Housing rent and road pricing in Milan

Evidence from a geographical discontinuity approach

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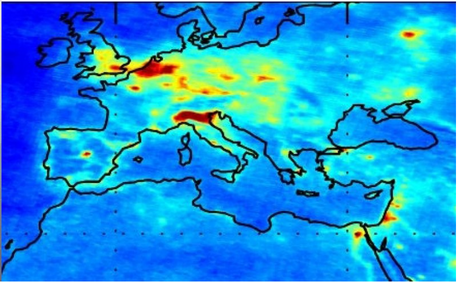

Socio-economic issues of urban traffic

- The cost of congestion to the London economy was $8.5bn in 2013, and would rise to $14.5bn in 2030. The cumulative cost over that period would be more than $200bn (Inrix, 2014).
- 3.7 million deaths per year are attributable to pollution, mostly generated in the cities through traffic. 7,000 deaths in London per year (WHO, 2012).
- Recently, a group of cities has implemented road pricing schemes (i.e. a charge to enter the city center). Among them, London (London Congestion Charge, 2003)) and Milan (Ecopass, 2008).
- Policy makers claim that RP is effective. They build their opinions on simple before-after comparisons (traffic, pollution, accidents)....**What about the causal effect?**

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The research in a nutshell

- In this research, I estimate the *causal* effect of the Ecopass on housing rents
- By using regression discontinuity in time and space, the Ecopass is evaluated in terms of variation in housing rents.
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3. Methodology and data
4. Results
5. Concluding remarks and current research

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- Most of the literature deals with the theory of road pricing: bottlneck model and cordon pricing in monocentric cities.
- Recent research on the political economy - acceptability of road pricing (DeBroek and Proost, 2013; Russo, 2013; Percoco, 2014a).
- Empirical literature on CBA (London and Milan) with mixed results: negative for London (Prud'homme and Bocarejo, 2005) or slightly positive for Milan (Rotaris et al., 2012).
- Failure in identifying the causal effect of road pricing (simple before-after statistics). Counterfactual analysis in Percoco (2013; 2014b; 2014c).
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The Ecopass

- The Ecopass was introduced on January 2008.

- The objective was to reduce congestion and pollution in the central area of Milan, covering an area of 8.2 sq. km (about 1% of the territory of Greater Milan).
  - Daily payment to obtain permission to move freely in the area (2-10 euros). Policy's enforcement through cameras and automatic recognition of cars' license plates.
  - Operation from Monday to Friday, from 7:00 AM to 7:00 PM. Exemptions are provided for public vehicles and green vehicles.
  - Referendum in 2011 and transformation into Area C (claim: less pollution charge, more congestion charge)

- Slight socio-economic convenience (Rotaris et al., 2010).

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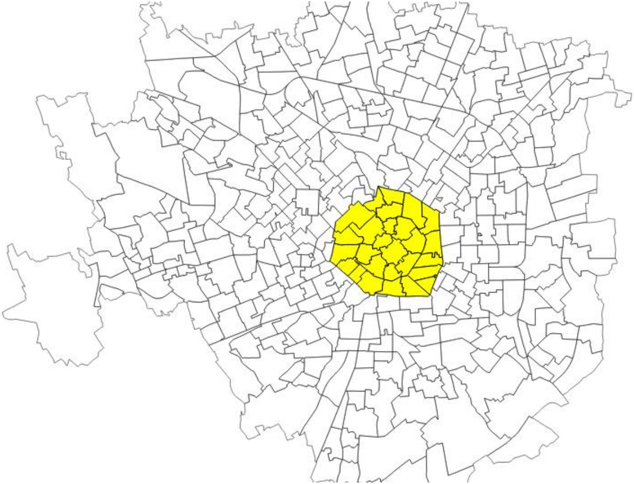
Figure: The Ecopass



Methodology

Estimate the parameter ρ on treatment of this form:

$$y_{it} = Treated_i + \rho Post_t + \gamma Post_t \cdot Treated_i + f(\tilde{x}_t) + \varepsilon_i \qquad (1)$$

where:

$y_{t,T}$ is the (log) average housing rent in period t in area i

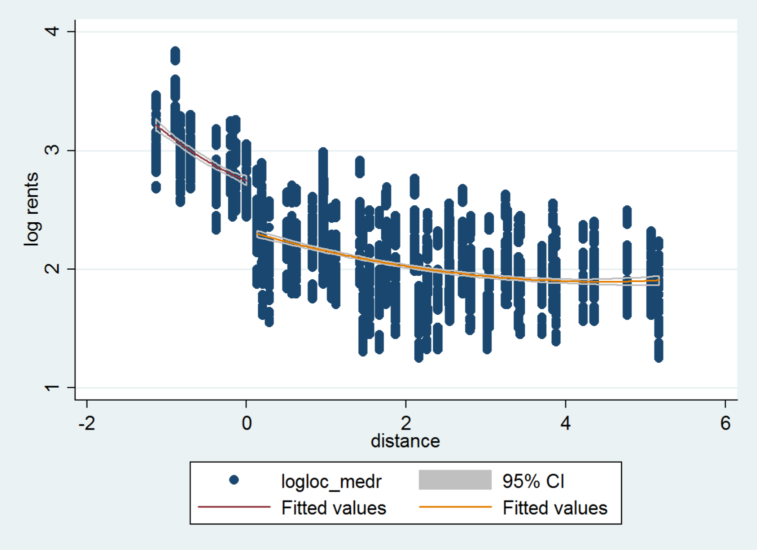
$\tilde{x}_{t,T}$ is the forcing variable properly normalized (a spatial trend from the Duomo centered at the border of the charged area). $f(\tilde{x}_{t,T})$ is a 5-th order parametric polynomial trend

Post is the treatment variable. It measure the average impact in the whole city London

$Treated_i$ is a dummy taking the value of 1 for monitoring stations within the treated area.

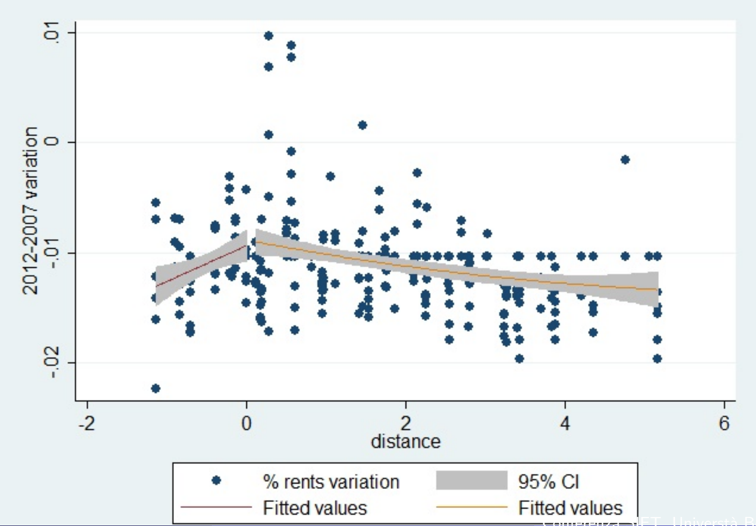
Adjustment for seasonality, housing types, preservation status.

Figure: Housing rent: levels



Data

Figure: Housing rents: temporal differences



Descriptive statistics

Table: Descriptive statistics

Zone	N	Mean rent (€ $\times$ month /sq.m)	Standard Dev.
Central	720	19.42	6.15
Semi-central	864	10.19	2.96
Peripheral	2,088	7.45	2.30
Suburban	288	7.05	2.00
Whole city	3,960	10.19	5.66

Results

Table: Baseline results

Average (log) rents at constant prices	(1)	(2)	(3)
Policy [T(i)×D(i)]	0.00749***	0.00749***	0.00749***
	(0.00230)	(0.00230)	(0.00230)
Distance from the trated area (km)	-0.0907***	-0.0907***	-0.0907***
	(0.0132)	(0.00863)	(0.00861)
Inside the treated area [D(i)]	0.628***	0.628***	0.598***
	(0.0556)	(0.0364)	(0.0718)
Treatment period [T(i)]	-0.00613***	-0.00587***	-0.00613***
	(0.00124)	(0.00124)	(0.00124)
Time trend	-0.0120***	-0.0120***	-0.0120***
	(0.000125)	(0.000125)	(0.000128)
Preservation		Yes	Yes
Type		Yes	Yes
Interaction type*preservation		Yes	Yes
Interactions treatment*pres.*type			Yes

Robustness checks

Different types of polynomial in the spatial distance

Geo diff-in-diff vs diff-in-diff

Pooled OLS vs Random effect

Restriction of the sample

Discussion

Previous results are different with respect to Percoco (2014) who found a decrease in housing prices by 1.2-1.8%

1. Inefficiency in housing markets. The implied rate of return from this evidence and Percoco (2014) is 4%, wherease the user cost estimated by Catter et al. (2004) for Italy is 1%.

2. Road pricing increases the user cost more than rents (through externalities reduction): $P = \frac{R}{r}$; Var r=90-445% for residents (50-250 euros for annual payments); Var R=0.75%.

3. Mis-specfication in Percoco (2014)

Concluding remarks

- Geo-RDD combined with DiD
- Positive effect on housing rents (+0.75%)

- Policy implications:
  - Housing markets is the transmission channel for changes in land use
- Future (current work):
  - (long run) welfare analysis for London
  - road pricing and health (in MIlan)

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Thank you for your attention!

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