



Centre for Transport Studies

STOCKHOLM

Effects of Charges Comparison Gothenburg - Stockholm

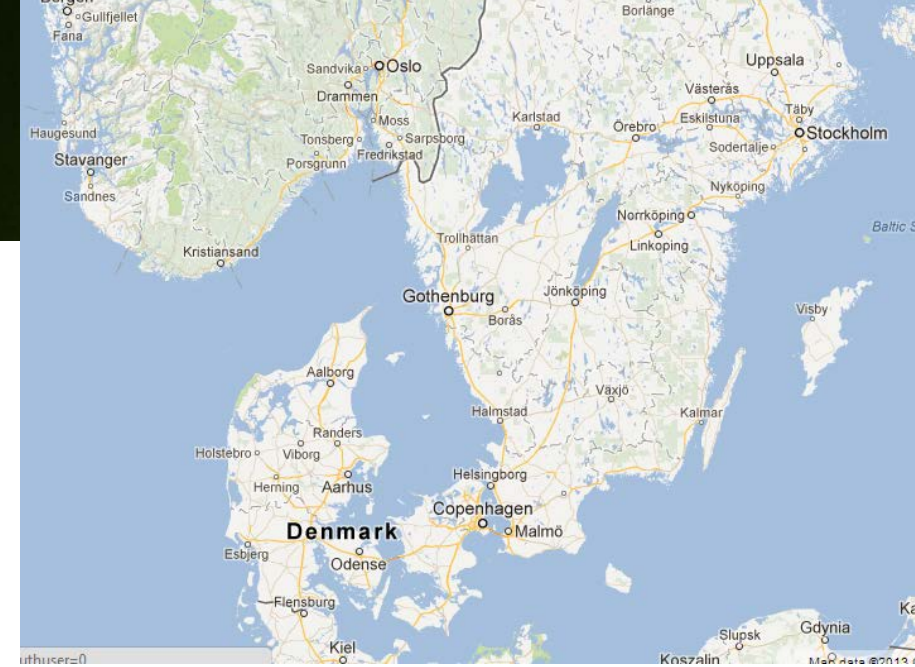
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Stockholm and Gothenburg



- 2 million people
- High public transport share
- Road congestion in over bridges
- Built on 14 islands



- 1-0.5 million inhabitants
- Lower public transport share/low density
- Less road congestion/freight hub
- River with only 3 – 4 crossings

Similarities:

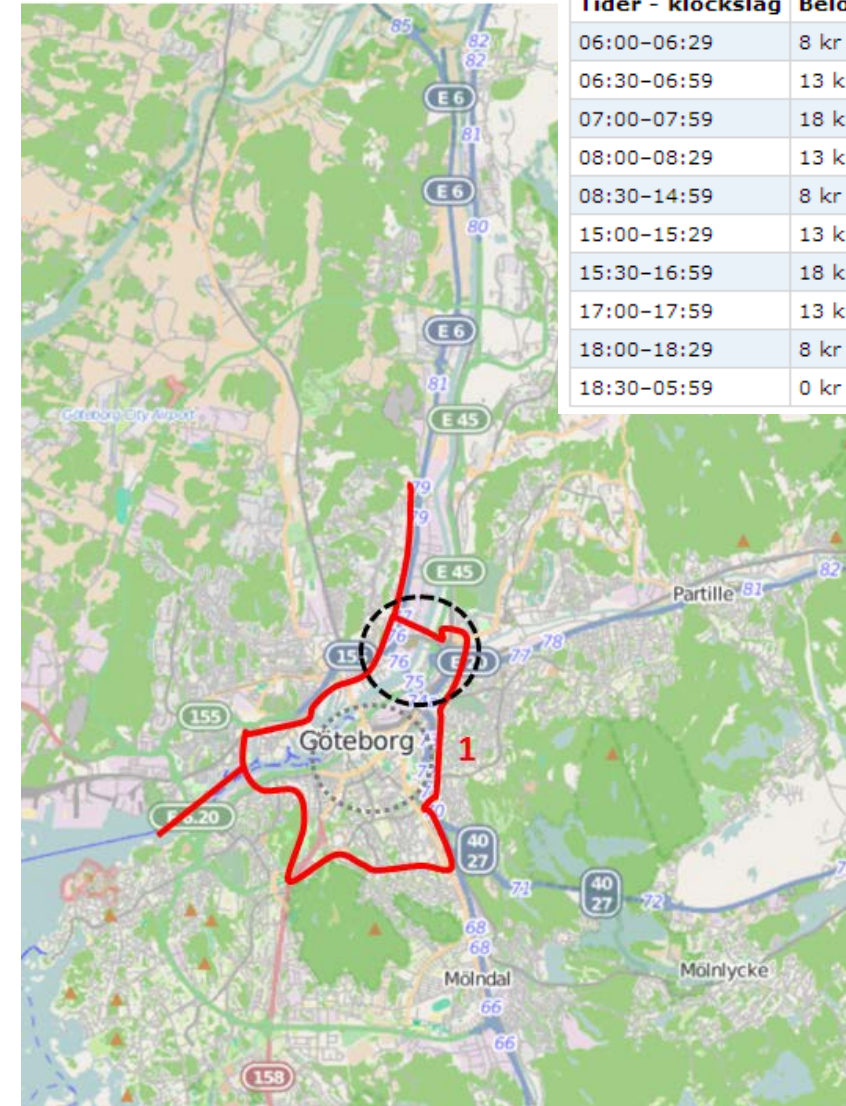
- Time-of-day dependent cordon pricing

Differences:

- A multi-passage rule states
- Public transport share (density)
- Size and Congestion levels
- Location of congestion
- Topology 38/18 check points
- Objectives/Drivers
- Public opinion



Time	(SEK) Amount
06.30-06.59	10 kr
07.00-07.29	15 kr
07.30-08.29	20 kr
08.30-08.59	15 kr
09.00-15.29	10 kr
15.30-15.59	15 kr
16.00-17.29	20 kr
17.30-17.59	15 kr
18.00-18.29	10 kr
18.30-06.29	0 kr



Tider - klockslag	Belopp
06:00-06:29	8 kr
06:30-06:59	13 kr
07:00-07:59	18 kr
08:00-08:29	13 kr
08:30-14:59	8 kr
15:00-15:29	13 kr
15:30-16:59	18 kr
17:00-17:59	13 kr
18:00-18:29	8 kr
18:30-05:59	0 kr

- What can we learn about transferability of the effects, acceptability and adaptation mechanisms?

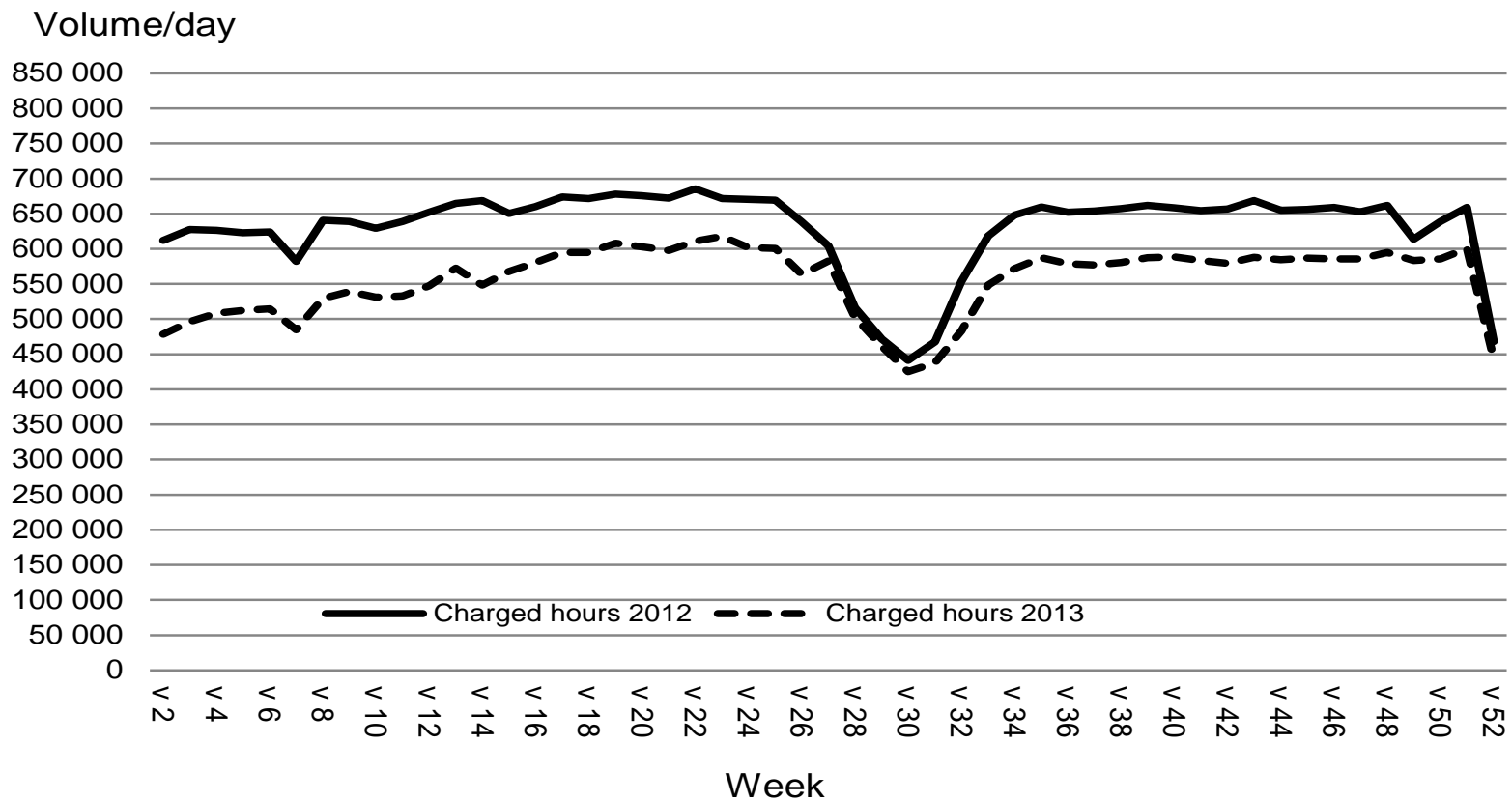
Objectives of the Gothenburg Charges

- 1 million € net revenue in 2015.
 - 30% more than the Stockholm revenues (Gothenburg being less than half the size).
- Congestion reduction (required by the law)
- Reduction in air polluting emissions from traffic

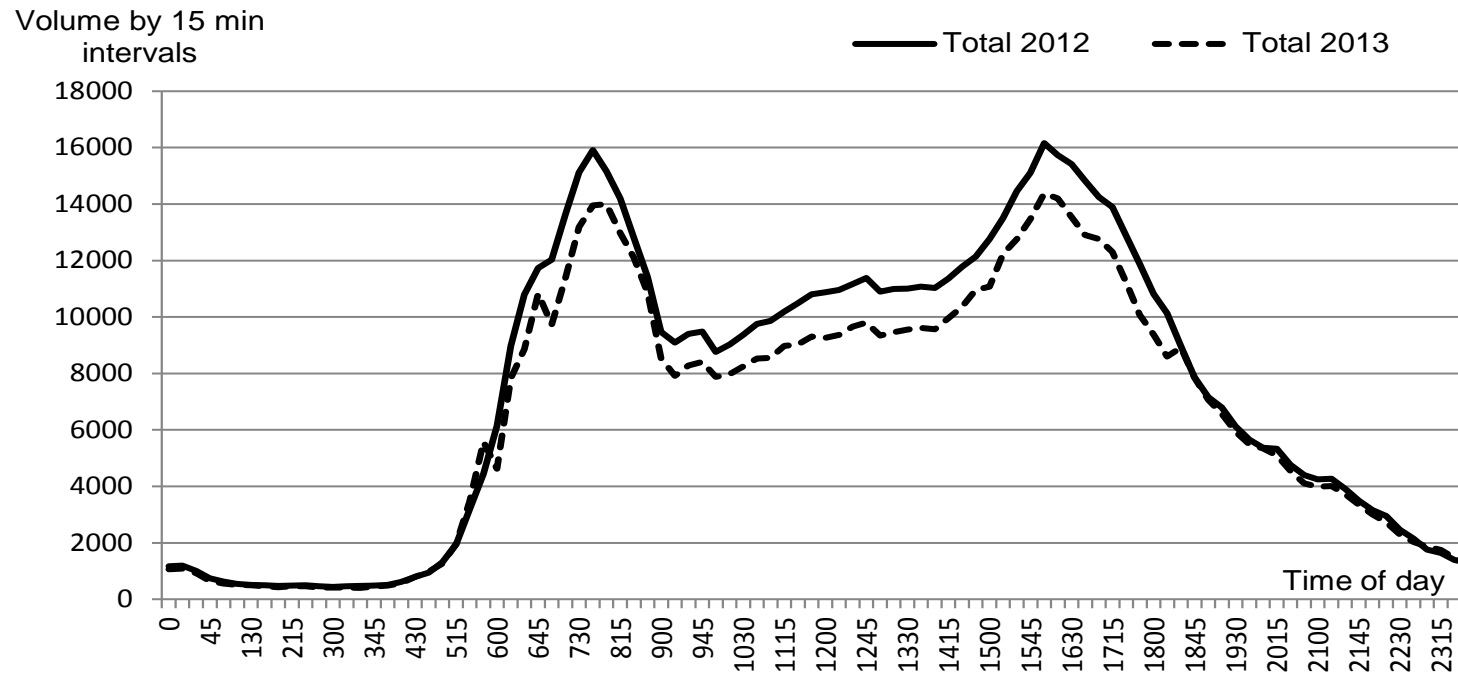
Objectives of the Stockholm

- Congestion reduction
- Reduction in air polluting emissions from traffic
- Revenue ???

Smaller reduction across the cordon (12% / (22%)) Slower adjustment than in Stockholm

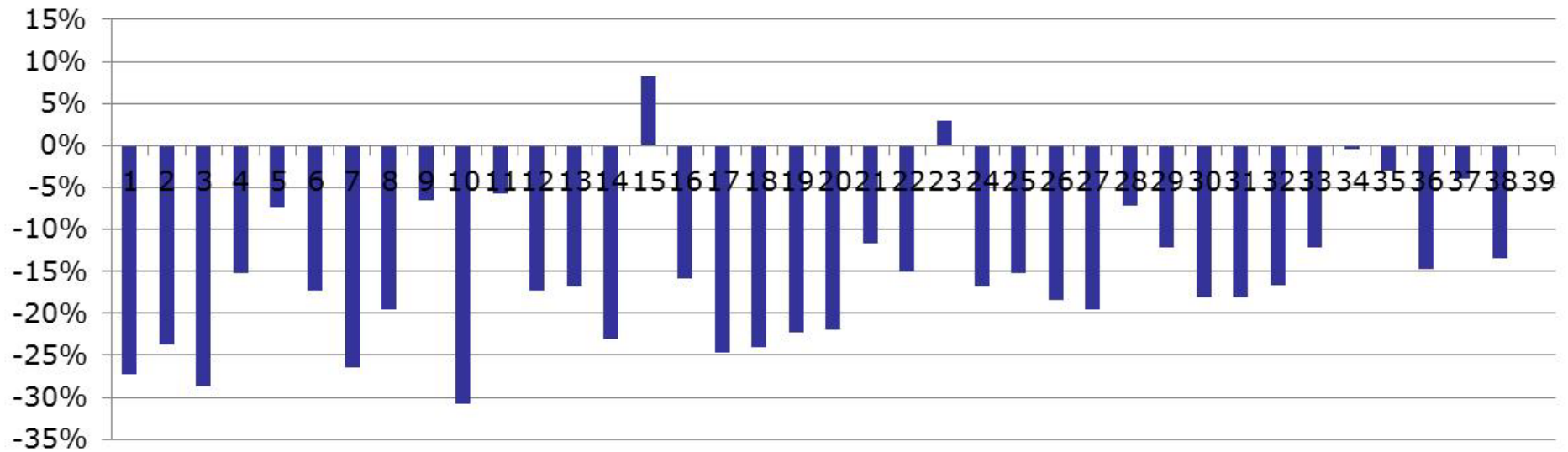


Small visible effects on departure time choice



- Very similar in Stockholm:
 - The spikes disappeared after a while
 - Equal effect in the mid-day as and peak - in spite of higher charge
 - Virtually no effect outside charged hours

Some route choice effects

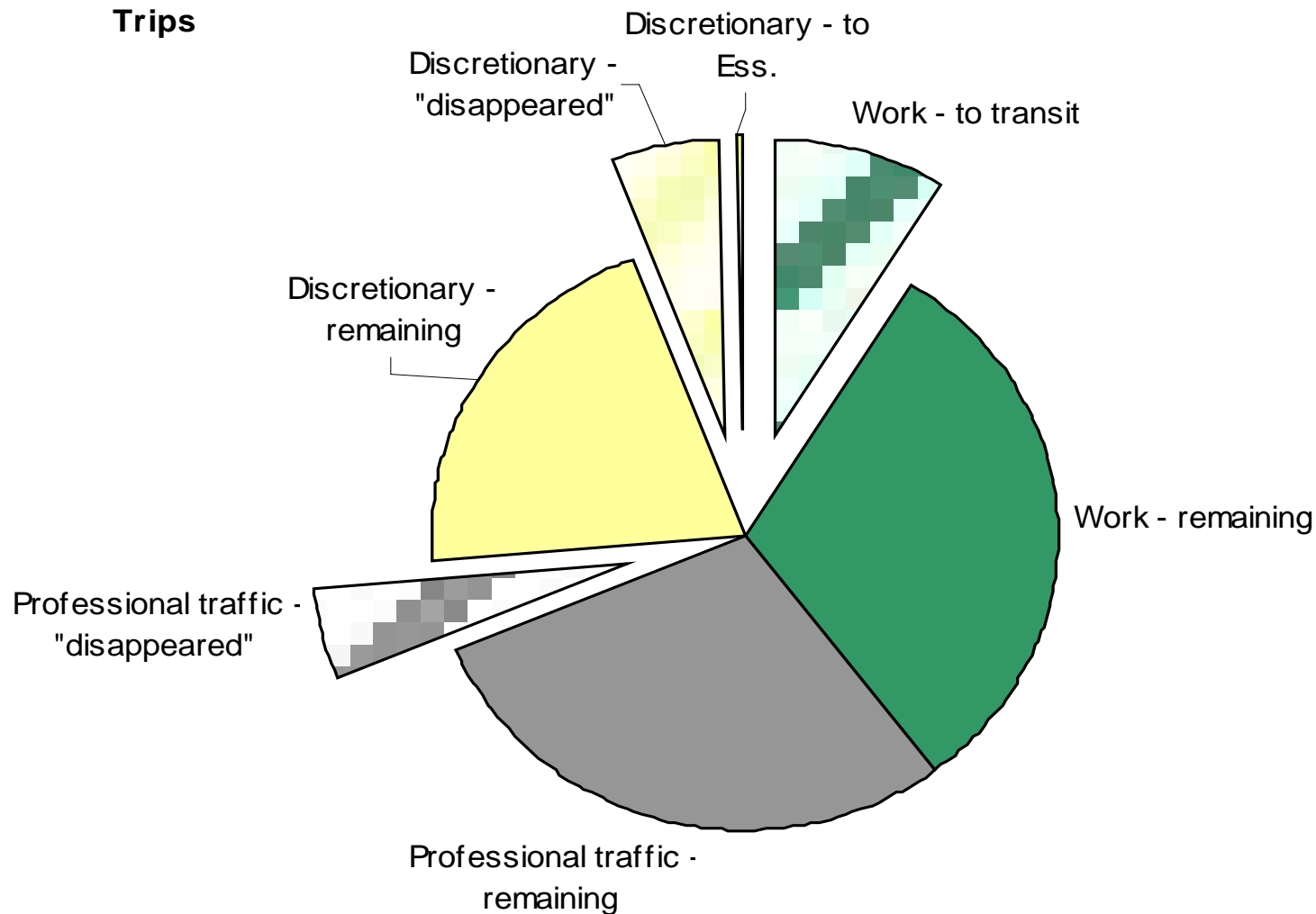


Effects compared to model forecast

Oktober 2012 - Oktober 2013	Mätningar
FM	-13%
EM	-12%
Mellanperiod	-12%
Betaltid	-12%
Icke betaltid	-2%

- Model predicts the same effect across the day
 - As in Stockholm
- More discretionary in off peak – apply more adaptation mechanisms that are not captured in the forecast model

Adaptation: similar in Stockholm & Gothenburg



A general over-prediction of the effect

Oktober 2012 - Oktober 2013	Mätningar	Prognos
FM	-13%	-18%
EM	-12%	-18%
Mellanperiod	-12%	-13%
Betaltid	-12%	-15%
Icke betaltid	-2%	0%

- The underprediction of the off-peak effect is cancelled out by a general overprediction of the total effect.
- 18% compared to the observed 13% in the peak.
 - Underpredicted the use of the multi-passage rule (30%-45%)
 - Overprediction of the route choice effects
 - The topology makes route choice more difficult to model.
 - The VD functions predicts no reduction in travel time

Better air quality in the city centre?

- Reduction: 9%
- Ca 3-5% due to congestion charge
- Rest bus lanes/parking measures?
- 1/3 of the effect across the cordon similar to Stockholm

	Betaltid	FM	EM	Mellanperiod	Icke betaltid
Ullevigatan	-15%	-15%	-15%	-14%	-11%
Sten Sturegatan	-18%	-28%	-22%	-13%	-16%
Nya Allén	-8%	-11%	-4%	-10%	1%
Engelbrektsgatan	1%	0%	0%	3%	-2%
Vasagatan	6%	10%	14%	0%	12%
Per Dubbsgatan	-14%	-17%	-18%	-10%	-9%
Eklandagatan	-6%	-8%	-7%	-5%	-5%
Parkgatan	9%	10%	10%	8%	9%
Linnegatan	-3%	-3%	2%	-4%	-4%
Aschebergsgatan	-16%	-17%	-18%	-14%	-12%
Viktat medelvärde	-9%	-11%	-10%	-8%	-6%

Increasing traffic flow – detours

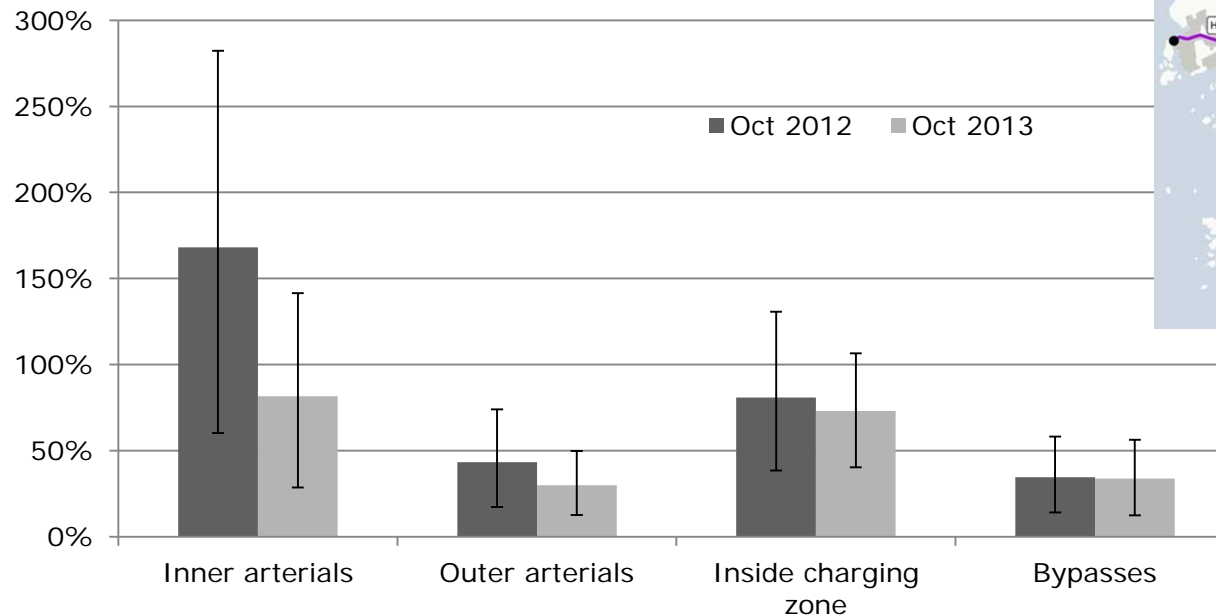
- But there is (mostly) capacity
- Increases smaller than predicted.

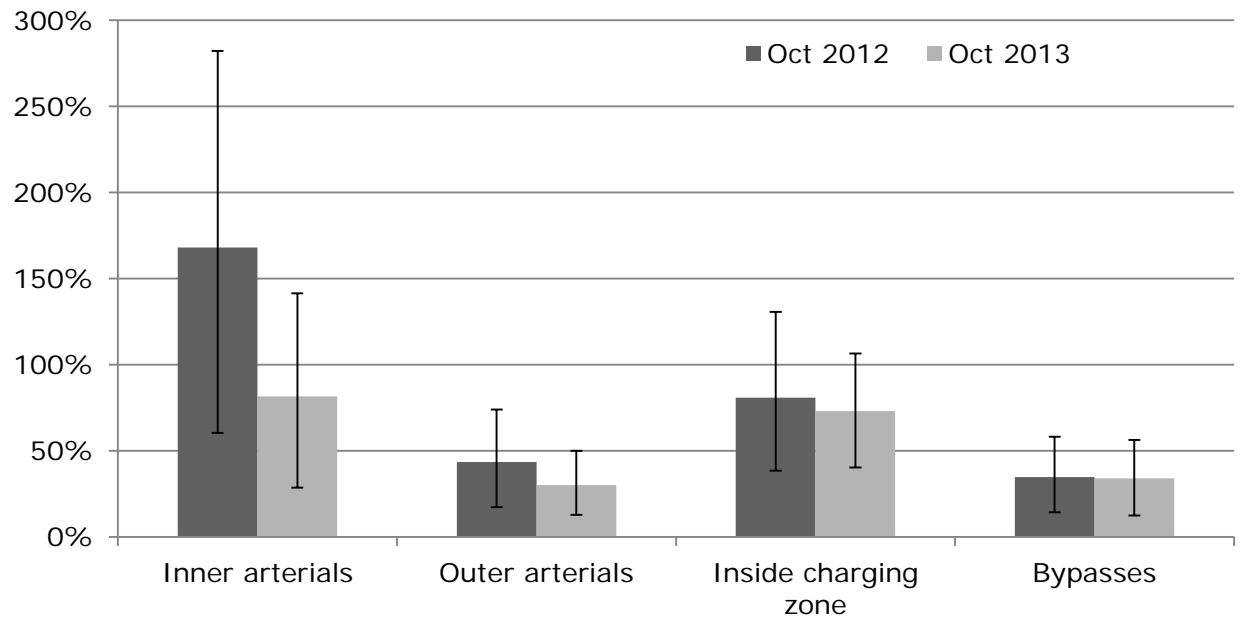
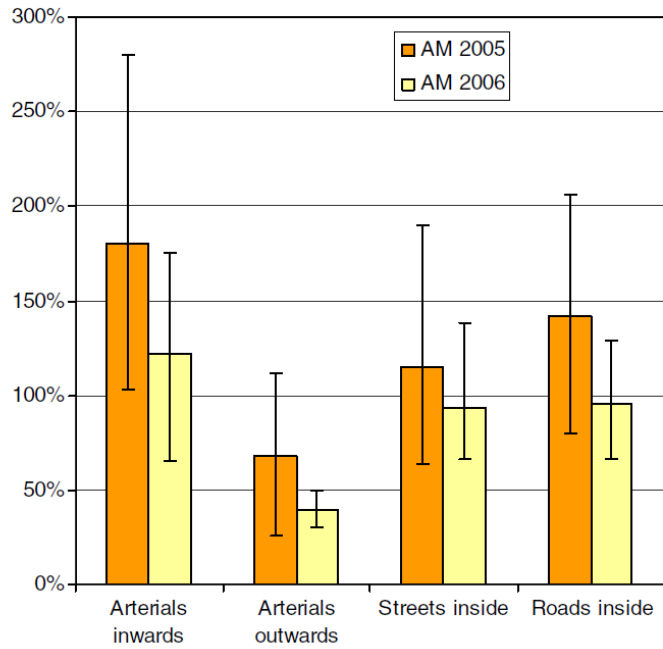
	Mätningar					Prognos	
	Betaltid	FM	EM	Mellanperiod	Icke betaltid	FM	
Söderleden	1%	1%	-1%	2%	3%	3%	
Bergsjövägen	6%	3%	6%	7%	2%	15%	
Björlandavägen	-2%	-4%	-4%	0%	4%	-8%	
Angeredsbbron	4%	4%	1%	8%	-1%	18%	
Jordfallsbron	20%	24%	25%	14%	13%	0%	
Landvettervägen	16%	19%	16%	14%	2%	32%	
Tuvevägen	8%	6%	8%	8%	4%	22%	
Norrleden	26%	26%	22%	30%	0%	34%	



Travel times

- Congestion on the innermost links is significantly reduced (average travel time 2-5 min).
- Small effects on other links



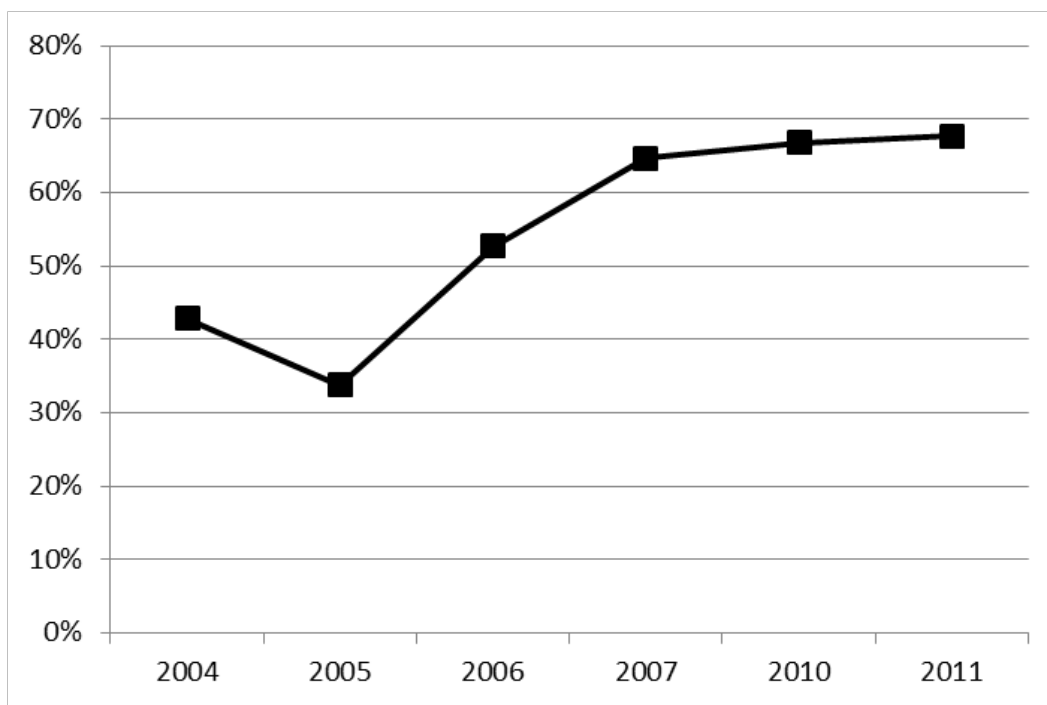


Public transit use

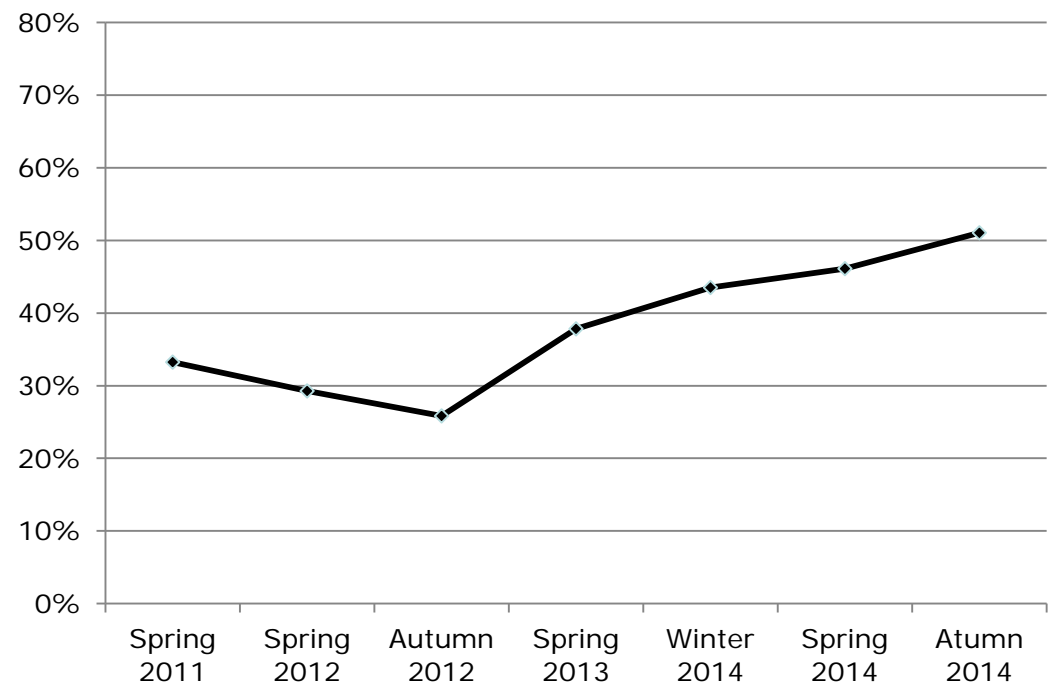
- Traffic counts from Västtrafik unreliable (optional to tap the travel card)
- Ticket sales:
 - The monthly and yearly ticket sales increased by 7.5%
 - 2% (1-3%) yearly increase for many years
- 6% in charged relations, according to travel survey
- 4.5-6.5% (model prediction: 3%, excluding the extension of the PT improvement).

Opinions

Stockholm



Göteborg



Why?

- More people pay a larger amount
- Lower PT share
- Large cost per inhabitant
- Smaller congestion reduction ??
- Unpopular barriers effects through residential areas
- More focus in the purpose of collecting revenue

Stockholm paved the way

- Introduced as a trial January-July 2006 - extremely controversial but forced on by the green party
- Referendum September 2006 – majority *in favour* of charges!
- Agreed that revenues would co-fund the Stockholm bypass.
- Paradigm shift in Swedish infrastructure financing
- Inspiration for Gothenburg politicians: Västsvenska Paketet
- 50 % national funds and 50% regional funds (revenues)
- Agreement in 2009, preceded by virtually no public debate.
- All traditional political parties in Gothenburg in favour.
- Referendum September 2014 – majority *against* the charges!

Summary – Differences and Similarities

- Gothenburg smaller and less denser
- Has more potential "Rat-running" and detouring
- Larger charge per inhabitant
- Less and more local congestion
- Funding a more important driver
- Opinion more negative in Gothenburg

- Revenue of the same magnitude (1 MSEK/Year)
- A substantial/persistent reduction across the cordon
- Small/absent effects outside charging period
- Same adaptation mechanisms
- Reduction in the inner city approx. 1/3 of the effect across the cordon.