

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

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# 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 cyclical.

## 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?

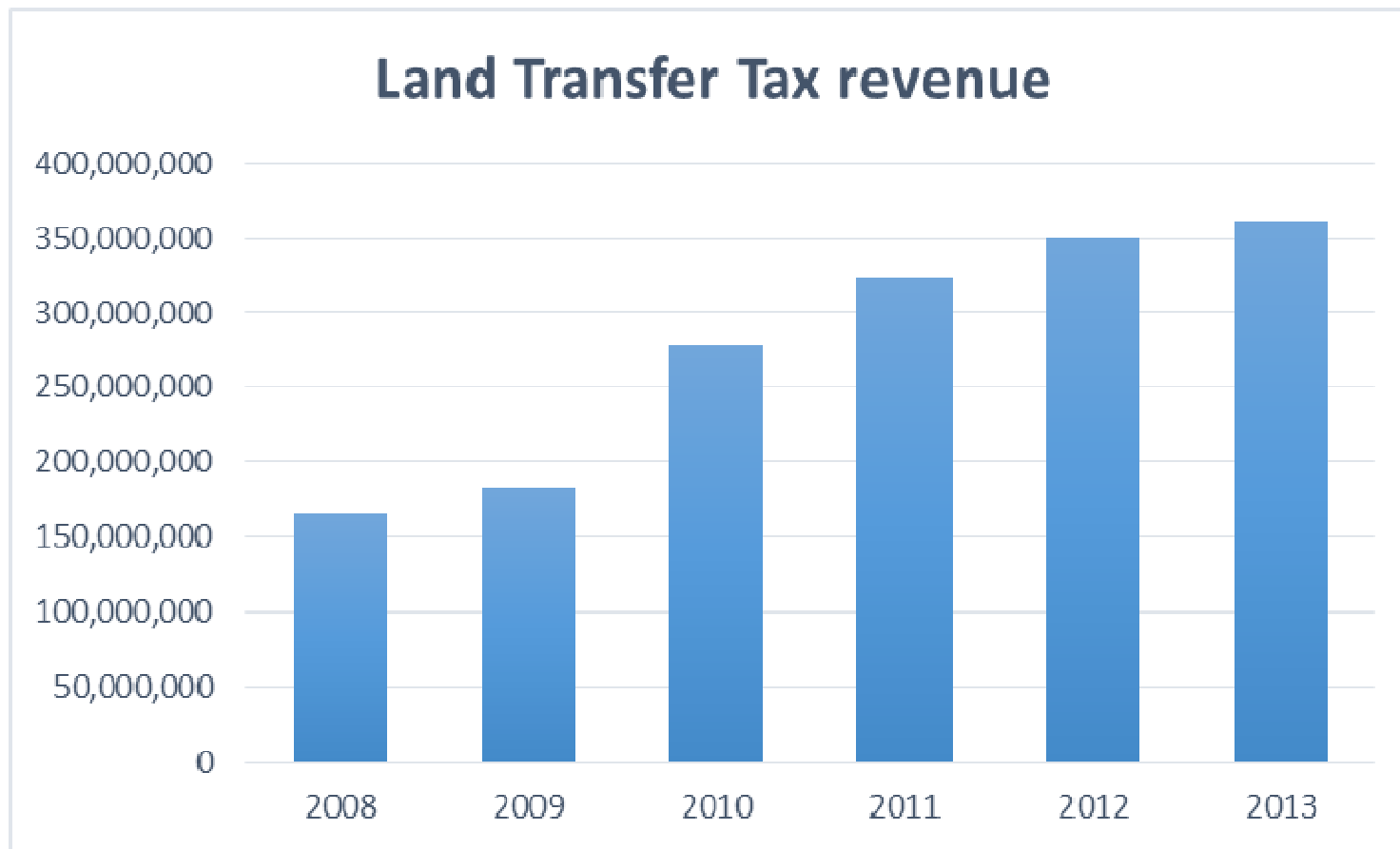
- ❑ LTT differs from cigarette tax
- ❑ LTT offers direct benefits to the tax-payers
  - ▣ Better municipal services
  - ▣ Lower increase in property taxes, etc.
- ❑ David Nowlan, 2007
  - ▣ “... the burden of the LTT will be offset by benefits that are at least as great as the burden of the LTT. Offsetting 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*



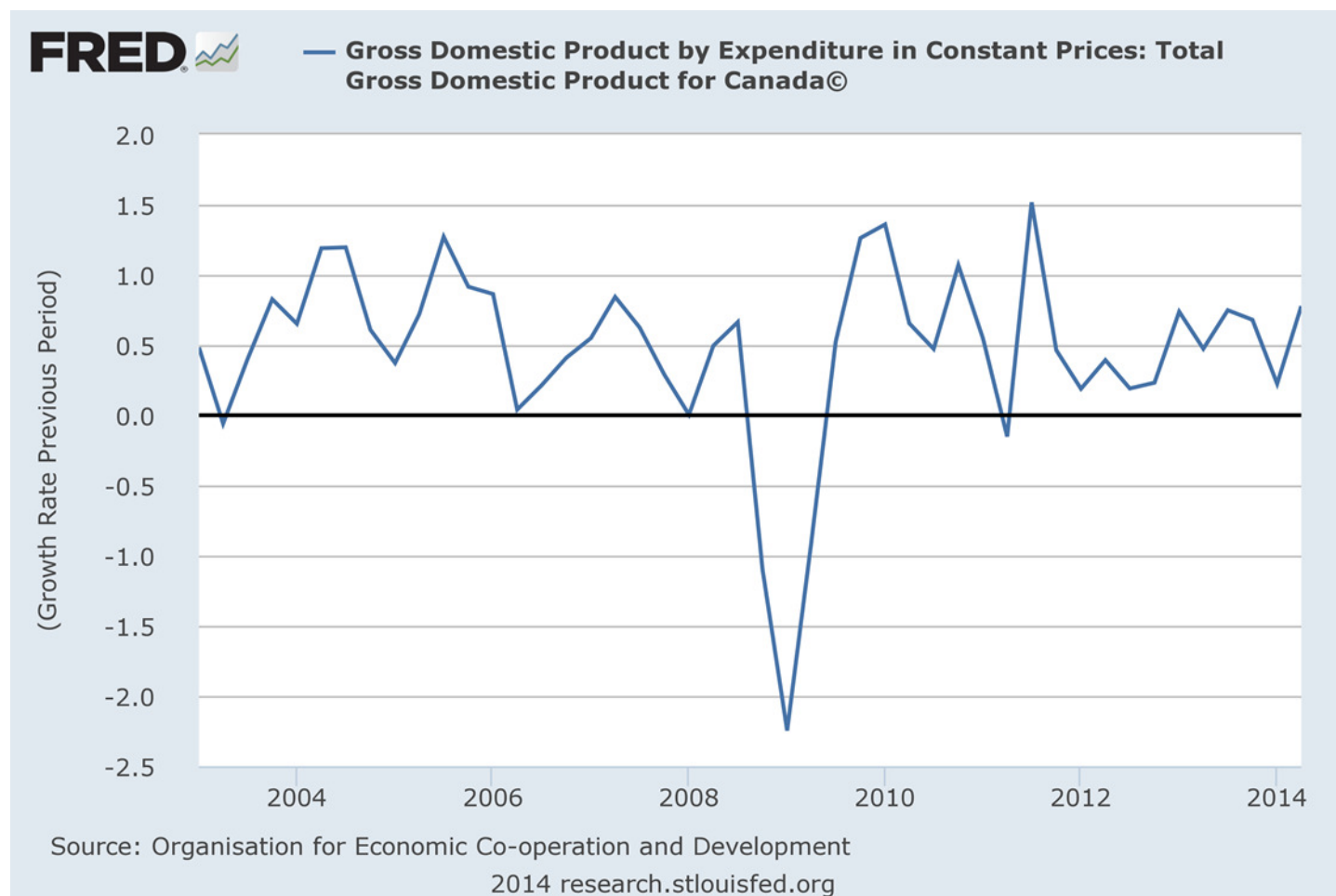
# Property tax revenues in Toronto



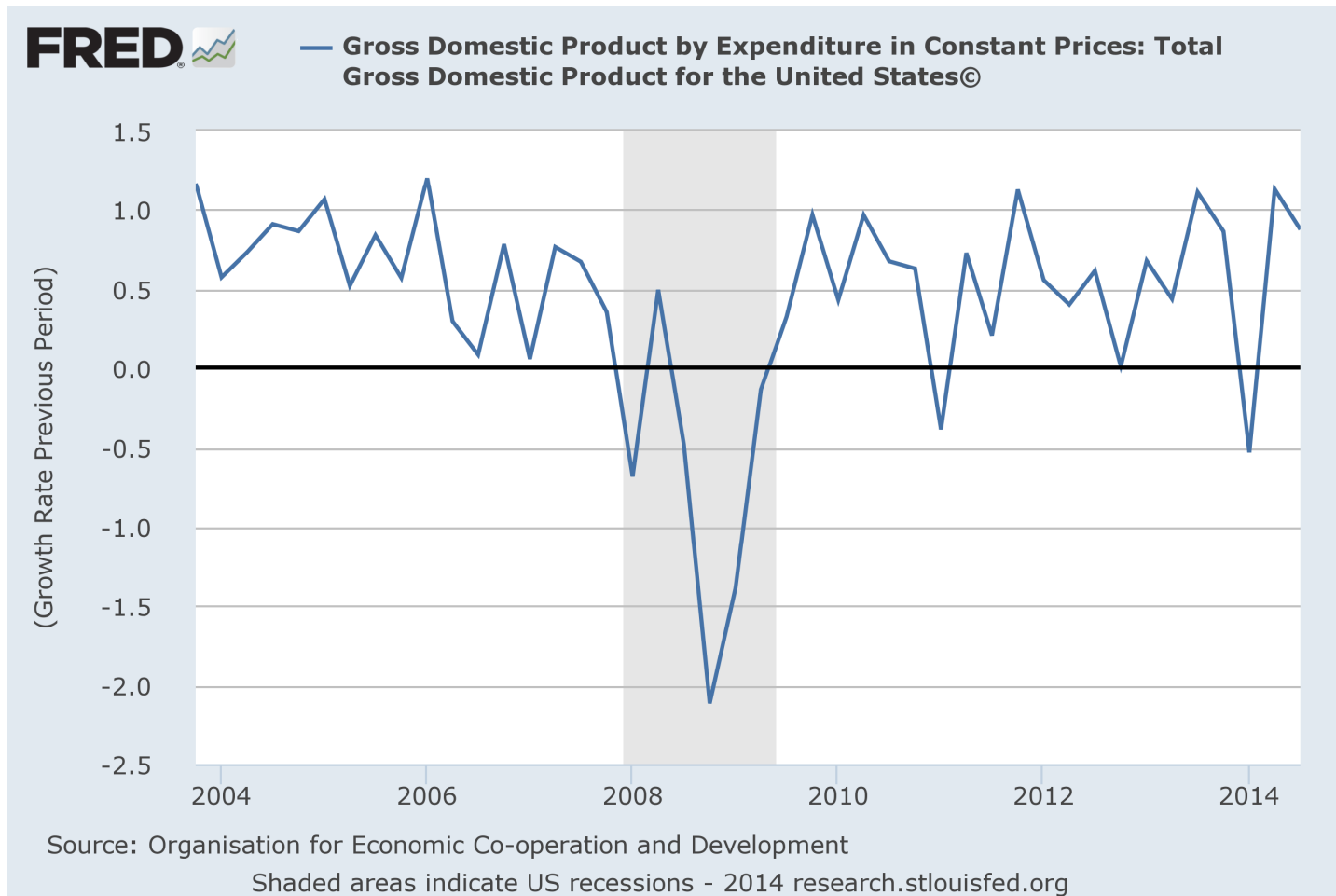
# The small questions

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# Canada GDP Growth rate (previous period)



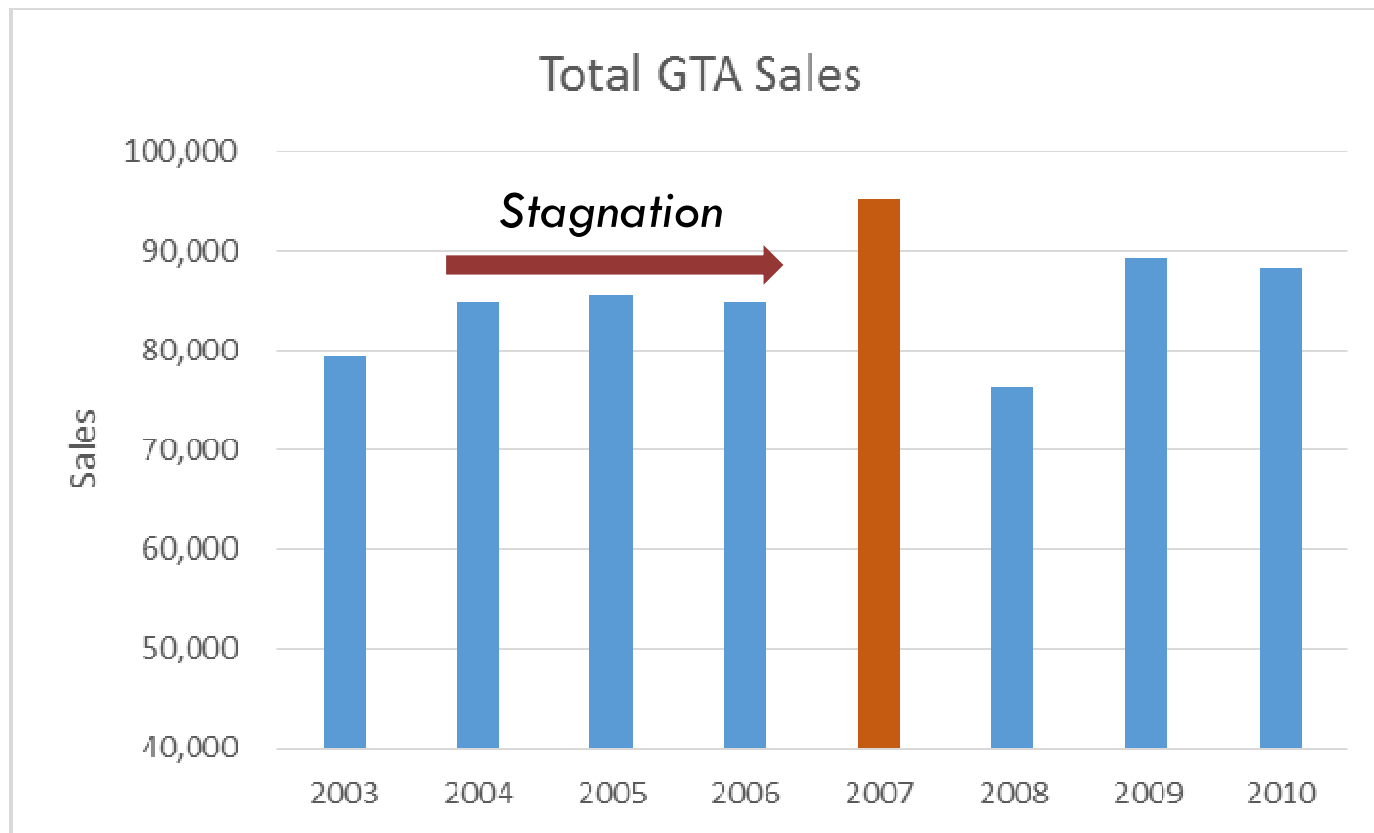
# US GDP Growth rate



# The small questions

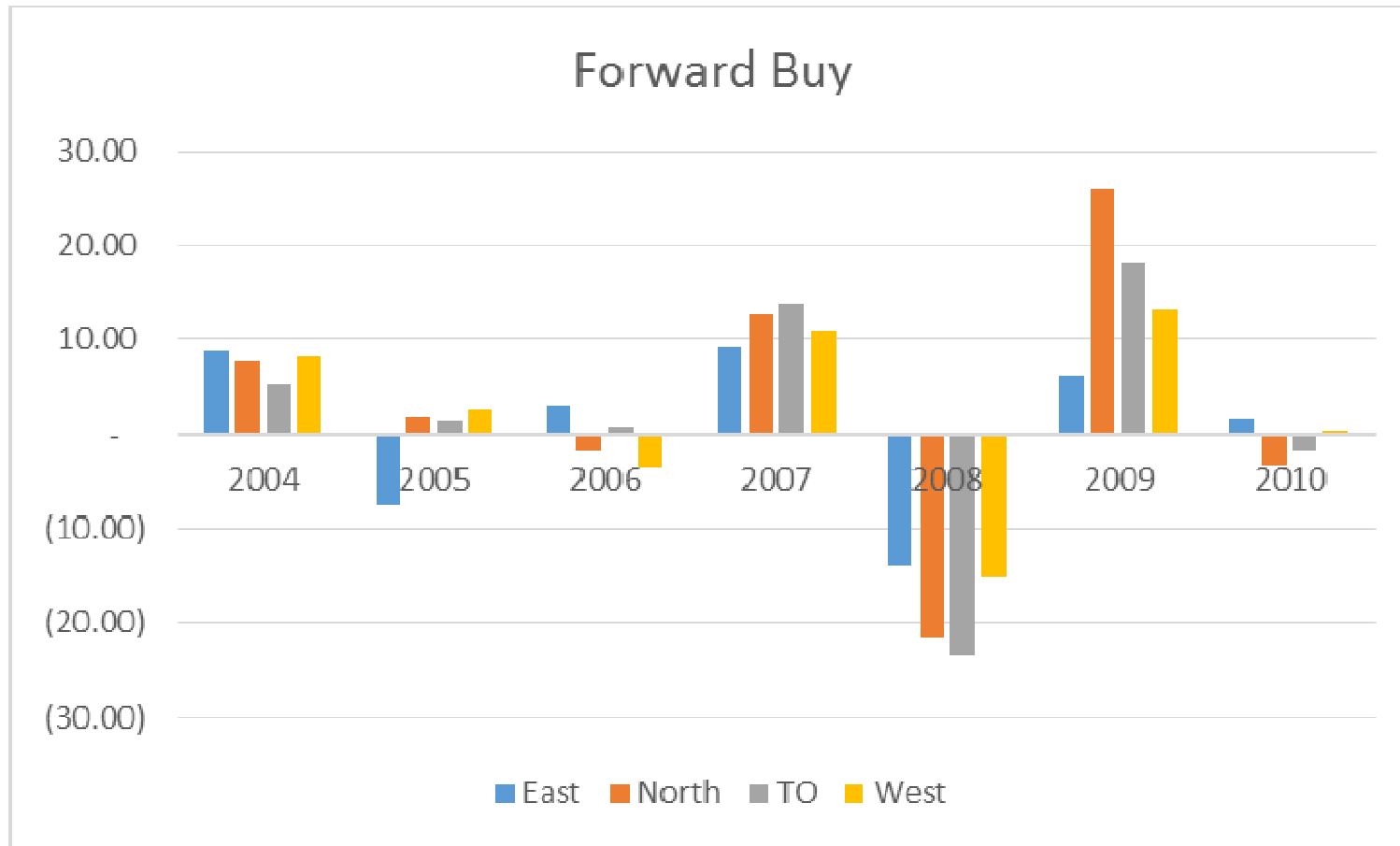
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# Forward Buy in 2007





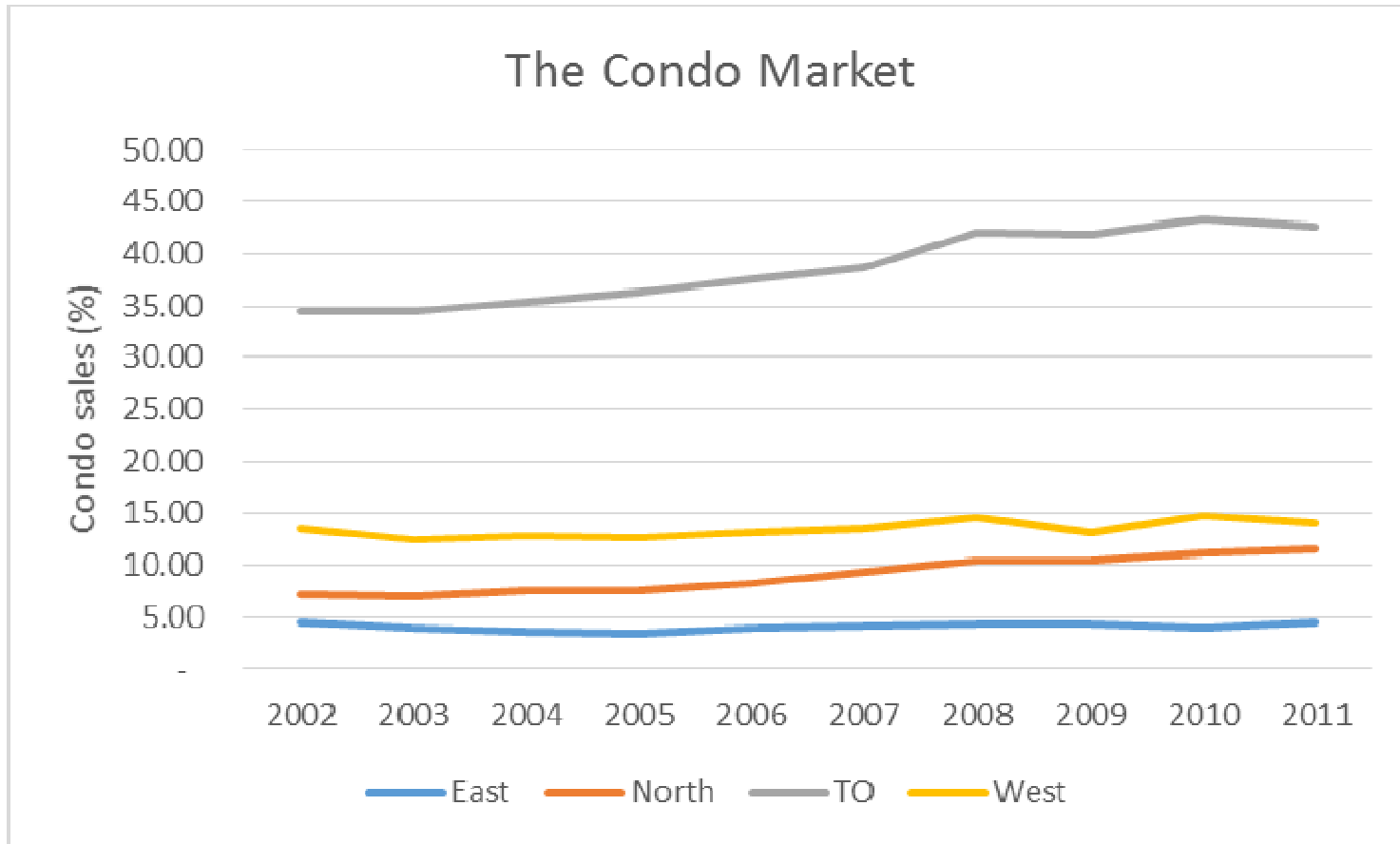
# What about the suburbs?



# The small questions

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# Market share of condominiums



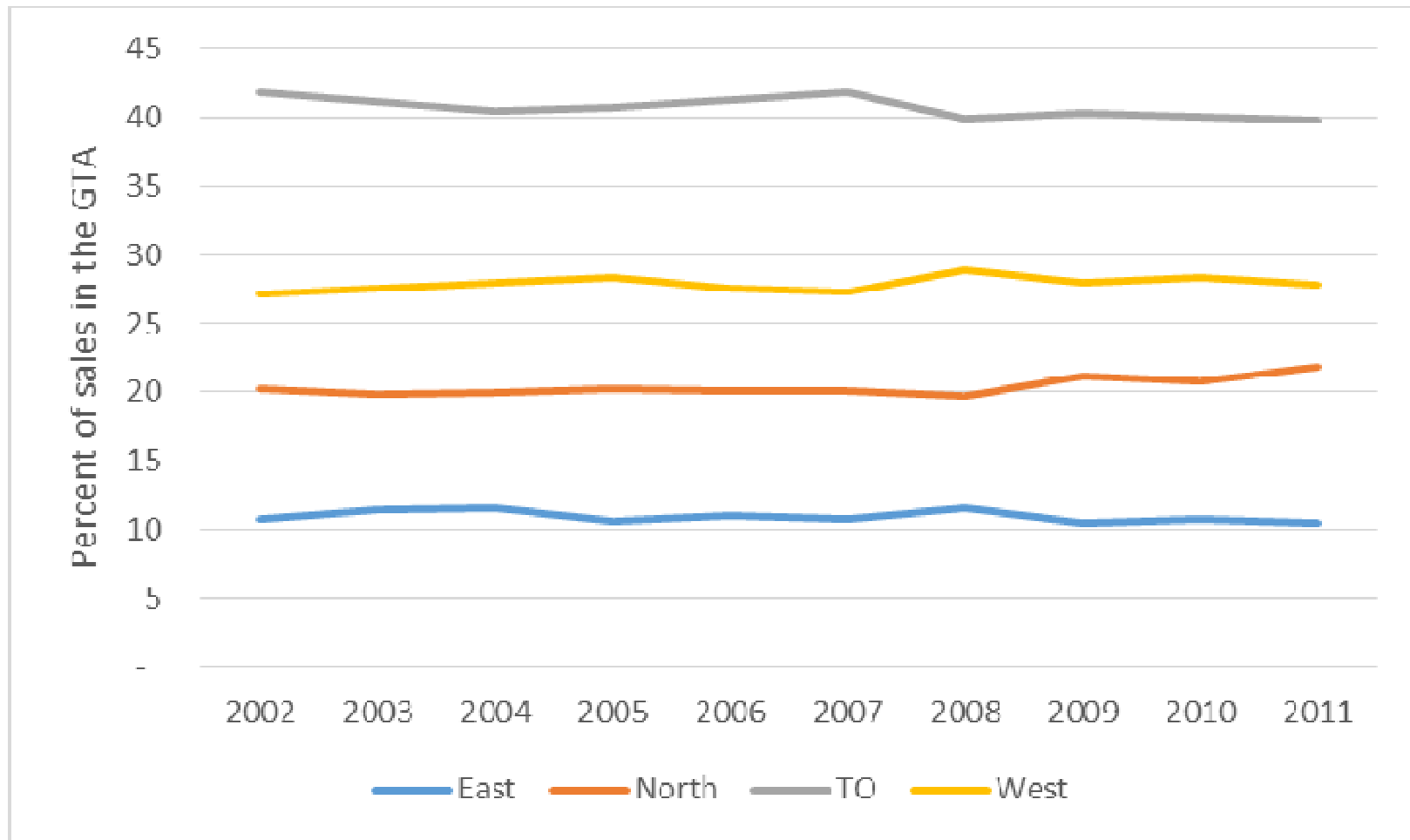
# Condos are cheaper, even in Toronto

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

# The small questions

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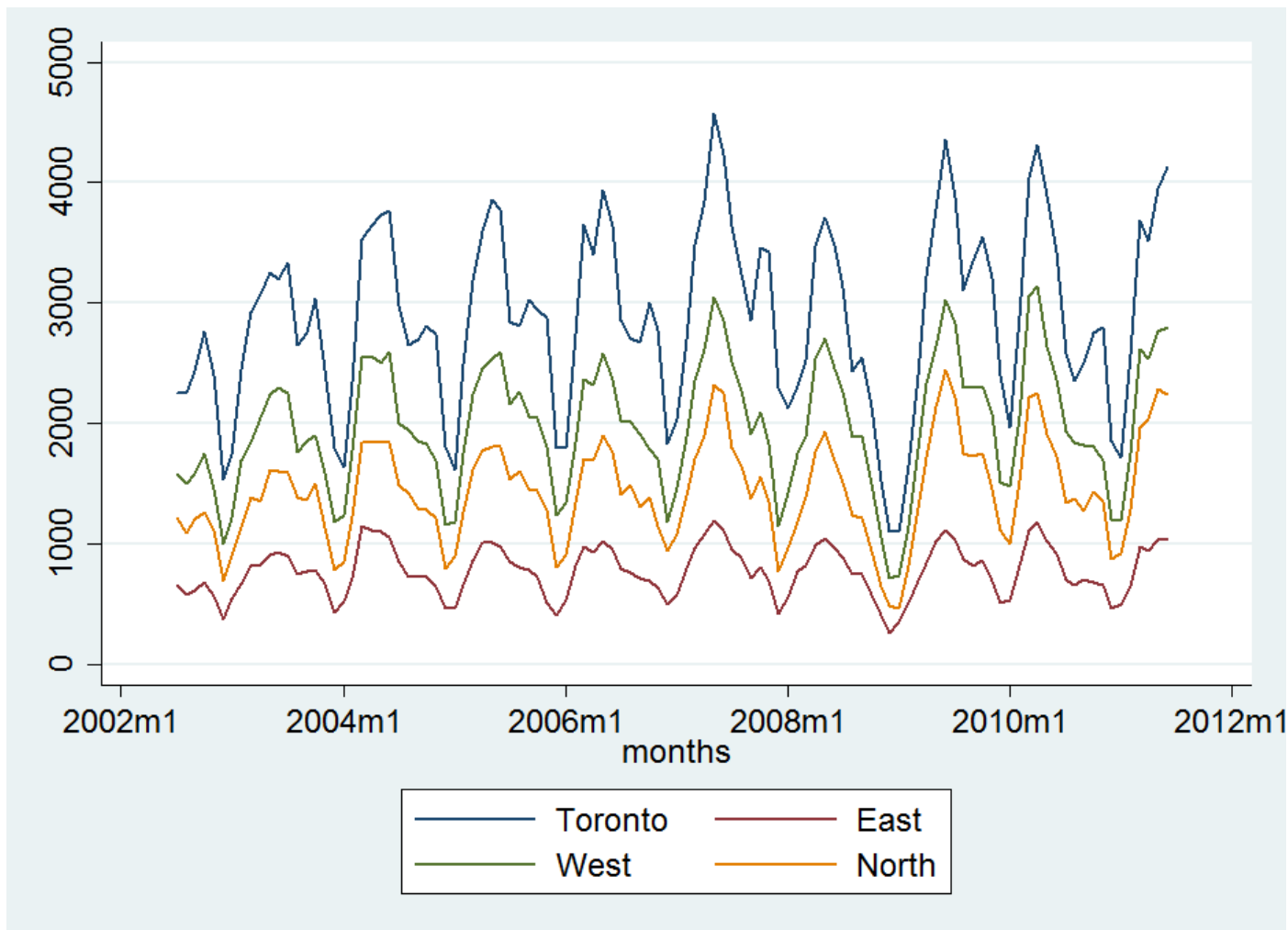
# Did Peel gain at Toronto's expense?



# The cyclical effects

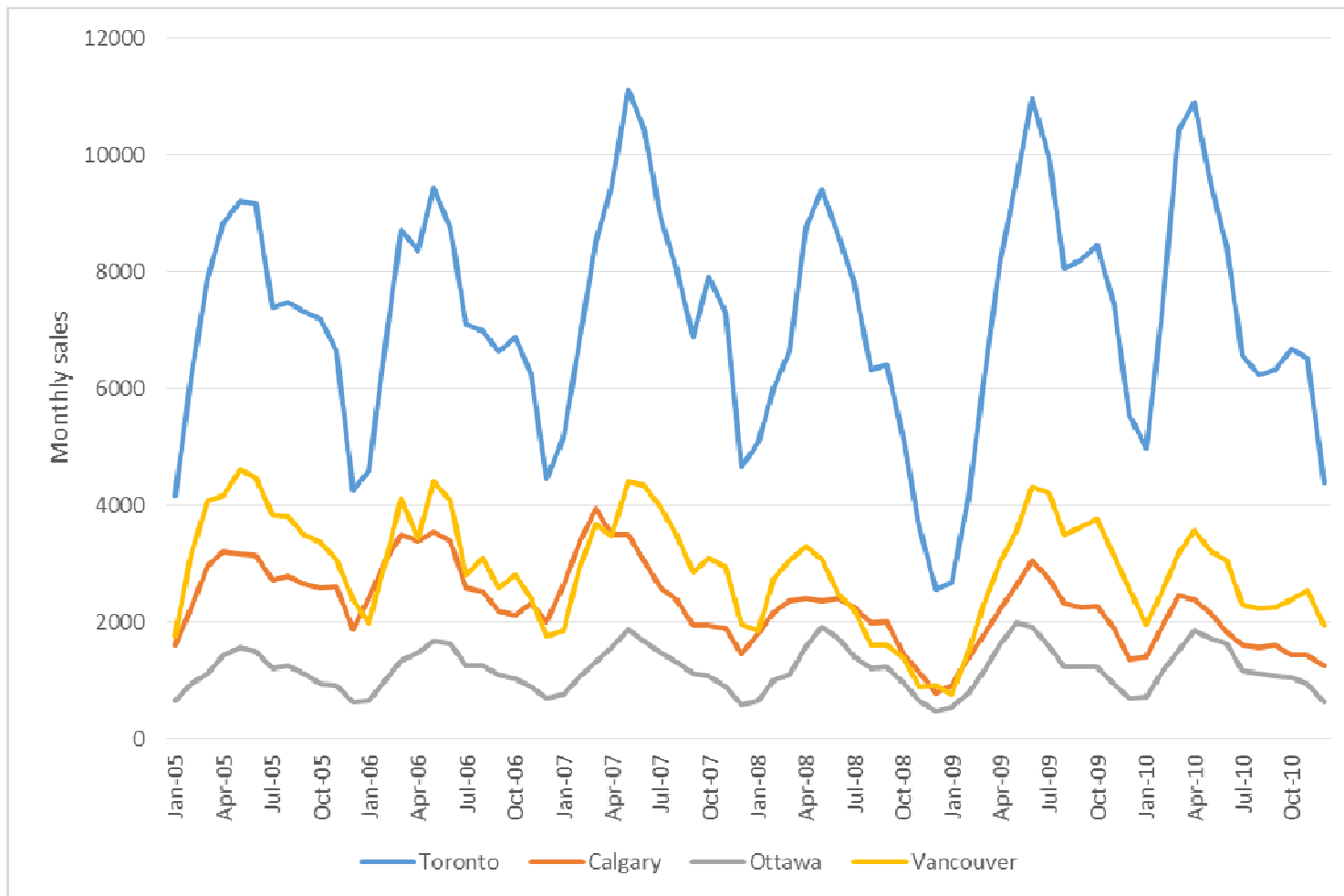
- Housing sales are time series
  - Cyclical effects
    - Recessions
  - Seasonal effects
    - Cold winters
    - Hot summers
  - Overall trends
    - The system effect

# The time series





# Vancouver, Calgary, and Ottawa?

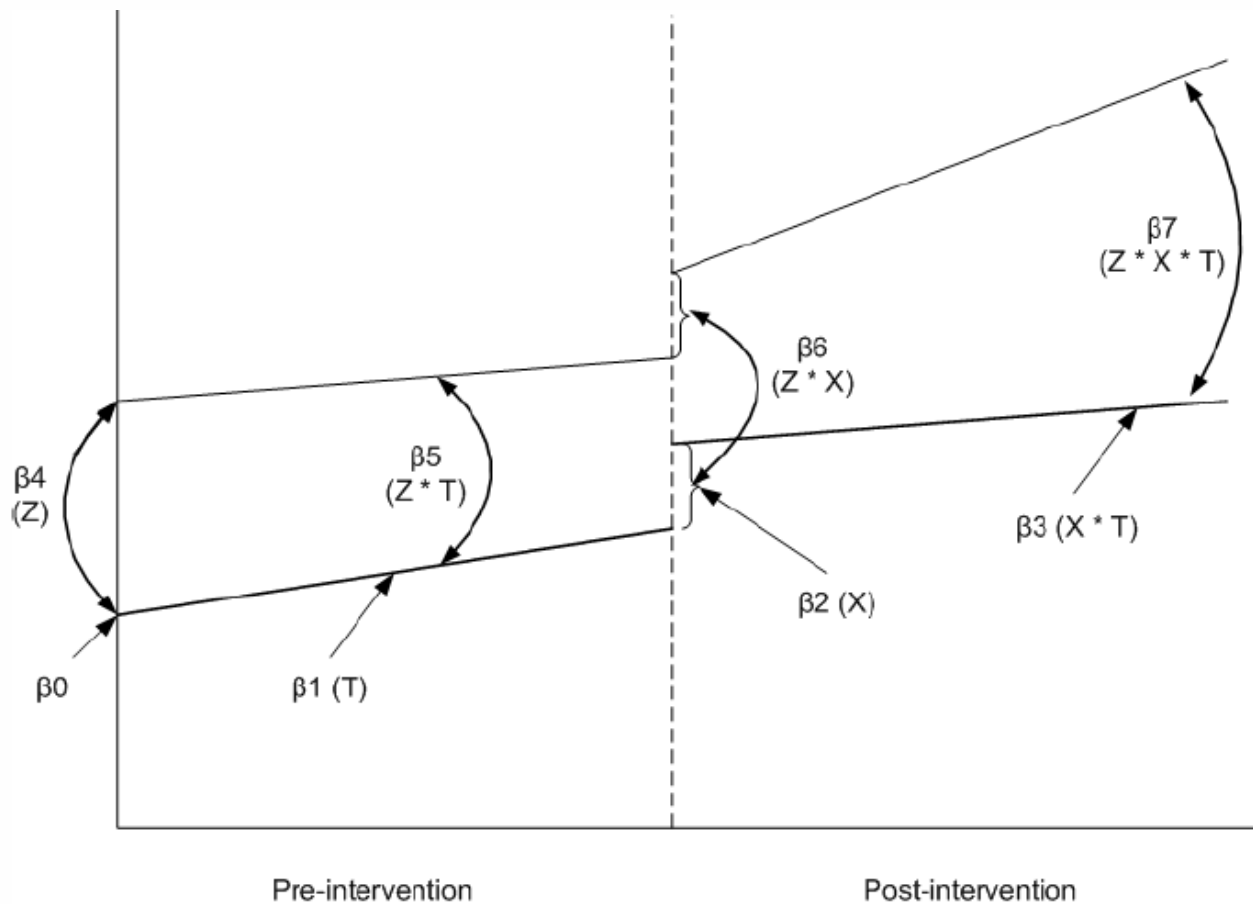


# Interrupted time series analysis (ITSA)

- 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

$$Y_t = \beta_0 + \beta_1 T + \beta_2 X_t + \beta_3 X_t T + \beta_4 Z + \beta_5 Z T + \beta_6 Z X_t + \beta_7 Z X_t T + \epsilon_t$$



## ITSA (2)

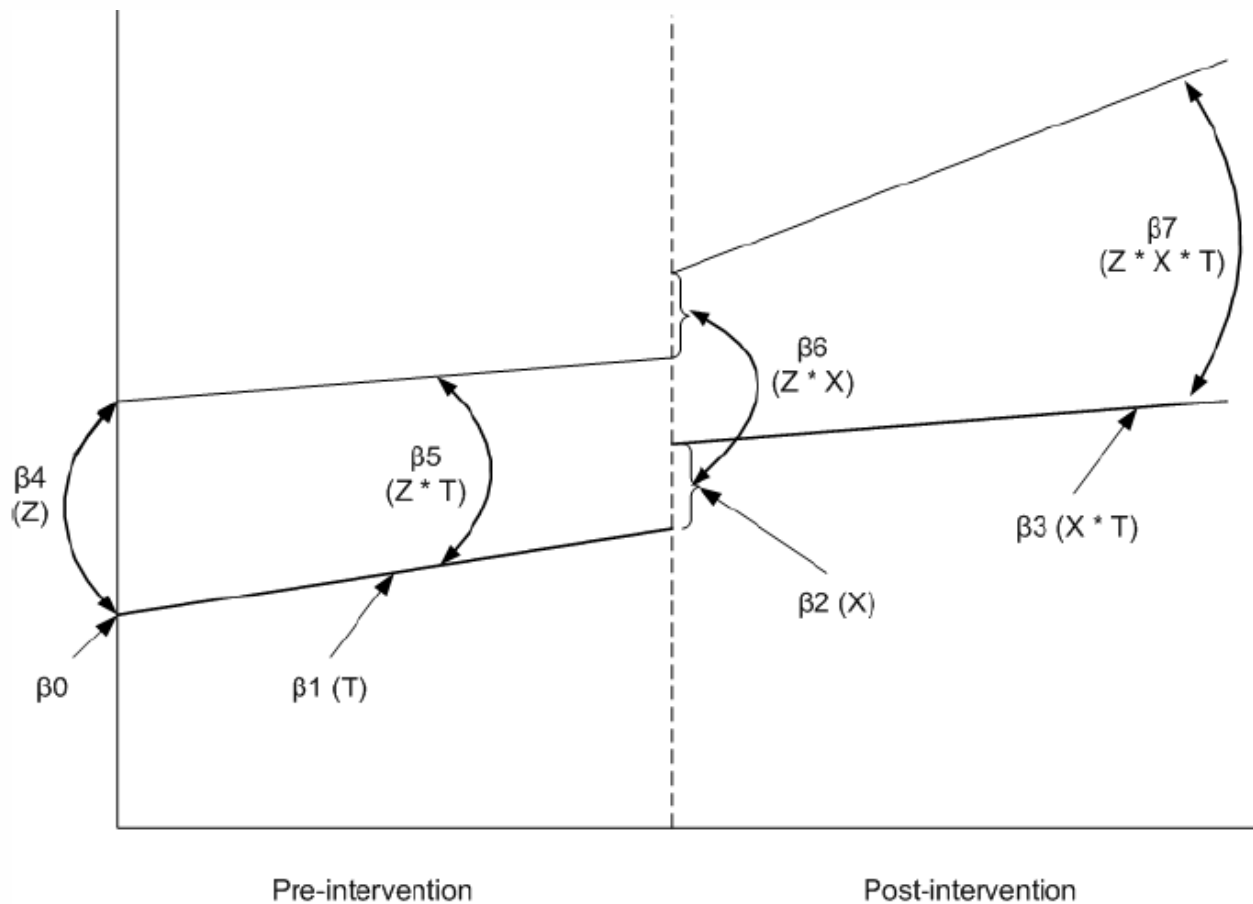
- Important statistics
  - ▣ Starting or base level of outcome ( $\beta_0$ )
  - ▣ Trajectory or slope until intervention ( $\beta_1$ )
  - ▣ Immediate effect of the intervention ( $\beta_2$ )
    - In comparison to counterfactual
  - ▣ The difference in pre- and post-intervention slopes or trends (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

# ITSA (3)

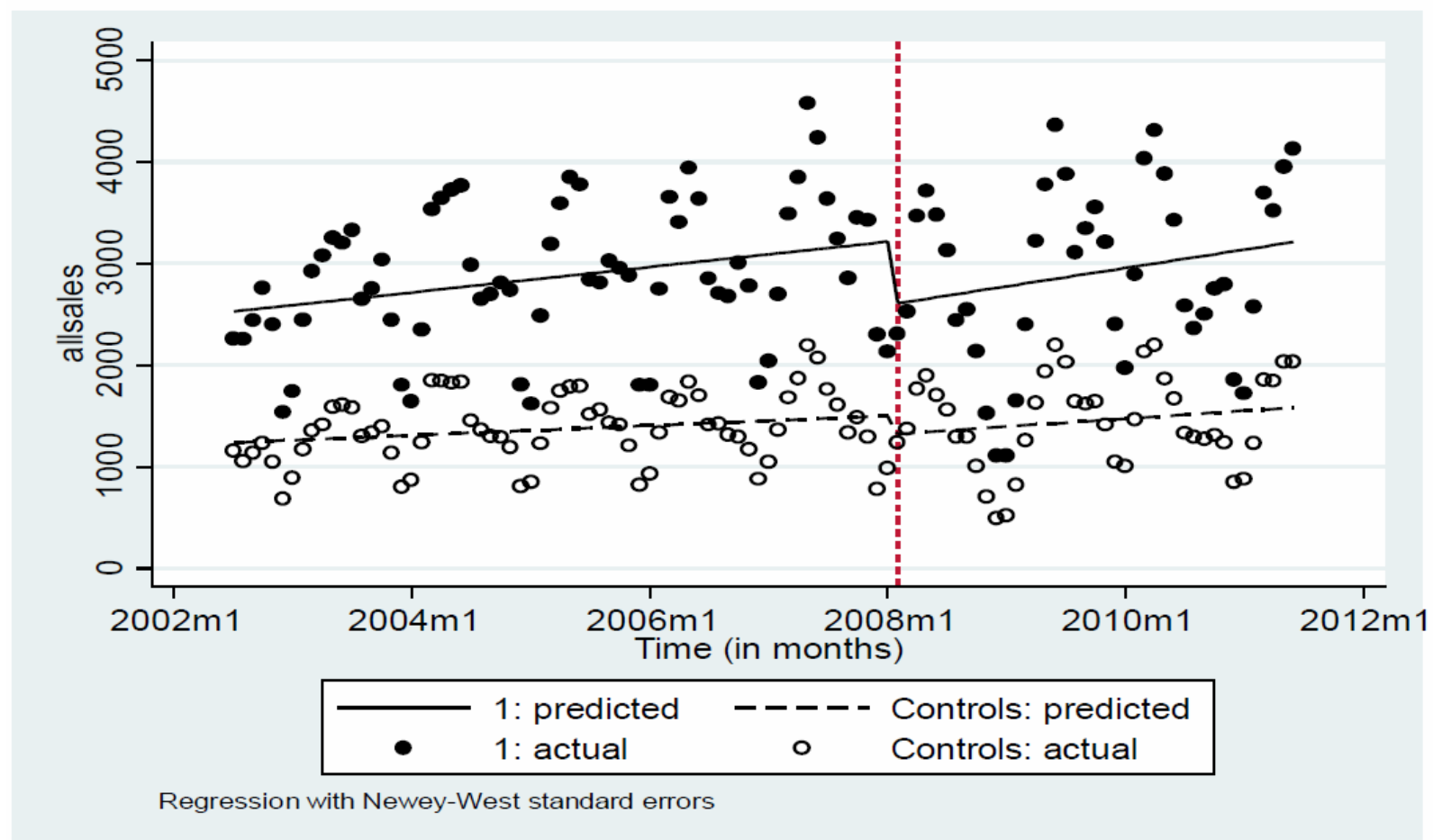
- Multiple groups
  - Control and treated
    - Z denotes the cohort assignment
    - Earlier coefficients for the control group
      - Sales in West, East, and North of the City of Toronto
      - Toronto is the treated group
  - Difference in level of treated and control prior to intervention ( $\beta_4$ )
  - 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



# ITSA , All sales

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

Variable	Single Group Analysis	Multiple Group Analysis	
	All Sales	All Sales (Newey-West standard errors)	All Sales (prais standard errors)
T	10.429643*	3.9855801	0.0574048
LTT	-618.33292	-182.05447	175.8404
T*LTT	4.6830745	2.5361969	5.6884381
Z		1284.678***	1316.1117*
Z*T		6.4440631	3.427895
Z*LTT		-436.27845	-145.19724
Z*T*LTT		2.1468777	5.9494465
_cons	2517.7653***	1233.0873***	1298.0564***
N	108	432	432
r2_a			0.07121781
ll			-3136.6076

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001



# ITSA , Detached

**Table 4: Impact of Land Transfer Tax (LTT) on Detached Houses in Toronto**

Variable	Single Group Analysis	Multiple Group Analysis	
	Detached Sales	Detached Sales (Newey-West standard errors)	Detached Sales (prais standard errors)
T	2.2840211	2.3200043	-0.04052782
LTT	-273.52494	-104.08983	107.37143
T*LTT	2.3086619	1.7039795	3.0684478
Z		326.55676***	319.51467
Z*T		-0.03598319	-0.38090983
Z*LTT		-169.43511	-99.838745
Z*T*LTT		0.60468237	0.31264164
_cons	1015.0896***	688.53279***	733.38676***
N	108	432	432
r2_a			0.02089111
ll			-2829.1973

legend: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

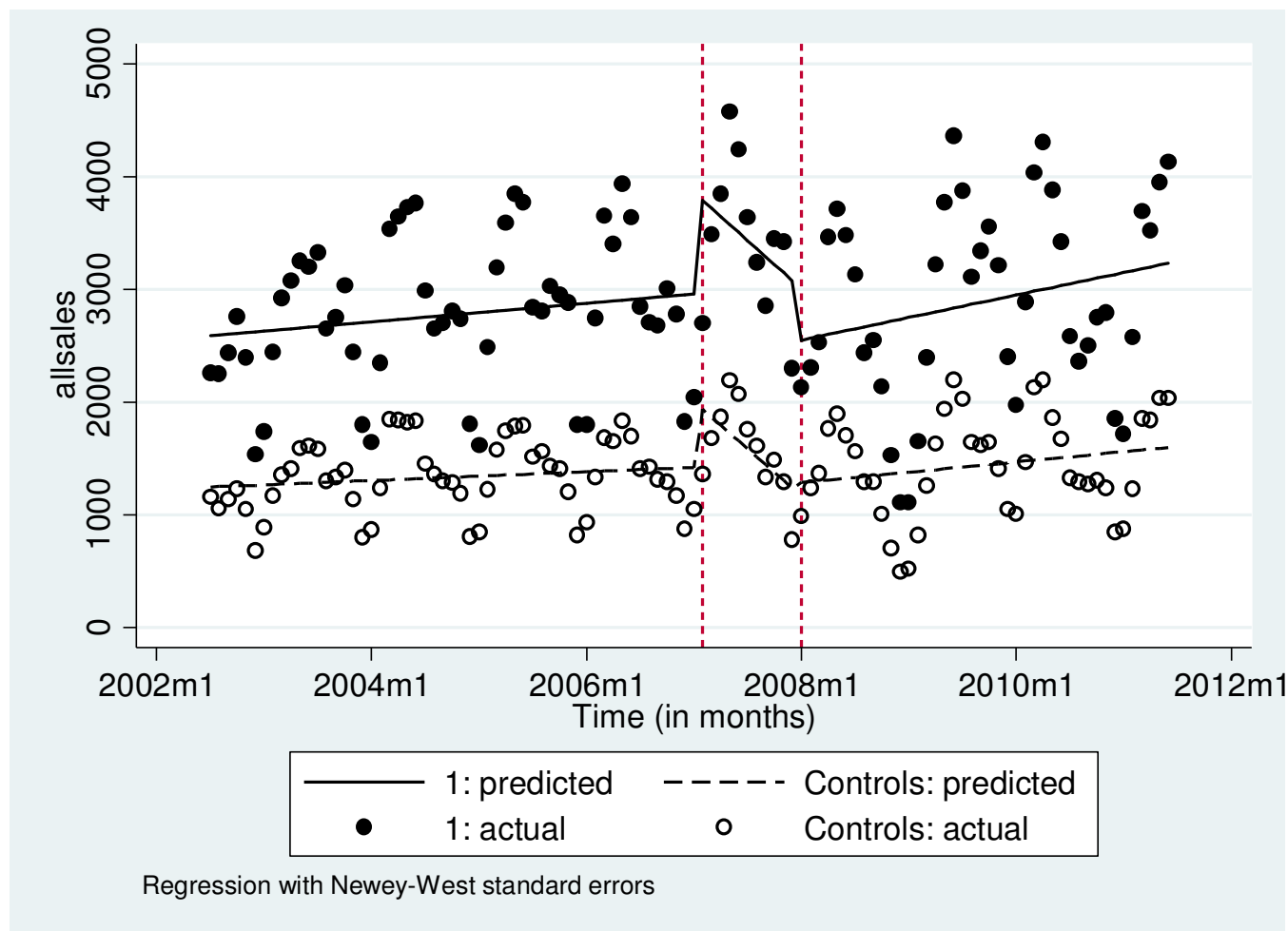
# ITSA , Condominiums

**Table 6: Impact of Land Transfer Tax (LTT) on Condos Sales in Toronto**

Variable	Single Group Analysis	Multiple Group Analysis	
	Condos Sales	Condos Sales (Newey-West standard errors)	Condos Sales (prais standard errors)
T	6.3332269***	0.72369436	0.43618108
LTT	-182.77118	-16.025044	11.085231
T*LTT	1.4197348	0.43246127	0.68337121
Z		727.01221***	746.38576***
Z*T		5.6095326***	4.2443107
Z*LTT		-166.74614	-40.109804
Z*T*LTT		0.98727349	2.5918566
_cons	833.75984***	106.74763***	111.56261
N	108	432	432
r2_a			0.44666656
ll			-2575.3981

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

# Forward Buy



# 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