Quasi-experimental evidence on the effect of traffic externalities on housing prices

Ioulia Ossokina & Gerard Verweij

CPB Netherlands Bureau for Economic Policy Analysis

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Research question:

What:

Valuation of traffic nuisance

How:

Ex post (quasi-experimental) evaluation of the effect of reduced traffic nuisance on housing prices

Why?

Costs and benefits of policies that influence traffic nuisance

Highway construction

"De eis 'niet horen, niet zien en niet ruiken' blijft voor ons bovenaan staan"

Aanleg A4 Midden-Delfland geen gelopen zaak

"Op 2 september ondertekende demissionair minister Eurlings het Tracébesluit voor de aanleg van de A4. Op zaterdag 25 september werd op het dijklichaam van de A4 een manifestatie gehouden als protest tegen het genomen besluit."

AD, 27/10/09

Verzet tegen nieuwe snelweg tussen A13 en A16 Rotterdam

"De geplande aanleg van een nieuwe snelweg tussen A13 en A16 kan rekenen op massaal verzet van bewoners in de regio Rotterdam. ...

Ook op de Molenlaan in Hillegersberg, waar veel sluipverkeer rijdt, **zal het nauwelijks leiden tot een vermindering van de overlast**, denkt de belangenclub."

AD, 10/09/09

Parking policies

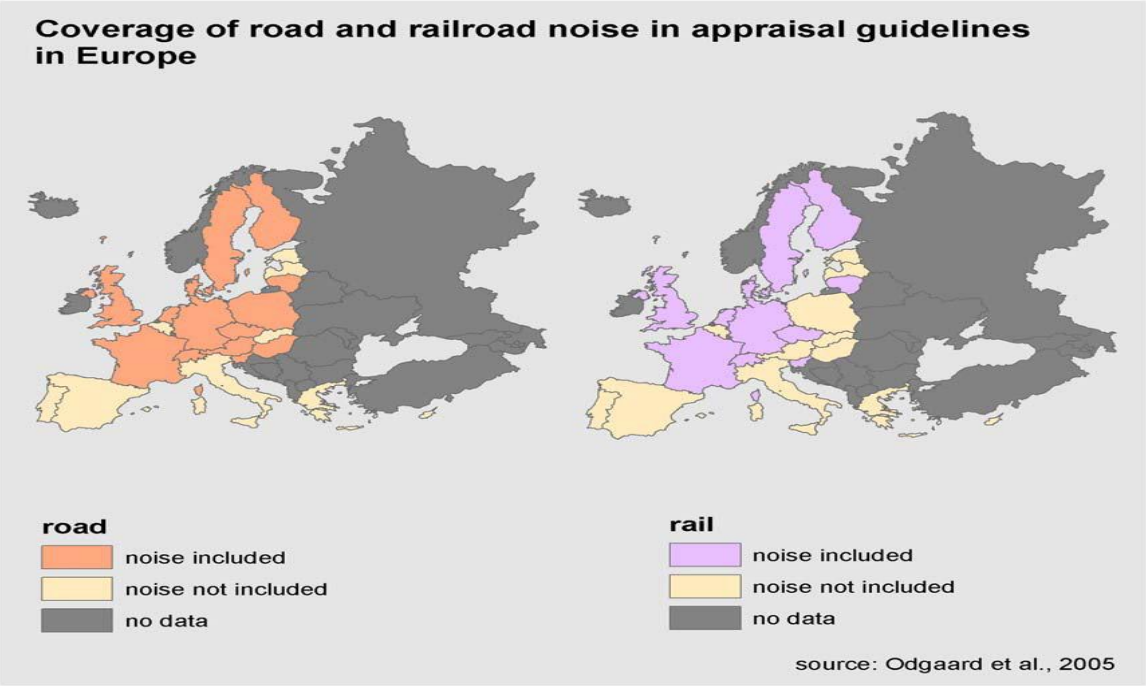
Parkeren levert gemeenten € 533 mln. op

"Volgens de brancheorganisatie detailhandel is het parkeren een melkkoe geworden en wordt het tijd dat de Tweede Kamer ingrijpt."

Telegraaf, 31/08/2009

Valuation of traffic nuisance in practice

- Navrud (2004), Odgaard (2005), Nijland and Van Wee (2008)
- Working Group on Health and Socio-Economic Aspects of the European Commission (WG HSEA 2003)



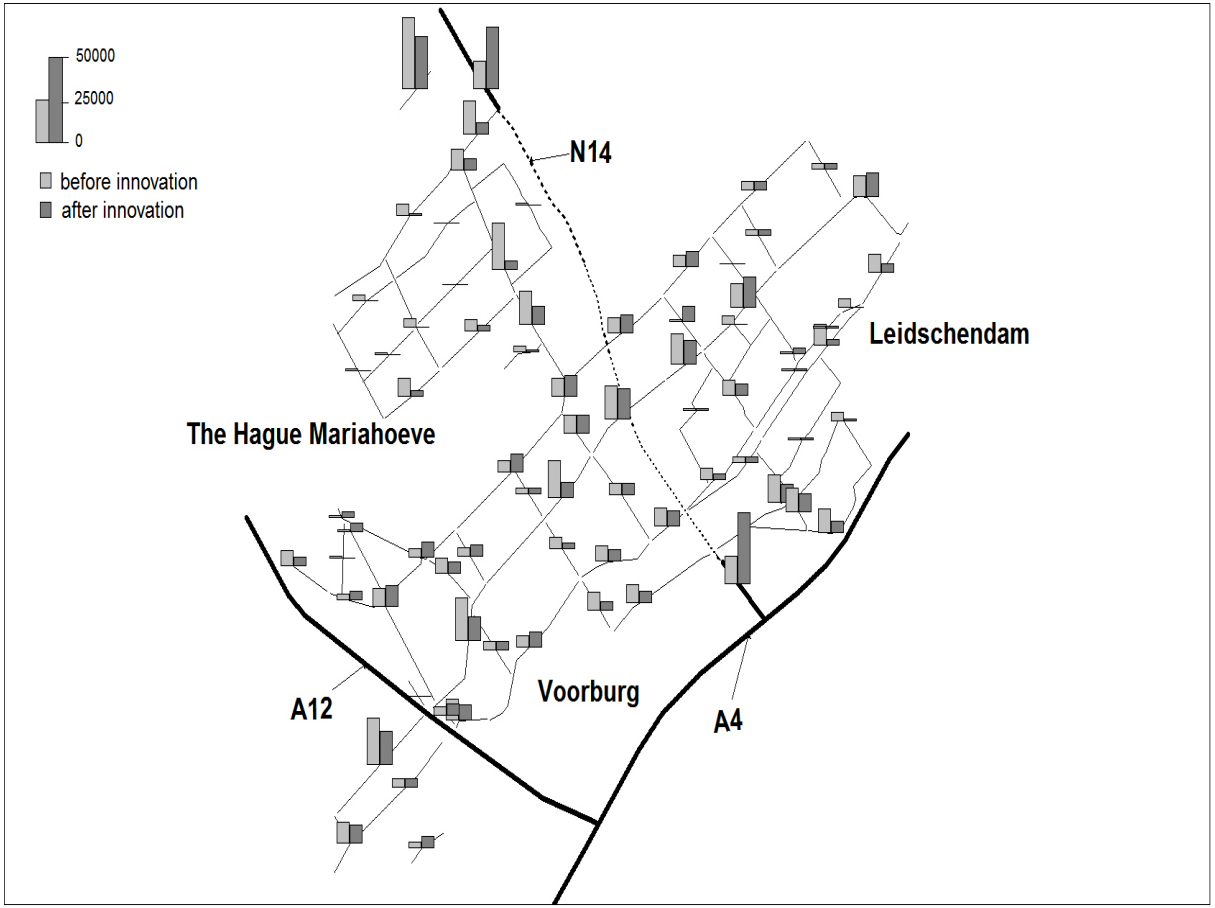
Literature Quasi-experimental

- accessibility effects: Klaiber and Smith (2010), Gibbons and Machin (2005), Koster (2010)
- noise effects (Boes&Nuesch, 2011, McMillen, 2004, Palmquist, 1982)
- effects of air quality (Chay and Greenstone, 2005, Davis, forthcoming)

We add to this literature:

- externalities from local traffic flows,
- effects of the whole bunch of local traffic externalities.
- noise
- polution
- safety
- difficulties with parking, crossing the street
- etc.

Case: construction of a new highway near The Hague led to traffic density changes on local streets (see figure)



1995 - decision taken
1998 - start construction
2003 - opening N14

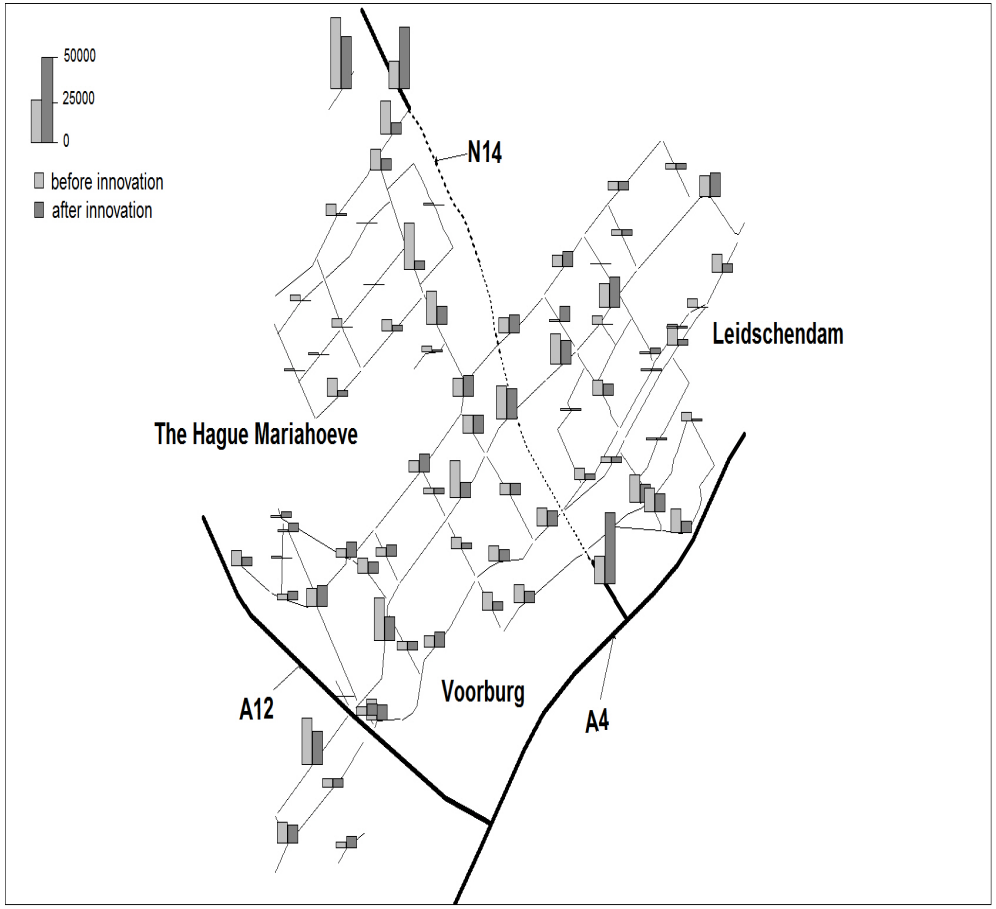
Data: 1998-2006
- home sales,
- traffic density through streets.

Data

Table 3.2 Descriptive statistics

	Affected dwellings, fall in traffic density		Affected dwellings, rise in traffic density		Not-affected dwellings	
Variable	Before	After	Before	After	Before	After
Price	170020	212305	208364	254648	182043	221559
Traffic density (in thousand cars per day)	8.6	4.5	5.4	6.2	.26	.27
Number of observations	835	448	369	205	4725	2924

Methodology



Identification strategy:

- data before- and after-period,
- variation in traffic density change,
- control for other influences on affected dwellings,
- test for anticipation effects.

Hedonic regression, postcode unit fixed effects, clustered errors

$$\ln P_{it} = \alpha + \beta_1 \ln D_{it} + \beta_2 SQ_{it} + \gamma_1 X_{it} + \gamma_2 Y_t + \gamma_3 I_{LM,2004-2006} Y_t + f_{j(i)} + \varepsilon_{it}$$

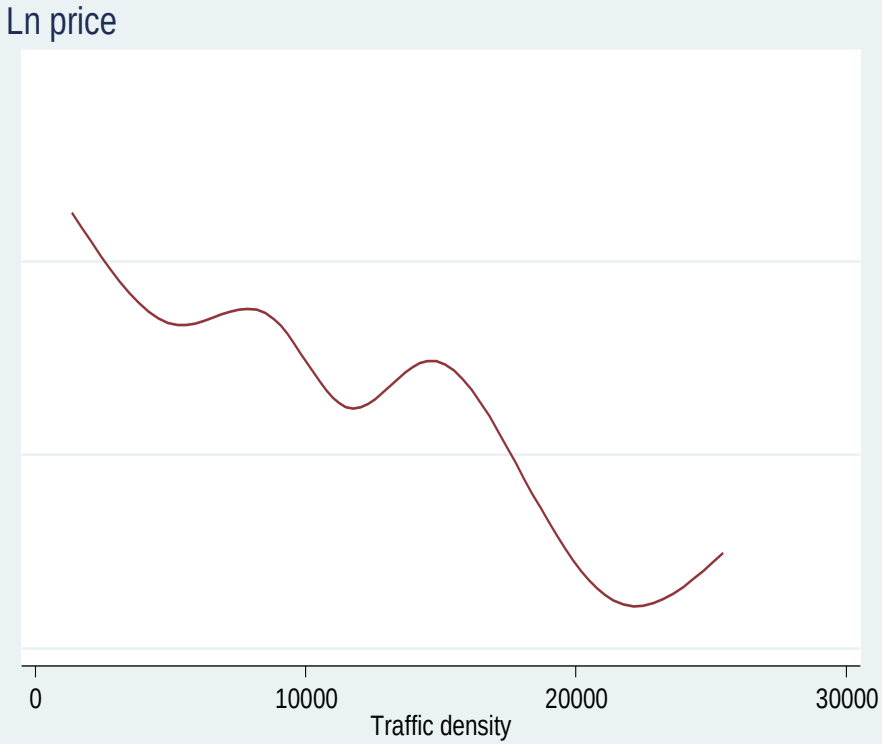
- P is price of dwelling *i* in year *t*,
- D is the traffic density,
- SQ controls for the changes in spatial quality near the highway,
- X is a vector of the structural housing attributes,
- Y is the general time trend, IY are town-specific time trends
- f is the fixed effect of the postcode unit of the house,
- *β* and *γ* are coefficients to be estimated,
- ε̇ is the residual term.

Estimated effects traffic density

	Only houses adjacent to road	Geographical range of 100 m.	Geographical range of 40 m.
	(1)	(2)	(3)
Price elasticity to traffic density, adjacent to street	-0.019***	-0.020***	-0.020***
	(0.005)	(0.005)	(0.005)
Elasticity to density, distance (0,20]		-0.014***	-0.010**
		(0.005)	(0.005)
Elasticity to density, distance (20,40]		-0.010**	-0.006*
		(0.004)	(0.003)
Elasticity to density, distance (40,60]		-0.006*	
		(0.003)	
Elasticity to density, distance (60,80]		-0.004	
		(0.003)	
Elasticity to density, distance (80,100]		-0.002	
		(0.002)	

Flexible and piece-wise log relationship price-density

Effect of a marginal density increase larger at higher densities. This is in line with the noise literature.



Conventional approach leads to lower estimates

- fixed effects on the level of neighbourhoods (larger statistical entities than postcode units)
- control for land use characteristics, social-economic characteristics

	Baseline estimation	Conventional estimates
Price elasticity to traffic density, houses adjacent to street, medium densities	-0.018***	-0.003
	(0.005)	(0.002)
Price elasticity to traffic density, houses adjacent to street, high densities	-0.101***	0.057*
	(0.029)	(0.032)

Conclusions

We have studied the valuation of traffic nuisance
- quasi-experimental estimation of the effect of a traffic density change on the housing prices.

Findings:
- Halving of traffic density leads to:
  2% price increase on medium density streets,
  higher price increase on high density streets.

- The effect is present up to 40 meter distance from the street.

- Conventional estimates tend to be biased.