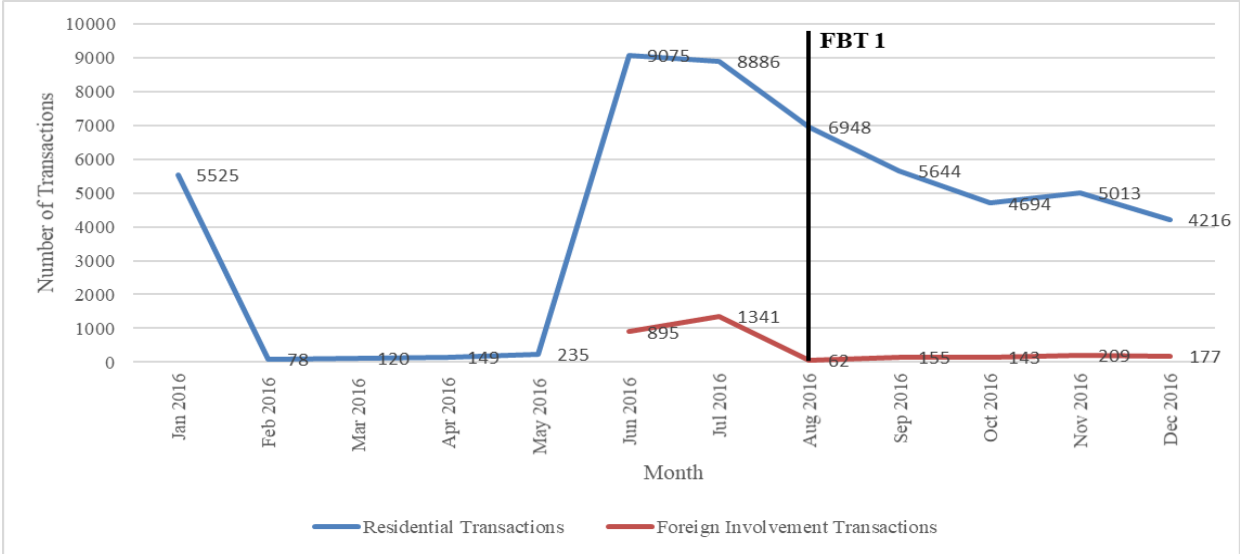
⁵ In Australia for example, non-residents can purchase an existing home if they redevelop it in a way that increases the stock of housing.

⁶ The four housing types considered in the report are condominium apartments, row houses, semi-detached, and single-detached.

Canadian residents. Based on this level of foreign activity in the Canadian housing market, it appears plausible that a foreign buyer’s tax could reduce prices.

Complete historical data on purchases of Canadian real estate involving foreign buyers is not publicly available. Only around the time of imposing the FBT and NRST, did Vancouver and Toronto begin collecting this data. The data that is publicly available describes the total number of real estate transactions involving international buyers on a monthly basis, by municipality. Figure 1 displays these transactions for the year 2016. This data is limited in its usefulness in empirically estimating the impact of the FBT and NRST on the housing market, since there are only one or two observations that precede the dates the taxes were imposed.

Figure 1. Number of Transactions Involving Foreign Buyers in Vancouver in 2016



Source: Government of British Columbia

3. Data

The data in the estimation was provided by the Canadian Real Estate Association (CREA). It describes benchmark housing prices and the number of homes sold on a monthly basis. Both measures are generated from sales of homes that occur through Canada’s Multiple Listing Service (MLS) platform, which is used to facilitate most home sales in Canada. All realtors in Canada that are associated with real estate boards sanctioned by CREA, list their client’s homes using the MLS

platform. It is generally accepted that 80 to 90 percent of all homes in Canada are listed and sold through the MLS platform. As a result, the data on housing prices and the number of transactions captures the vast majority of housing market activity in the respective Census Metropolitan Area (CMA), which are the regions being compared in the estimation.

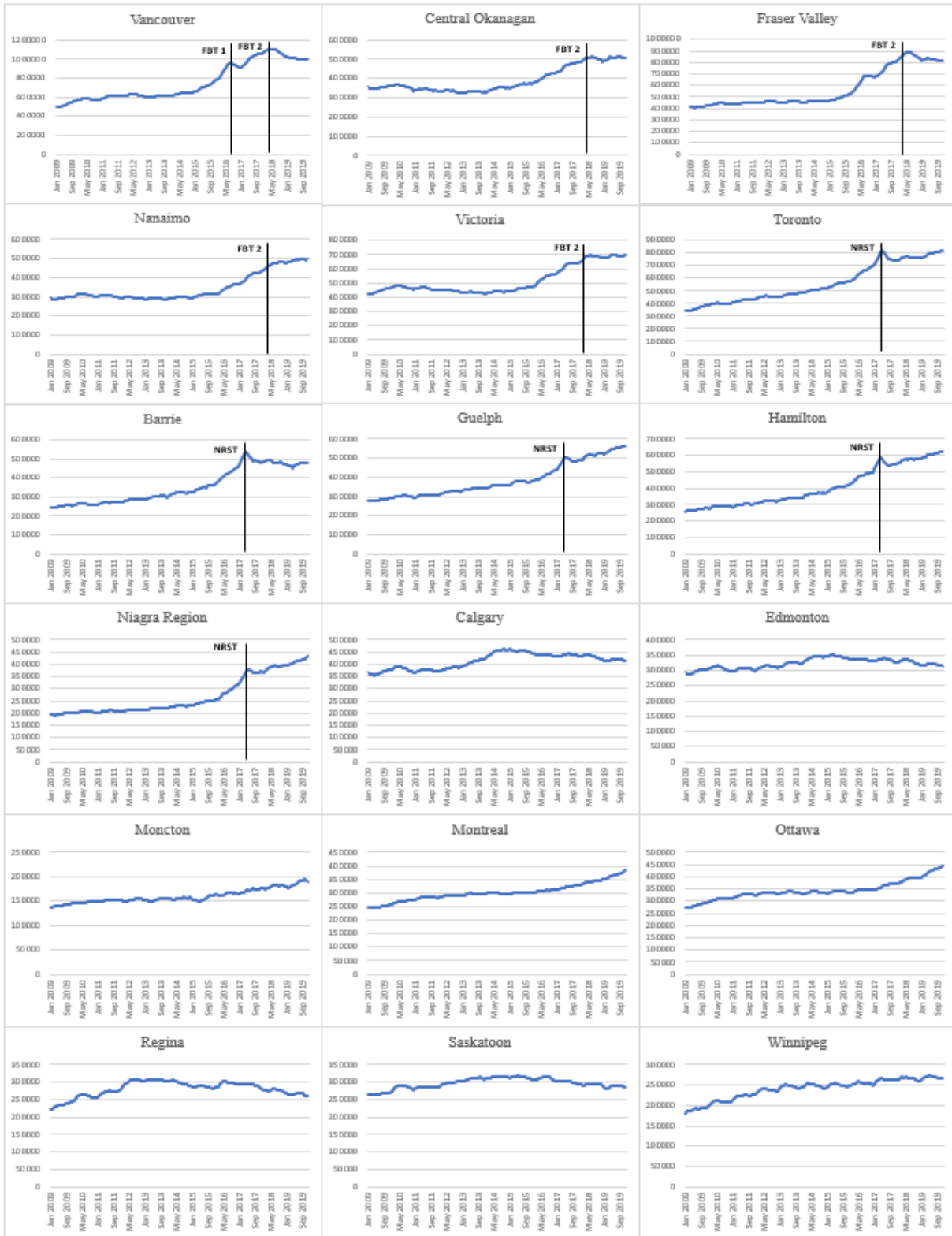
Benchmark housing price data is available for twenty different major Canadian housing markets over the January 2005 to December 2019 period.⁷ This data is assigned to the appropriate CMA. These are straight forward linkages. For example, benchmark housing price data for the Greater Toronto housing market is assumed to represent housing prices in the Toronto CMA. In certain cases, slight differences exist between housing market boundaries assigned by CREA and the CMA which the data is linked to. These differences are assumed to be insignificant as they exist at the outer limit of the CMA where very little housing market activity is expected to occur, as a share of the whole CMA. The Lower Mainland housing market is dropped from the dataset, since it is a large area encompassing many CMAs. The Oakville housing market is also dropped, since it is a subregion of the Halton municipality within the Toronto CMA.⁸ Price data for the remaining eighteen housing markets is taken as representative of the associated CMA. These timeseries are displayed in Figure 2. Three of the four regions where the Foreign Buyers Tax (FBT) was expanded to on February 21st, 2018 are not officially designated as CMAs. These are the regional districts of Central Okanagan, Fraser Valley, and Vancouver Island. Given that their population and land mass are similar to the average CMA, these regional districts are treated as CMAs for the purposes of estimation.

Benchmark prices differ slightly from monthly average housing prices for each Census Metropolitan Area (CMA). Benchmark housing price data is meant to provide a more reliable measure of month-to-month changes in housing prices versus average measures, which can be overly volatile because of changes in the composition of houses sold. The benchmark price describes the price of a typical home for a given CMA and excludes commercial properties. A composite benchmark price is provided in the data, and a price for five different housing types

⁷ These twenty housing markets are: Vancouver Island, Victoria, Lower Mainland, Greater Vancouver, Fraser Valley, Okanagan Valley, Calgary, Edmonton, Regina, Saskatoon, Winnipeg, Guelph, Hamilton, Oakville, Barrie, Greater Toronto, Niagra Region, Ottawa, Greater Montreal, and Greater Moncton.

⁸ The appropriate data was not available to merge the housing prices of Oakville into prices of the Toronto CMA.

Figure 2. Benchmark Housing Prices in Control and Treatment Census Metropolitan



Source: Canadian Real Estate Association (CREA)

including: single family, one-storey, two-storey, townhouse, and apartments. A complete description of the calculation of this variable is given in CREA (2019).

The other dependant variable used in the estimation is the number of homes sold. All residential home sales conducted through MLS are recorded in this variable, regardless of the housing type. CREA provides this data by real estate board on a monthly basis dating back to January 1980. In certain cases, unit sales of two or more real estate boards were merged to represent sales of the corresponding CMA. For example, sales of the Niagara Falls and St. Catharines real estate boards were merged to form the sales of the St. Catharines – Niagara CMA.

A sample period of January 2009 to December 2019 was selected for estimation. This sample period was selected due to the imposition of a new real estate transaction tax in the municipality of Toronto in early 2008, which lies within the Greater Toronto Area. This transaction tax is known formally as the Land Transfer Tax (LTT) and it applies to all real estate transactions that close after February 1st, 2008. The rate of the tax increases from 0.5 to 2 percent depending on the value of the home. Since housing price data and unit sales is not available for the remaining municipalities that make up the Toronto CMA, this tax could not be controlled for.

The control variables used in the estimation procedure are population and the unemployment rate. These are factors that are thought to contribute towards housing price increases. This data is provided by Statistics Canada for all CMAs. Population is taken as total population aged 15 and over and this data is available at a monthly frequency for all CMAs. Similarly, the unemployment rate is available at a monthly frequency and is taken as the rate for all those aged 15 and over. While income is another factor that could potentially impact prices and number of houses sold, this data is only available at an annual frequency. Variation in this variable will be accounted for by CMA-year fixed effects.

4. Empirical Strategy

Over the sample period there was a clear difference in trends in benchmark housing prices and the number of transactions between Census Metropolitan Areas (CMAs). Moncton and Winnipeg exhibited stable growth in prices, while Vancouver, Toronto and their surrounding areas had significant accelerations in increases of home prices leading up to the imposition of the Foreign

Buyers Tax (FBT) and Non-Resident Speculation Tax (NRST). Differences in trends in the number of transactions among CMAs were less pronounced, although it was clear that Vancouver and Toronto experienced similar increases in the number of transactions leading up to the imposition of the taxes.

To deal with this issue, a difference-in-differences model was selected that includes both CMA-year and month-year fixed effects. These fixed effects deal with the pre-trends in the data by allowing treated housing markets to have especially high growth in prices, or especially large jumps in unit sales leading up to treatment. To estimate the effect of interest, only within year comparisons are made around the time of treatment. In this framework, only variables whose timing and location across CMAs are correlated with treatment, within the year of the imposition of the tax, could pose a threat to the results.

This model can be represented as,

$$BHP_{i,m,y} = \alpha + \beta FBT1_{i,m,y} + \delta FBT2_{i,m,y} + \gamma NRST_{i,m,y} + \theta_{i,y} + \rho_{m,y} + \mu_{i,m,y}$$

In the regressions with house prices, $BHP_{i,m,y}$ is the monthly percentage change in the benchmark housing price for CMA i in month m and year y . This specification is run for the six housing types, including the composite measure. In the regressions with quantities sold, the dependant variable is instead the level of sales (in logs). With the percentage change in housing prices as the dependant variable, identification is based on the fact that there should be an unusual trend break in a given CMAs month-to-month growth rate, within the year treatment is imposed. Identification when the dependant variable is the level of sales is instead based on treatment causing an unusual jump in the level of sales within the same year.

The following variables, $FBT1_{i,m,y}$, $FBT2_{i,m,y}$, and $NRST_{i,m,y}$ are treatment dummies for each of the taxes. For the FBT dummies, $FBT1_{i,m,y}$ represents treatment when the rate was set at 15 percent and the tax only targeted the Vancouver CMA. The second dummy for the tax, $FBT2_{i,m,y}$, represents treatment when the rate was increased to 20 percent and the scope expanded to include the additional regions in British Columbia.⁹ CMA-year and month-year fixed effects are then added to the equation to control for pre-trends and omitted variables. More specifically, CMA-

⁹ FBT 1 is then set to zero in Vancouver starting in the month that FBT 2 is imposed.

year fixed effects control for differences in local year-to-year trends, while month-year fixed effects control for omitted variables that are common across CMAs. The CMA-year fixed effects are denoted by $\theta_{i,y}$ and the month-year fixed effects by $\rho_{m,y}$. The remaining variables are a constant α , and the error term $\mu_{i,m,y}$.

Robust standard errors are relied upon to judge the significance of the estimated coefficients. A number of alternatives were examined, none of which appeared to be reliable. These alternatives being robust standard errors clustered at the CMA level, wild bootstrap, and wild clustered bootstrap. While robust standard errors clustered at the CMA level may seem like an appropriate choice, recent research has found inference based on this procedure to be unreliable when the number of clusters is small and large sample assumptions do not hold (Roodman et al., 2018). The result being that the standard errors are biased downwards, leading to an over-rejection of the null hypothesis that the respective estimated coefficient is equal to zero.

Neither the wild bootstrap or wild cluster bootstrap methods were a good fit for the model. Webb and MacKinnon (2018) advise that the wild cluster bootstrap procedure can be unreliable when the treatment variable is nonzero for only a few clusters, which is exactly the case with FBT 1 where the only treated cluster is Vancouver. Their remedy is to apply the wild bootstrap method. However, since the treatment dummies FBT 1, FBT 2, and NRST are zero for some portion of the sample, the conditions for this method of inference are still not met. The most reliable method then, is robust standard errors since CMA-year and month-year fixed effects are incorporated into the model. These fixed effects are relied upon to remove correlation in individual errors at the CMA level.

5. Results

The results of the estimation indicate that both the Foreign Buyers Tax (FBT) and Non-Resident Speculation Tax (NRST) negatively impacted housing prices and the number of transactions in Vancouver, Toronto and the other treated regions. The estimated coefficients are presented in Table 1. Despite the initial tax rates being equivalent at 15 percent, the NRST appears to have had the greatest impact on prices and transactions. This tax was found to decrease the monthly percentage change in composite housing prices, on average, by 3.94 percentage points. The FBT

Table 1. Baseline Results

Dependant Variable	<i>Log Difference in Composite Benchmark Housing Prices</i>			<i>Log Number of Home Transactions</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Specification						
FBT 1	-0.0173*** (0.0047)	-0.0216*** (0.0044)	-0.0217*** (0.0042)	-0.2440** (0.1050)	-0.3113*** (0.1013)	-0.3067*** (0.1003)
FBT 2	-0.0143*** (0.0033)	-0.0218*** (0.0068)	-0.0219*** (0.0065)	-0.2983*** (0.0571)	-0.4276*** (0.1343)	-0.4254*** (0.1330)
NRST	-0.0394*** (0.0039)	-0.0392*** (0.0038)	-0.0390*** (0.0040)	-0.3790*** (0.0319)	-0.3593*** (0.0343)	-0.3549*** (0.0347)
Population			-0.0001 (0.0002)			-0.0003 (0.0003)
Unemployment Rate			-0.0006 (0.0014)			0.0076* (0.0044)
Regional Districts Included	Yes	No	No	Yes	No	No
Controls	No	No	Yes	No	No	Yes
Observations	2375	1979	1979	2376	1980	1980
R-squared	0.6321	0.5759	0.5761	0.9889	0.9907	0.9907

Notes: Significance levels (robust standard errors in brackets): *** 0.01, ** 0.05, and * 0.10. Regional Districts and Census Metropolitan Areas (CMAs) are included in columns (1) and (4). The remaining columns only include CMAs.

appears to have affected housing prices to a lesser degree. The initial tax rate of the FBT was set at 15 percent (FBT 1) and this tax only applied to homes sold within the Vancouver Census Metropolitan Area (CMA). This tax is estimated to have decreased the monthly percentage change in housing prices by 1.73 percentage points, on average. Housing prices were impacted to a similar degree when the tax rate was increased to 20 percent (FBT 2), and the scope of the tax expanded to include additional regions in close proximity. The FBT, at this rate, decreased the monthly percentage change in housing prices in the treated regions, on average, by 1.43 percentage points. Since the model captures within year deviations from CMA specific trends in the year treatment is imposed, these results should be interpreted as the short-run impact of the taxes.

Two other baseline specifications were run with composite housing prices as the dependant variable. These are the specifications in columns (2) and (3) of Table 1. First, three of the four additional regions that the FBT was expanded to include, were dropped from the regression. These were the regional districts of Central Okanagan, Fraser Valley, and Nanaimo so that only CMAs

Table 2. Baseline Results by Housing Type

Dependant Variable	<i>Log Difference in Benchmark Housing Prices</i>									
	Single Family		One-Storey		Two-Storey		Townhouse		Apartment	
Housing Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FBT 1	-0.0240*** (0.0062)	-0.0303*** (0.0060)	-0.0279*** (0.0066)	-0.0334*** (0.0066)	-0.0207*** (0.0071)	-0.0286*** (0.0062)	-0.0140** (0.0057)	-0.0146** (0.0064)	-0.0133*** (0.0047)	-0.0141*** (0.0043)
FBT 2	-0.0090*** (0.0040)	-0.0210*** (0.0077)	-0.0120*** (0.0043)	-0.0218*** (0.0079)	-0.0034 (0.0051)	-0.0199** (0.0085)	-0.0107* (0.0058)	0.0100 (0.0104)	-0.0364*** (0.0097)	-0.0359*** (0.0083)
NRST	-0.0421*** (0.0043)	-0.0415*** (0.0042)	-0.0424*** (0.0054)	-0.0417*** (0.0053)	-0.0412*** (0.0043)	-0.0414*** (0.0042)	-0.0295*** (0.0075)	-0.0293*** (0.0078)	-0.0174** (0.0072)	-0.0174** (0.0073)
Regional Districts Included	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Observations	2375	1979	2375	1979	2375	1979	2375	1979	2375	1979
R-squared	0.6143	0.5603	0.6395	0.5840	0.5857	0.5316	0.5293	0.4639	0.5857	0.5249

Notes: Significance levels (robust standard errors in brackets): *** 0.01, ** 0.05, and * 0.10. Regional Districts and Census Metropolitan Areas (CMAs) are included in column (1), (3), (5), (7) and (9). The remaining columns only includes CMAs.

remained. Second, the regional districts were dropped and the control variables were added. In both specifications, the magnitude of the estimated coefficients increased for FBT 1 and 2, while the magnitude of the estimated coefficient for the NRST remained virtually unchanged.

The number of transactions in the treated housing markets was also negatively impacted by the taxes, indicating a slow down in market activity. Again, the NRST appears to have impacted transactions to a higher degree. The results indicate that monthly transactions decreased by 38 percent in the treated CMAs, on average. This is quite a significant impact considering the tax only targeted a subset of buyers in the market. FBT 1, which only targeted Vancouver, negatively impacted the number of monthly transactions, on average, by 24 percent. A similar impact was observed when the scope of the tax was broadened. FBT 2 is estimated to have decreased the number of monthly transactions by 30 percent in the treated areas, on average. Changes to the specification made in columns (5) and (6) mirror those that were made in columns (2) and (3). The magnitude of the estimated coefficients increased in these columns for FBT 1 and remained similar for FBT 2 and the NRST.

The data also allowed estimating the effect of the taxes on the prices of five different housing types. These results are displayed in Table 2. The FBT and NRST appear to have impacted the prices of most housing types, with the NRST having the greatest effect. FBT 1 and the NRST

impacted the prices of one-storey homes the most. These taxes were found to decrease the monthly percentage change in prices of this housing type, on average, by 2.79 and 4.24 percentage points. Both taxes had a similar impact on the prices of single family and two-storey homes and the weakest effect on the prices of apartments. In the even numbered columns, the regional districts in British Columbia are dropped. This tended to increase the magnitude of the estimated coefficients for FBT 1 and FBT 2, while the magnitude of the estimated coefficients for the NRST remained relatively unchanged.

FBT 2 was found to impact the prices of apartments the most. This housing type includes condominiums and is the most common type of house owned by foreign individuals in Canada. The tax was found to decrease the monthly percentage change in the price of apartments by 3.64 percentage points, on average in the treated areas. Out of all the taxes, FBT 2 also had the weakest impact on the prices of two-storey homes and townhouses with the estimated coefficient being non-significant and marginally statistically significant respectively.

6. Robustness Checks

Several sets of alternate specifications were estimated to verify the stability and validity of the estimated coefficients. The first of these specifications inserted placebo treatment dummies in place of those used in the baseline specification. Each of these treatment dummies are set three years in advance of the actual imposition of the tax. The first placebo dummy for the Foreign Buyers Tax (FBT) takes a value of one beginning in August 2013, and the second in March 2015.¹⁰ Following this pattern, the Non-resident Speculation Tax (NRST) takes a value of one beginning in May 2014. The results of this specification are displayed in Table 3. The results of these regressions generally indicate that the model is operating as it should. Some statistically significant coefficients were observed for the mock treatment variables, but the estimated coefficients were positive. Since these estimated coefficients were positive, it appears that the placebos are capturing some of the pre-trends.

¹⁰ The first placebo treatment dummy in Vancouver takes a value of one in August 2013 and is then set equal to zero in the first month the second dummy is imposed in the model.

Table 3. Placebo Dummy Variables

Dependant Variable	<i>Log Difference in Composite Benchmark Housing Prices</i>			<i>Log Number of Home Transactions</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Placebo FBT 1	0.0013 (0.0016)	0.0025 (0.0016)	0.0028 (0.0019)	0.1704*** (0.0480)	0.1776*** (0.0537)	0.1783*** (0.0550)
Placebo FBT 2	0.0062** (0.0027)	0.0089*** (0.0029)	0.0094*** (0.0032)	0.1074** (0.0432)	0.0806 (0.0680)	0.0807 (0.0700)
Placebo NRST	0.0008 (0.0019)	0.0014 (0.0019)	0.0056 (0.0068)	-0.0054 (0.0421)	0.0147 (0.0408)	0.0249 (0.0446)
Population			-0.0001 (0.0002)			-0.0005 (0.0003)
Unemployment Rate			-0.0004 (0.0014)			0.0104** (0.0046)
Regional Districts Included	Yes	No	No	Yes	No	No
Controls	No	No	Yes	No	No	Yes
Observations	2375	1979	1979	2376	1980	1980
R-squared	0.6300	0.5735	0.5738	0.9882	0.9900	0.9900

Notes: Significance levels (robust standard errors in brackets): *** 0.01, ** 0.05, and * 0.10. Placebo treatment dummies are imposed three years before the respective tax became effective.

The second set of alternate specifications involved using different treatment variables, the first of these being a single treatment dummy encompassing the three dummies used in the baseline specification. This treatment variable takes a value of one for treated CMAs over entire period that a tax is imposed, regardless if there is a change in the rate. While this may not be the ideal variable to estimate the effect of the FBT and NRST, it nonetheless serves its purpose in testing the robustness of the model. Using this variable, similar estimates were obtained to the coefficients of the treatment variables used in the baseline specification. These results are displayed in Table 4. The results indicate that treatment, in general, decreased the monthly percentage change in composite housing prices in the affected areas by 2.86 percent. Also, treatment was found to decrease the number of monthly transactions by 33 percent. The final alternate regressions run were ones using the tax rate in place of the treatment dummy. This variable would take a value of 0.15 for FBT 1 and the NRST, and 0.2 for FBT 2. Regressions run with this variable again confirm the robustness of the model. The estimated coefficients were statistically significant and larger in value than the ones obtained the baselines specification.

Table 4. Alternate Treatment Variables

Dependant Variable	<i>Log Difference in Composite Benchmark Housing Prices</i>		<i>Log Number of Home Transactions</i>	
	(1)	(2)	(3)	(4)
Treatment	-0.0286*** (0.0029)		-0.3329*** (0.0299)	
Tax Rate		-0.1630*** (0.0029)		-1.9735*** (0.1968)
Observations	2375	2375	2376	2376
R-squared	0.6318	0.6316	0.9889	0.9889

Notes: Significance levels (robust standard errors in brackets): *** 0.01, ** 0.05, and * 0.10. The treatment dummy variable merges the FBT 1, FBT 2, and NRST treatment dummies into one variable. The tax rate variable also incorporates all three taxes, but is set equal to the tax rate that is imposed in the respective month.

7. Conclusion

The introduction of the Foreign Buyers Tax (FBT) and Non-Resident Speculation Tax (NRST) in the Vancouver, Toronto and surrounding housing markets has increased the cost of purchasing real estate in these areas for foreign buyers significantly. In conclusion, these taxes have had a considerable impact on the housing markets in which they apply. Both prices and the number of transactions have decreased due to the introduction of the taxes, with transactions being impacted to a higher degree. It is estimated that FBT 1 and FBT 2 decreased the monthly percentage change in housing prices in the affected areas by 1.73 and 1.43 percentage points respectively, while the NRST decreased prices by 3.94 percentage points. The results also indicate that the number of monthly transactions decreased by 24 and 30 percent as a result of FBT 1 and FBT 2. The NRST was found to negatively impact monthly transactions by 38 percent. These estimates should be interpreted as the short-run impact of the taxes within the year they are imposed.

When the effect of the taxes on prices of different housing types was estimated, the effect of FBT 1 and the NRST was found to be negatively correlated with the level of foreign ownership of that housing type, in the respective areas the taxes applied. FBT 1 and the NRST decreased the monthly percentage change in the prices of apartments by 1.33 and 1.74 percentage points, and this housing type includes condominiums. Of all foreign owned properties in Vancouver and Toronto, 53 and

44 percent of these are condominiums (Statistics Canada, 2017). Conversely, FBT 2 had the greatest impact on this housing type. This tax negatively impacted monthly percentage changes in prices of this housing type by 3.64 percentage points. This tax applied to Vancouver and four additional regions in close proximity, which may have affected the magnitude of its impact.

Another correlation exists between the difference in the average value of housing types between non-residents and residents and the effect of the taxes. The greatest difference in the average value of homes exists for single-detached homes. Single-detached homes owned by non-residents are \$707,800 and \$103,500 higher in value in Vancouver and Toronto than the average value of homes of the same type owned by Canadian residents (Statistics Canada, 2017). Single-detached homes are similar in their definition to single-family homes. FBT 1 and the NRST reduced the monthly percentage change in prices of single-family homes by 2.40 and 4.21 percentage points respectively, which is higher than the effect of these taxes on composite prices.

There are many possible avenues for future research, given that the body of literature that studies real estate transfer taxes targeting foreign buyers is small. One possibility is to examine the spillover effect of these taxes on the rental markets in the CMAs affected by the tax. It is possible that these taxes led to a higher demand for rentals, since foreign buyers can secure rental properties at the same rate after the taxes have been imposed. Another interesting avenue would be to explore the mechanisms through which these taxes have impacted the housing market. Understanding these mechanics would help determine the external validity of the results obtained here.

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