DID THE LAND TRANSFER TAX AFFECT HOUSING SALES IN THE GREATER TORONTO AREA?

Murtaza Haider & Amar Anwar (CBU)
The game plan

- What is the impact of the Land Transfer Tax (LTT) on housing sales in the Greater Toronto Area (GTA)?
  - Previous research has shown that housing sales declined after the implementation of the LTT
  - We believe that the negative impact on housing sales was not statistically significant.
    - We include condominiums as well as single-family homes in the analysis
    - We are mindful of the influence of the great recession on housing prices and sales
    - We compare the decline in sales in Toronto to the increase in sales in the suburbs
The big and small questions

- Did housing sales in Toronto decline post LTT?
  - Yes

- But what about the impact of the following on sales?
  - Great recession
  - Forward buying in 2007
  - Substitution effect
    - Buyers switching to smaller units, including Condominiums
  - Decline/gain in sales in other jurisdictions:
    - suburban GTA
    - Other metropolitan areas
Dachis et al. (2011)

- 139,266 single-family houses sold in the greater Toronto area that were listed with the Multiple Listing Service (MLS) between January 2006 and August 2008

- Results:
  - “… we estimate the impact of real estate transfer taxes on the market for single family homes. Our data show that Toronto’s 1.1% tax caused a 15% decline in the number of sales and a decline in housing prices about equal to the tax. Relative to an equivalent property tax, the associated welfare loss is substantial, about $1 for every $8 in tax revenue.”
Dachis et al. (2011)

- Using postal codes as the aggregating unit imposes unnecessary structural constraints on the model resulting from too frequent zero transactions.
  - 139,226 houses sold
  - 226,995 observations in sales model
  - 385,188 observations in other models

- Excluding condos is a concern
  - Toronto reports far more condo sales than the suburbs. Excluding condos will artificially lower Toronto's transactions.
  - Condos are cheaper (<$400k), LTT= 1%
Dachis et al. (2011)

- The housing stock in play is not uniform across Toronto.
  - Greater proportion of units under $400k available outside Toronto
- The cross-sectional approach misses the long term market dynamics in play that show sales slow in winter months and pick up in summer months. Time series model can capture this cyclicality.
Dachis (2012)

- A follow-up analysis:
  - Transactions covering the years from 2005/2007 to 2008/2012
  - “The LTT resulted in, on average, a 16 percent decrease in sales volume. The effect of the LTT on transactions varies by house price, with the largest effect on homes in areas with resale prices below the median market sale price.”
  - “I exclude condominium sales from the analysis because such units are often sold directly by developers and not included in the MLS data.”
Does LTT offer any benefits to residents?

- LTT differs from cigarette tax
- LTT offers direct benefits to the tax-payers
  - Better municipal services
  - Lower increase in property taxes, etc.
- David Nowlan, 2007
  - “… the burden of the LTT will be offset by benefits that are at least as great as the burden of the LTT. Offsetting benefits will come in the form of enhanced City services or lower-than-otherwise property taxes, or both. If the LTT revenue were used simply to replace what would otherwise be an increase in property taxes, the LTT burden, in money terms, would be exactly offset by the lower property taxes.”
Nowlan, 2007

“If the number of transactions without a City tax were the 2006 volume of 56,227, that number would be between 56,098 and 56,171 with the City LTT, a negligible reduction.”

“An average property owner (i.e., one paying the average property tax rate of 1% of assessed value and attracting the average LTT cost of 1.25% of transactions value) will find that the present value of reduced property taxes will just equal the present value of the LTT cost if their property is sold and another bought after 10 years.”
LTT (TO), ka-ching, ka-ching
Property tax revenues in Toronto

Property tax
The small questions

- But what about the impact of the following on sales?
  - Great recession
  - Forward buying in 2007
  - Substitution effect
    - Buyers switching to cheaper units, including Condominiums
  - Decline/gain in sales in other jurisdictions:
    - suburban GTA
    - Other metropolitan areas
Canada GDP Growth rate (previous period)

Source: Organisation for Economic Co-operation and Development
2014 research.stlouisfed.org
US GDP Growth rate

Source: Organisation for Economic Co-operation and Development
Shaded areas indicate US recessions - 2014 research.stlouisfed.org
The small questions

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    - Other metropolitan areas
Forward Buy in 2007

Total GTA Sales

Sales

10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000 100,000

2003 2004 2005 2006 2007 2008 2009 2010

Stagnation
What about the suburbs?
The small questions

- But what about the impact of the following on sales?
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  - Substitution effect
    - Buyers switching to cheaper units, including Condominiums
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    - Other metropolitan areas
Market share of condominiums

The Condo Market

Condo sales (%)

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

East North TO West
## Condos are cheaper, even in Toronto

<table>
<thead>
<tr>
<th>year</th>
<th>SF Detached Nominal ($)</th>
<th>Condominiums Nominal ($)</th>
<th>Price (50k - 400k)</th>
<th>LTT (400k+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>421,702</td>
<td>215,869</td>
<td>50k - 400k</td>
<td>1%</td>
</tr>
<tr>
<td>2003</td>
<td>452,468</td>
<td>229,742</td>
<td>400k+</td>
<td>2%</td>
</tr>
<tr>
<td>2004</td>
<td>489,026</td>
<td>231,862</td>
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<td></td>
</tr>
<tr>
<td>2005</td>
<td>528,877</td>
<td>235,872</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>560,989</td>
<td>250,145</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>622,541</td>
<td>274,083</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>631,618</td>
<td>278,422</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>630,221</td>
<td>281,750</td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td>703,947</td>
<td>312,207</td>
<td></td>
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<tr>
<td>2011</td>
<td>784,042</td>
<td>321,447</td>
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</tbody>
</table>
The small questions

- But what about the impact of the following on sales?
  - Great recession
  - Forward buying in 2007
  - Substitution effect
    - Buyers switching to cheaper units, including Condominiums
  - Decline/gain in sales in other jurisdictions:
    - suburban GTA
    - Other metropolitan areas
Did Peel gain at Toronto’s expense?
The cyclical effects

- Housing sales are time series
  - Cyclical effects
    - Recessions
  - Seasonal effects
    - Cold winters
    - Hot summers
  - Overall trends
    - The system effect
The time series

[Graph showing time series data for Toronto, East, West, and North, with months from 2002m1 to 2012m1 on the x-axis and values on the y-axis.]
Vancouver, Calgary, and Ottawa?
Interrupted time series analysis (ITSA)

- ITSA is useful to determine the impact of large scale interventions, such as taxes.
- Data are time series with auto-correlated errors
- Treatment takes place at a certain time, e.g., Feb. 2008
- Two distinct time periods:
  - Pre-intervention
  - Post intervention
- Two or more groups
  - Treated
  - Controls
Interrupted Time Series Analysis

\[ Y_t = \beta_0 + \beta_1 T + \beta_2 X_t + \beta_3 X_t T + \beta_4 Z + \beta_5 ZT + \beta_6 ZX_t + \beta_7 ZX_t T + \epsilon_t \]
ITSA (2)

- Important statistics
  - Starting or base level of outcome ($\beta_0$)
  - Trajectory or slope until intervention ($\beta_1$)
  - Immediate effect of the intervention ($\beta_2$)
    - In comparison to counterfactual
  - The difference in pre- and post-intervention slopes or trends ($\beta_3$)
  - $\beta_2$ and $\beta_3$ are immediate and overtime treatment effects
ITSA (3)

- **Multiple groups**
  - **Control and treated**
    - Z denotes the cohort assignment
    - Earlier coefficients for the control group
      - Sales in West, East, and North of the City of Toronto
      - Toronto is the treated group
  - **Difference in level of treated and control prior to intervention** ($\beta_4$)
  - **Difference in trends prior to intervention** ($\beta_5$)
  - **Difference in the immediate effect of the intervention** ($\beta_6$)
  - **The post intervention difference-in-difference in slopes** ($\beta_7$)
Interrupted Time Series Analysis

\[ Y_t = \beta_0 + \beta_1 T + \beta_2 X_t + \beta_3 X_t T + \beta_4 Z + \beta_5 Z T + \beta_6 Z X_t + \beta_7 Z X_t T + \epsilon_t \]
LTT impact

Regression with Newey-West standard errors
### ITSA, All sales

**Table 2: Impact of Land Transfer Tax (LTT) on All Sales in Toronto**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Single Group Analysis</th>
<th>Multiple Group Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Sales</td>
<td>All Sales (Newey-West standard errors)</td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>10.429643*</td>
<td>3.9855801</td>
</tr>
<tr>
<td><strong>LTT</strong></td>
<td>-618.33292</td>
<td>-182.05447</td>
</tr>
<tr>
<td><strong>T*LTT</strong></td>
<td>4.6830745</td>
<td>2.5361969</td>
</tr>
<tr>
<td><strong>Z</strong></td>
<td></td>
<td>1284.678***</td>
</tr>
<tr>
<td><strong>Z*T</strong></td>
<td></td>
<td>6.4440631</td>
</tr>
<tr>
<td><strong>Z*LTT</strong></td>
<td></td>
<td>-436.27845</td>
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<tr>
<td><strong>Z<em>T</em>LTT</strong></td>
<td></td>
<td>2.1468777</td>
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<tr>
<td><strong>_cons</strong></td>
<td>2517.7653***</td>
<td>1233.0873***</td>
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<tr>
<td><strong>N</strong></td>
<td>108</td>
<td>432</td>
</tr>
<tr>
<td><strong>r2_a</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ll</strong></td>
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<td></td>
</tr>
</tbody>
</table>

*legend:  * p<0.05;  ** p<0.01;  *** p<0.001*
### Table 4: Impact of Land Transfer Tax (LTT) on Detached Houses in Toronto

<table>
<thead>
<tr>
<th>Variable</th>
<th>Single Group Analysis</th>
<th>Multiple Group Analysis</th>
<th>Detached Sales (prais standard errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Detached Sales</td>
<td>Detached Sales (Newey-West standard errors)</td>
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</tr>
<tr>
<td>T LTT</td>
<td>2.2840211</td>
<td>2.3200043</td>
<td>-0.04052782</td>
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<tr>
<td></td>
<td>-273.52494</td>
<td>-104.08983</td>
<td>107.37143</td>
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<tr>
<td>T*LTT</td>
<td>2.3086619</td>
<td>1.7039795</td>
<td>3.0684478</td>
</tr>
<tr>
<td>Z</td>
<td>326.55676***</td>
<td>319.51467</td>
<td></td>
</tr>
<tr>
<td>Z*T</td>
<td>-0.03598319</td>
<td>-0.38090983</td>
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<td>Z*LTT</td>
<td>-169.43511</td>
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<tr>
<td>Z<em>T</em>LTT</td>
<td>0.60468237</td>
<td>0.31264164</td>
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<tr>
<td>_cons</td>
<td>1015.0896***</td>
<td>688.53279***</td>
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<td>N</td>
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<td>r2_a ll</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>-2829.1973</td>
</tr>
</tbody>
</table>

**legend:**  * p<0.05; ** p<0.01; *** p<0.001
Table 6: Impact of Land Transfer Tax (LTT) on Condos Sales in Toronto

<table>
<thead>
<tr>
<th>Variable</th>
<th>Single Group Analysis</th>
<th>Multiple Group Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Condos Sales</td>
<td>Condos Sales (Newey-West standard errors)</td>
</tr>
<tr>
<td>T</td>
<td>6.3332269***</td>
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<tr>
<td>LTT</td>
<td>-182.77118</td>
<td>-16.025044</td>
</tr>
<tr>
<td>T*LTT</td>
<td>1.4197348</td>
<td>0.43246127</td>
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<tr>
<td>Z</td>
<td>727.01221***</td>
<td>746.38576***</td>
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<tr>
<td>Z*T</td>
<td>5.6095326***</td>
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</tr>
<tr>
<td>Z*LTT</td>
<td>-166.74614</td>
<td>-40.109804</td>
</tr>
<tr>
<td>Z<em>T</em>LTT</td>
<td>0.98727349</td>
<td>2.5918566</td>
</tr>
<tr>
<td>_cons</td>
<td>833.75984***</td>
<td>106.74763***</td>
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<tr>
<td>N</td>
<td>108</td>
<td>432</td>
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<tr>
<td>r2_a</td>
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<tr>
<td>ll</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

legend: * p<0.05; ** p<0.01; *** p<0.001
Forward Buy

Regression with Newey-West standard errors
Conclusions

- Sales declined post LTT
  - The difference is not statistically significant
  - Sales also declined post LTT in the control group
    - Statistically insignificant
  - Sales pickup in subsequent years
- Pre-treatment trend for SFD sales slower in Toronto
  - (insignificant)
- Pre-treatment trend for Condo sales higher in Toronto and significant
- Condo sales in Toronto post LTT show increase