NUS SDE4, Singapore's First New-Build Net-Zero Energy Building

Cool Cities: The Value of Green Infrastructure

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Summary

- A very cool paper on the value of urban trees!
- Research design relies on two exogeneous variations: 1) EAB infestation; 2) short-run weather fluctuations and the positions of the trees
- Main findings

- One additional tree within a range of 50m from the house increases property prices by about 1.2%
- Substantial energy savings from urban trees

Why is there a tree premium?

- **Energy savings** (discussed in this paper, in terms of solar-shading potential and wind-sheltering potential)
- Is it always energy savings? Solar-shading may increase energy consumption in winter?
- Effect could be small
- **Aesthetic value of the house**
- Individual preferences are heterogeneous (example: according to *fengshui*, having a tree near the front door is undesirable because of its solar-shading potential…)
- Other benefits (e.g., noise reduction; relieve mental stress etc.)
- A result of ovb (e.g., larger units are more likely to afford trees)

Comment 1: The 1.2% price premium
(which seems to be a lower bound of the estimates)

- Two concerns
- 1) difference between OLS and IV
- 2) large variation in magnitude (same for Table 4. 4.8%)

Table 2. The amenity value of trees.

	Transaction price (log)			
	(1)	(2)	(3)	(4)
Panel B: Second stage				
Tree coverage	-.001	.017	-.001	.012
	(.0000)	(.008)	(.0000)	(.006)
Extended Controls	No	No	Yes	Yes
F-statistic	-	33.94	-	43.34
Observations	164,806	164,806	164,806	164,806

Table 3. The amenity value of trees at different distances.

	Transaction price (log)				
	(1)	(2)	(3)	(4)	(5)
Panel B: Second stage					
Tree coverage	.113	.080	.079	.113	.144
	(.052)	(.036)	(.036)	(.057)	.086
Extended Controls	Yes	Yes	Yes	Yes	Yes
F-statistic	43.34	68.29	45.30	16.49	7.30
Observations	164,806	164,806	164,806	164,806	164,806

Comment 2: Research design

- Tree data is 2007 and 2017 (or 2008 and 2018?) while property transactions cover 10 years (2007 to 2017)
- Instead of assigning TD values based on an arbitrary year cutoff (2011), why not only using property transaction data in 2007 and 2017?
- Is it possible to run a diff-in-diffs (treatment: houses surrounded by ash trees; control: houses surrounded by other trees; post: after EAB infestation)
- Have access to a specific register recording the dates of EAB removals and TreeAzin Injections (match with transaction records?)

Comment 3: Energy consumption (cont.)

- Measurement of extreme temperature (other than heat wave dummy)
- In the environmental economics literature, temperature bins are included in the regression instead of a single dummy (or the number of extreme weather days if at the monthly level)
- Also need to control for other weather variables in the equation, including precipitation, humidity, visibility, wind etc. (I assume there is spatial variation in terms of weather within Toronto)
- Effect in winter: wind sheltering (-) and solar shading (+)?

Comment 3: Energy consumption

- **Contribution to the climate change literature**: use more AC or plant more trees for adaptation

- Planting trees is not a substitute for reducing ongoing GHG emissions
- but the discussion on the energy saving effect of trees could be a new
- (the idea has been discussed in some building and environment literature but without rigorous statistical analysis. Pandit and Laband (2010 Ecological Economics) also studies this question with statistical model but with only160 households..)
- Calculate the energy consumption savings in terms of GHG emission

------Electricity structure of Canada (Hydro (58%), nuclear (15%), natural gas (10%))

------Electricity structure of China (Thermal (72%), hydro (10%), wind (4%), nuclear (3%))

- **Contribution to the energy consumption literature**

- Green infrastructure reduces energy consumption
- Is there a rebound effect?

Minor issues

- Replace year fe with year-month fe
- Table 4 why subsample no. of obs the same as full sample (columns 3, 4)
- When studying the impact of trees on energy savings, why defining tree dummy based on 20m distance instead of 50m? (page 16)
- Energy meter fixed effect: will it capture the change of households living in the same housing property?
- Magnitude on energy savings in Table 5 (around 30%) seems to be different from the magnitude shown in Figure 6 (8-10%)?

A very interesting and promising research!