Tracking impacts of light rail investment through a volatile housing market: Combining qualitative and quantitative methods to understand dynamic influences of demographic change and investment incentives

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ACSP, Buffalo, NY, 26 Oct 2018

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Why is Kitchener-Waterloo Region interesting?

- **Increasing people** and employment
- **High tech hub** with entrepreneurship and knowledge-intensive economy
- A new light rail transit system as a key strategy for urban revitalization and overall economic development strategy
- **Housing boom (price volatility), but why?**

**In 2016:**
- 535 K residents

**By 2031:**
- 742 K residents

…live in the Region of Waterloo.

(Region of Waterloo, 2016)

- Toronto speculative buyers?
- Foreign buyer tax?
- Low interest rate?
- Urban growth boundary?
- Massive shortage?
Research questions

• Evidence of LRT-led investment in the Central Transit Corridor?
• What causal relationships and feedback are evident?
• What explains the hot housing market—expansion of Toronto influence, or LRT influence?
Urban dynamics

Residential location choice

Commercial location choice

Retail location choice

Transportation and Accessibility

Demographic and economic diversity

Regional competitiveness / attraction

In-migration / skills retention

Government policy / investments

Waterloo Environment
Annual Average TREB MLS® System – Sale Price for the Greater Toronto Area, 2008–2017

Source: Toronto Real Estate Board

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The story elements ..

1. What intensification has occurred to date?
2. Who is investing, and why?
3. What market effects can we identify?
4. Where are the missing markets?
What intensification has occurred to date?

- Region of Waterloo monitoring project, collaborative design with our group

(All graphs in this section from the Region of Waterloo “Monitoring Change in the CTC” project : https://www.regionofwaterloo.ca/en/regional-government/land-use-planning.aspx)
Population - Not growing
  - Under 18% of region’s population
Building Permit Values ($ millions) adjusted to 2011 dollars

Type

CTC

Region


$1000 $800 $600 $400 $200 $0

Residential

Single & Semi-detached

Apartment

Townhouse
Who is investing, and why?
Developer Survey Highlights (Jinny Tran)

• Conducting surveys with 17 residential developers
• Fairly wide distribution of specializations and built form found; shift towards intensified and mixed use forms—but segmented target markets (no family housing for core)
• Few developers consider what others are doing when making plans
• Response to LRT generally positive, but more so for infill developers than the other two—some “wait and see” expressed
Realtor interviews/Focus Groups (Justin Cook/Jennifer Dean)

Three broad themes emerged from discussions:

1. CTC development and investment
2. Resident perception of attractiveness of CTC
3. CTC creating connections within region and beyond
Findings: 1. CTC Development and Investment

“We're seeing investment, local people that are buying in uptown, or downtown just for investment purposes. I think the families, the 30 plus demographic, that are now looking for more investment opportunities, they realize [the CTC] is something they can grasp and they realize that's an up and coming area.”
“Even some of the older demographics, I think they are really looking forward to [the LRT]. They are definitely buying to be close to it, not right on it but somewhat close to it, within a block or two. So it will be really good. I think it will impact [the Region] in a positive way.”
Findings: 3. Creating Connections

“In a real estate perspective, all the condos, the Google building… the Zehr group building; those are only there because of the LRT. They're looking at it as it’s not just a north and south train, it’s connection to Barrie, Hamilton, Niagara. All these places are going to have LRT that lead to these fast trains that all spine into Toronto. That's what [people are] investing on.”
What market effects can we identify?
Property Size Preferences & Value of Outdoor Space Under Intensification – DeFields, 2013

• In 2012, DeFields surveyed 206 residents in the Kitchener-Waterloo area
• Focused on property size preferences, relocation plans, landscaping choices, and factors favourable to higher density living

Low density defined as single detached houses on medium to large properties

High density defined as small detached dwellings, townhouses, condominiums and apartments
What density do people prefer?

• Low density homes are preferred by:
  – Couples with children
  – 25-45 year olds
  – Household incomes of $75k to $99k

• Low and high density are preferred by:
  – Couples without children
  – 46-65 year olds
  – Household incomes of $54k to $75k, $100k to $250k

• High density homes are preferred by:
  – 66+ year olds
  – Retired
What factors are important to people when they would not have a yard?

- Having a nice view
- Close to a park or forest
- Having a porch or balcony
- Walking distance to an urban centre
- Sense of privacy
How do we make high density living more attractive to low density residents?

1. Market high density living to those 55+

2. Incorporate private greenspace into buildings

3. Design open space to accommodate private uses

4. Preserve urban forests, parkland & open space

5. Use attractive landscape styles around buildings

Only the first point happening!
Pre-LRT hedonic Model (Babin)

- Statistical model to deconstruct property value (assessment and transaction models)

\[
\ln(Y_i) = \rho W y_i + \beta_0 + \beta_1 \times S_i + \beta_2 \times N_i + \beta_3 \times E_i + u_i
\]

\[
S_i = \begin{bmatrix}
    \text{Living Area}_i \\
    \text{Yard Size}_i \\
    \text{Building Age}_i
\end{bmatrix}
\]

\[
N_i = \begin{bmatrix}
    \text{In CTC}_i \\
    \text{Rate of Appreciation}_i \\
    \text{Education Rate}_i \\
    \text{Population Density}_i \\
    \text{Time Period}_i
\end{bmatrix}
\]

\[
E_i = \begin{bmatrix}
    \text{Open Space Access}_i \\
    \text{Transit Access}_i \\
    \text{Walkability}_i \\
    \text{Open Space Adjacent}_i \\
    \text{Regional Road Adjacent}_i \\
    \text{Open Space Access} \times \text{Yard Size}_i \\
    \text{In CTC} \times \text{Open Space Access}_i \\
    \text{In CTC} \times \text{Transit Access}_i \\
    \text{In CTC} \times \text{Walkability}_i \\
    \text{Open Space Access}_i \times \text{Transit Access}_i \\
    \text{Open Space Access}_i \times \text{Walkability}_i \\
    \text{Walkability}_i \times \text{Transit Access}_i
\end{bmatrix}
\]
Hedonic model highlights

• Model run using data from 2005-2015, to establish pre-LRT baseline
• Neighbourhoods with higher appreciation rates showed higher values
• After 2011, houses inside the CTC sold for around 4.5% more than houses outside
• Walkability showed a premium; more so inside the CTC
Renter’s survey and hedonic model (Xinyue Pi)

- Showed 7.5% rental premium in CTC
- Showed around 8% premium for high-rise and 8% discount for low-rise apartments, relative to other types
- Students paid more; households with children and singles paid less
Housing Types: by Subgroups

**Current**

• **18-24 and 55+ age groups** mostly live in apartment buildings

• The **higher the income** is, a higher the percentage of respondents of the group lives in high-rise apartments.

**Ideal**

• **Couples with children** have the greatest desire towards renting a house, especially single-detached

• **Retired, seniors and students** generally prefer apartments to houses.
Number of bedrooms: Current vs. Ideal

Percentage of Respondents

- 1-bedroom: 17% (Current), 9% (Ideal)
- 2-bedroom: 39% (Current), 35% (Ideal)
- 3-bedroom: 31% (Current), 17% (Ideal)
- 4-bedroom: 7% (Current), 17% (Ideal)
- 5-bedroom: 21% (Current), 3% (Ideal)
- 6-bedroom: 3% (Current), 3% (Ideal)
- 7-bedroom: 1% (Current), 0% (Ideal)

Number of bedrooms
Ideal Housing Size

- < 1000 sqft: 23%
- 1000-1499 sqft: 19%
- 1500-1999 sqft: 9%
- 2000-2499 sqft: 2%
- > 2500 sqft: 2%
Ideal Yard Size

- **Medium/small yards:**
  - Couples with children
  - Couples without children
  - Lone-parent families

- **Patio/deck/balcony:**
  - Students
  - Seniors
  - One-person households
Buyer/seller survey and two-Stage Demand analysis

1. Key points from the first-stage hedonic model

- Model run using housing survey data with 357 transactions from 2015 to 2017
- Housing structural characteristics (housing type, bedroom, bathroom, yard size, garage) strongly correlated with values
- Most neighbourhood characteristics (open space amenity, residential density) not significantly correlated with values
- No significant property value premium from the LRT has been realized (limited samples in the CTC, especially for high-rise condos)
2. Key points from the second-stage regression

1) Households choose **structural attributes** of homes, mainly based on household **income** and **household composition**
   - Households with **children** are willing to pay more for single-detached housing with larger private yard and more garage space

2) The GTHA buyers are significantly willing to pay more for single-detached housing; with no other preference difference compared to the local buyers
Distance to the nearest LRT stop

- Most homes are more than 3km away from the LRT stop
- No significant difference among single, semi and town houses in terms of locational distribution.
- Apartments are closer to LRT stops, but fewer samples
One-person households and couples without children have purchased homes closer to LRT, compared to families with children, including couples with children and loneparent families.
Top 10 move motivations of local buyers
(with sample size = 293)

- Upsize: 60%
- Better environment quality: 50%
- More affordable: 40%
- Expecting market prices to go up: 40%
- Expanding family size: 30%
- Better access to workplace: 20%
- Getting married/partnership: 20%
- Better access to facilities: 10%
- Taking advantage of the market: 10%

Top 10 move motivations of GTHA buyers
(with sample size = 40)

- More affordable: 60%
- Expecting market prices to go up: 40%
- Upsize: 40%
- For investment: 30%
- Getting a new job: 30%
- Seeking new job opportunities: 20%
- Better access to workplace: 10%
- Better access to facilities: 10%
- Taking advantage of the market: 10%
• GTHA buyers have purchased higher-price homes
• They bid higher above listing prices

Since 2016-Q2, Mean sales price is above Mean listing price, for both types of buyers.
Where are the missing markets?

• Residential home owners—green space in compensation for downsizing/intensification
• Renters—lack of appropriate size option in all income categories-open space less important
• New buyer survey
  – May under-sample core area buyers due to methods and lack of supply
  – Ideally want a larger, less intensified product than renters
  – Still, intensified product as bundles of desired attributes not there
• Developers are unresponsive to information about demand
Take-home points

• Builder investors responding to LRT/intensification promise through brick-and-beam investments, small residential, and some office
• Certain demographics responding strongly to perceived investment and amenity opportunities
• Potential over-build of small residential threatens market stability
• New family residential is completely missing in core areas
• Creates a washing-machine cycle of migration between cores and suburbs through life course
• Housing bubble and LRT investment appear to be independent
Implications for modelling

• Clear supply constraints
  – Lack of supply for families in the central transit corridor
  – Lack of strategic behaviour likely to lead again to oversupply dynamics
  – Actual demand seems poorly understood/anticipated

• Clear evidence of market segmentation
  – “Urban lifestylers” create demand for core properties
  – Locals more likely to see suburban properties
  – Future regression/modelling will respond to this new information
Acknowledgements

• Team members:
  – Profs Dawn Parker, and Jennifer Dean, Jeff Casello,
  – Former post-doc Xiongbing Jin
  – Students: Andre Antanaitis, Robert Babin, Justin Cook, Pedram Fard, Yu Huang, Erica Ogden, Xinyue Pi, Veronica Sullivan, Filiz Tamer, Jinny Tran, Kevin Yeung, AJ Wray, Ginny Hang

• Funding Sources:
  – SSHRC Insight Grant (SSHRC # 435-2012-1697) entitled “Urban intensification vs. suburban flight: An integrated residential land-use and transportation model to evaluate residential land market form and function
  – China scholarship programme (Yu Huang)
Collaborating partners

- Region of Waterloo
- Cities of Waterloo and Kitchener
- Kitchener-Waterloo Association of Realtors,
- Coldwell Banker Peter Benninger Realty
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