An aerial photograph of a city at sunset. The city is illuminated by the warm, golden light of the setting sun, with numerous lights visible on the roads and buildings. A large body of water, likely a lake or bay, occupies the foreground and middle ground, reflecting the sky and the city lights. The sky is a mix of orange, yellow, and blue, indicating the time is either dawn or dusk. The overall scene is a wide-angle shot from a high altitude, looking down on the city and the water.

Planning congestion pricing programs to achieve equitable outcomes

Daniel Firth, Global Congestion Pricing Lead

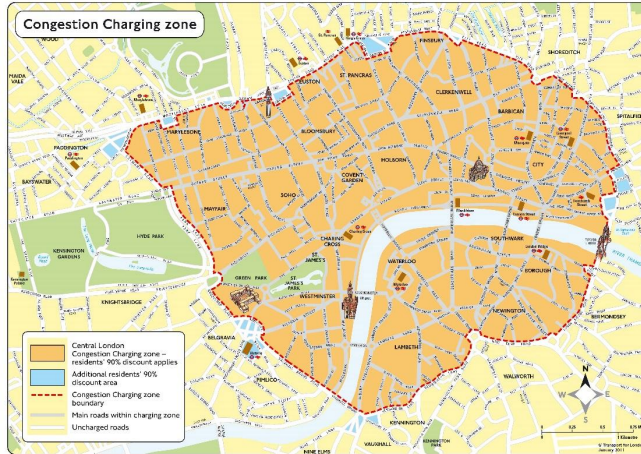
2019 UCLA Lake Arrowhead Symposium



- Some empirical evidence on equity from London and Stockholm
- How are costs and benefits distributed?
 - *Spoiler: it depends on what and how you measure*
- Lessons for North American cities from the Vancouver experience

Backgrounder

London 2003



\$6/day (2003)

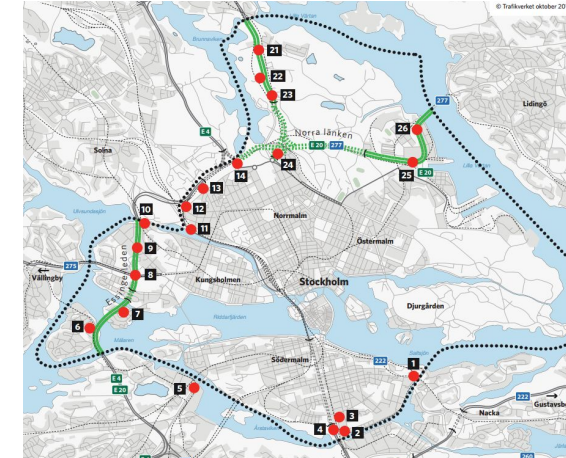
Traffic ↓ 20%

Congestion ↓ 30%

Emissions ↓ 13-16%

Net revenue \$350m/yr

Stockholm 2006



\$1-2/passage (2006)

Traffic ↓ 20%

Congestion ↓ 30-50%

Emissions ↓ 8-13%

Net revenue \$120m/yr

Main objections in London (2003) and Stockholm (2006)

- We already paid for the roads
- It won't work – won't reduce congestion
- Public transport won't cope
- Business impacts
- Unfair to suburban drivers



Why might equity have been less of an issue in Europe?

- **Time:** increasing income inequality and decreasing housing affordability since early 2000s
- **Income redistribution:** (traditionally) tax and transfer policies have aimed for greater equalisation
- **Cost of driving** before charging: gas is ~50% more expensive than US
- **Transit:** higher mode shares

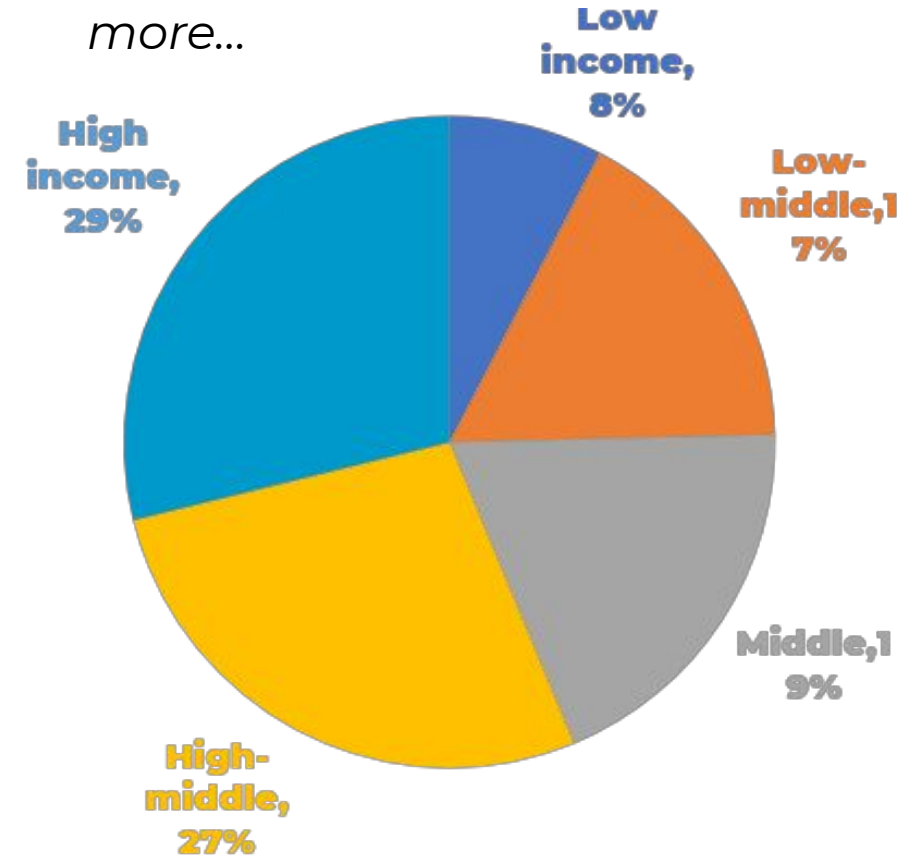


What does the data say?

In Stockholm:

- **Downtown residents** pay twice as much as the rest of the region
- **Employed people** pay three times as much as people not in employment
- **Men** pay twice as much as women
- **Households with children or two adults** pay 50% more than other households (per person)
- **High income households** pay three times as much as lower income households

High income segments pay more...

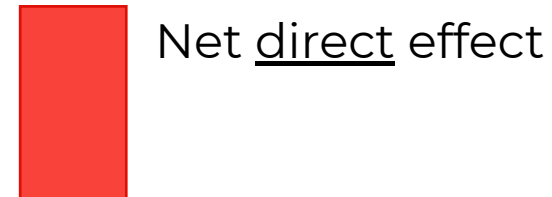
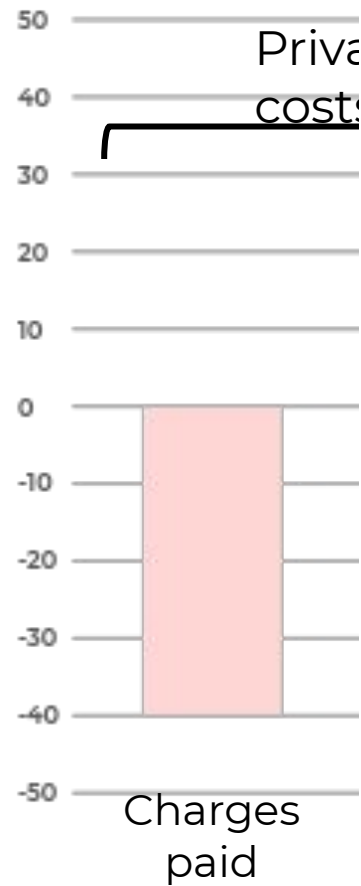


...low income segments pay a greater proportion of household income...

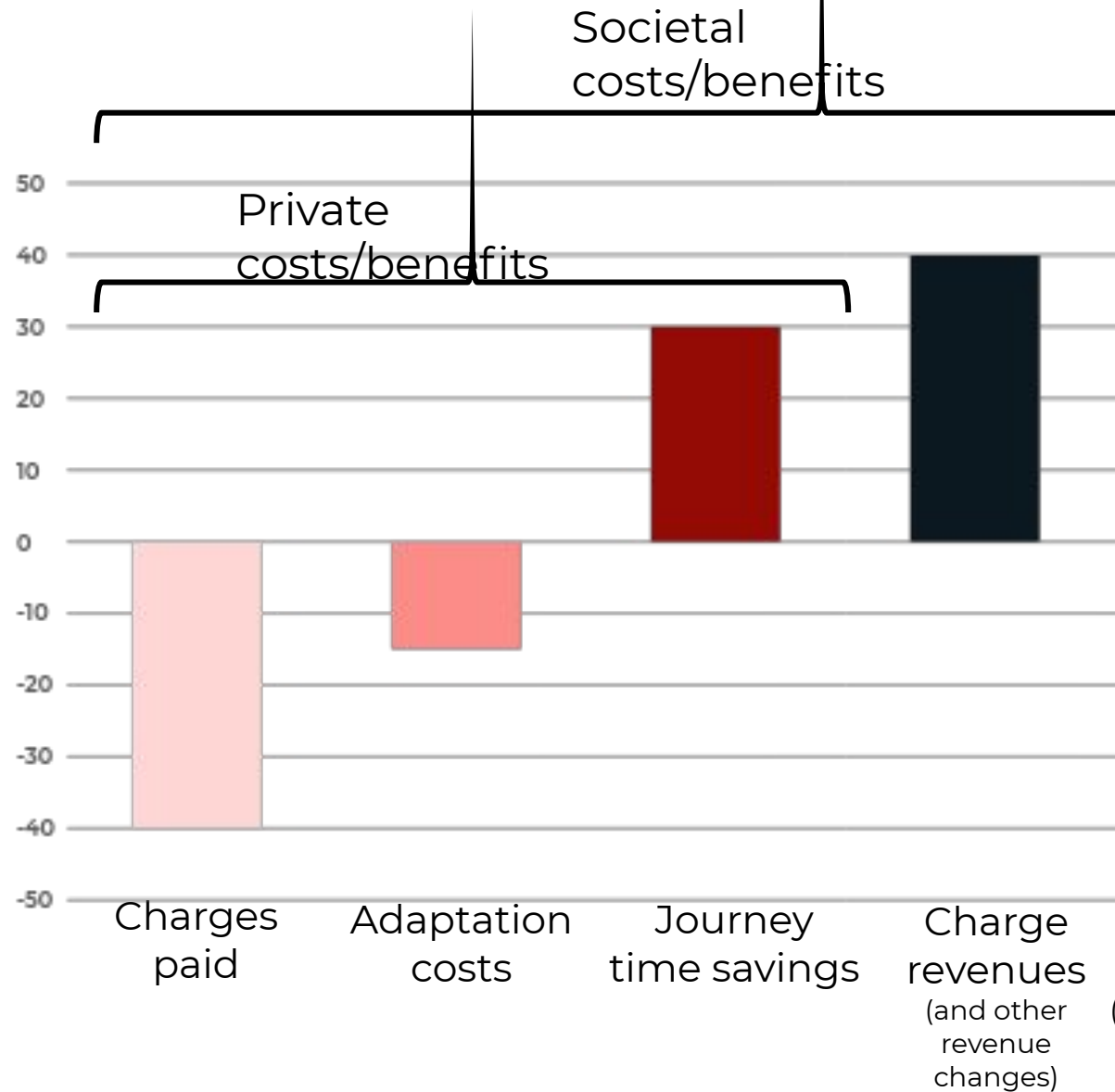
Source: City of Stockholm, Samhällsekonomiska fördelningseffekter av Stockholmsförsöket, 2006



Calculating the costs & benefits of congestion pricing



Calculating the costs & benefits of congestion pricing



Other

Congestion Pricing, Air Pollution and Children's Health

Emilia Simeonova, Janet Currie Peter Nilsson, and Reed Walker¹

February, 2017

Abstract

This study examines the effects of implementing a congestion tax in central Stockholm on both ambient air pollution and the population health of local children. We demonstrate that the tax

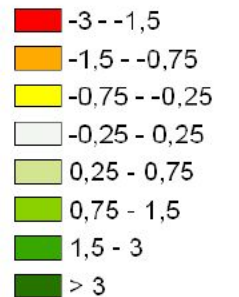
reduced ambient air pollution by 5 to 10 percent, and this reduction in air pollution was associated

with a significant decrease in the rate of acute asthma attacks among young children. The change

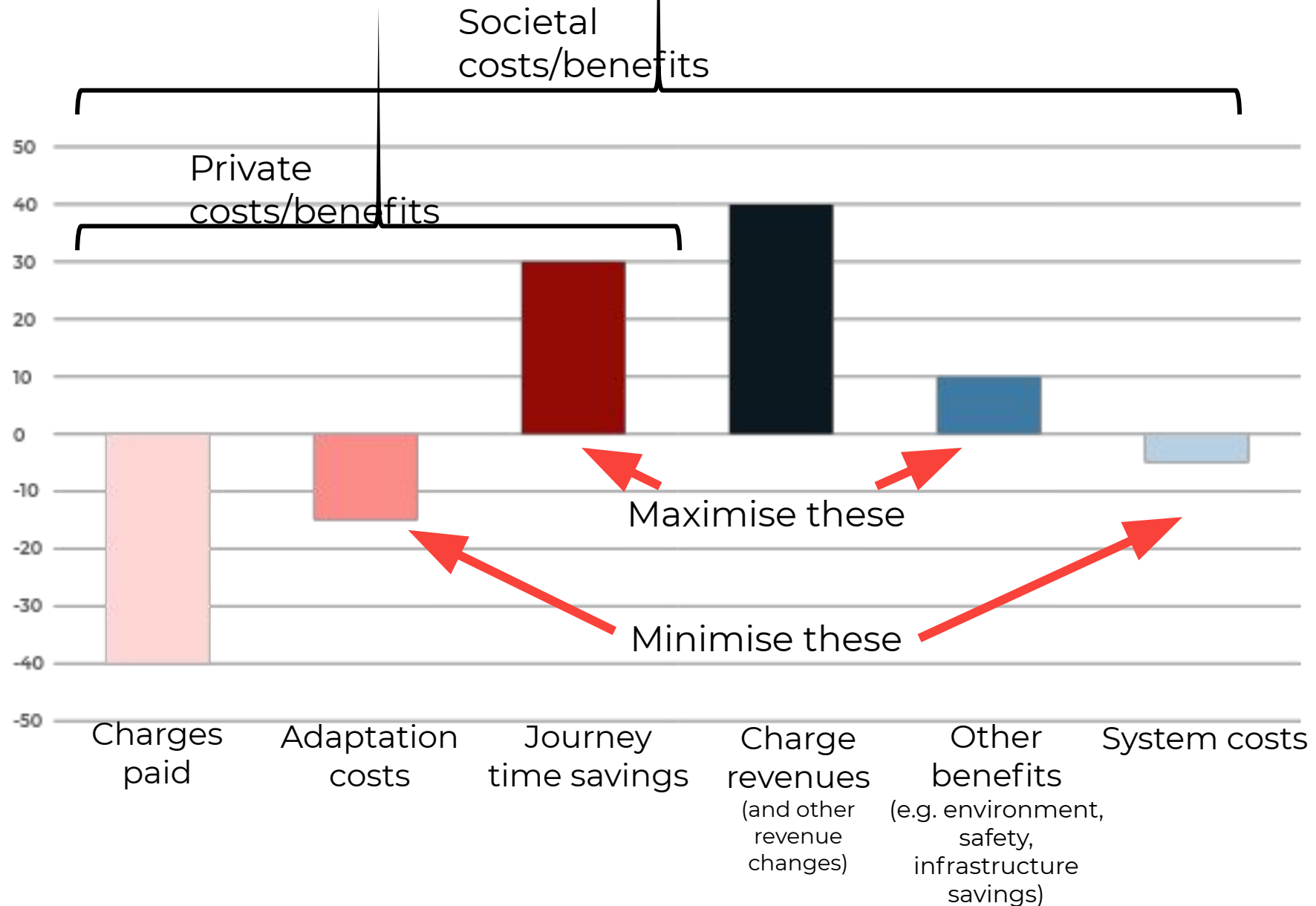
in health was more gradual than the change in pollution suggesting that it may take time for the full health effects of changes in pollution to be felt. Given the sluggish adjustment of health to pollution changes, short-run estimates of the pollution reduction programs may understate the long-run health benefits.



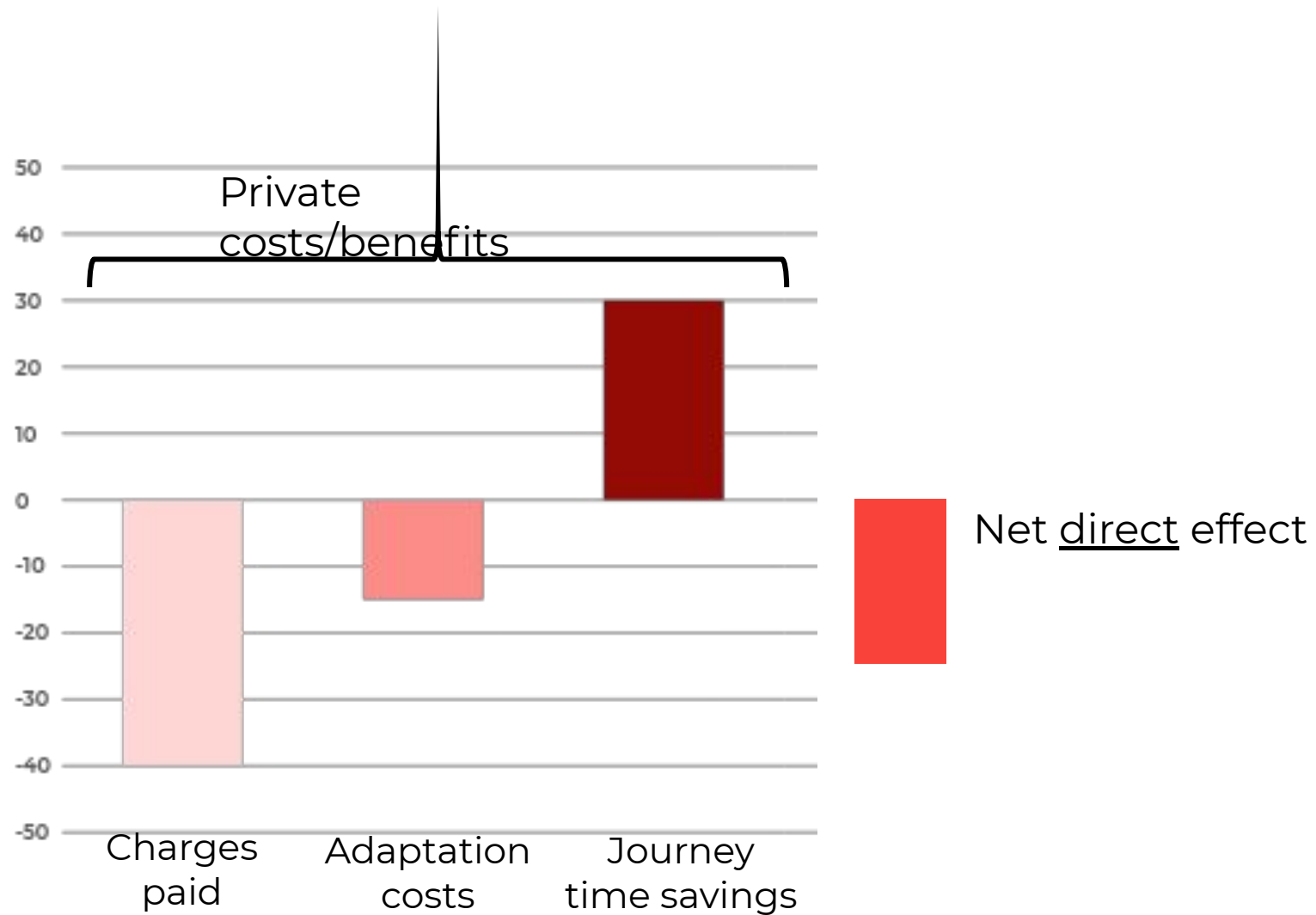
Skilnad i NO_x-halt,
µg/m³



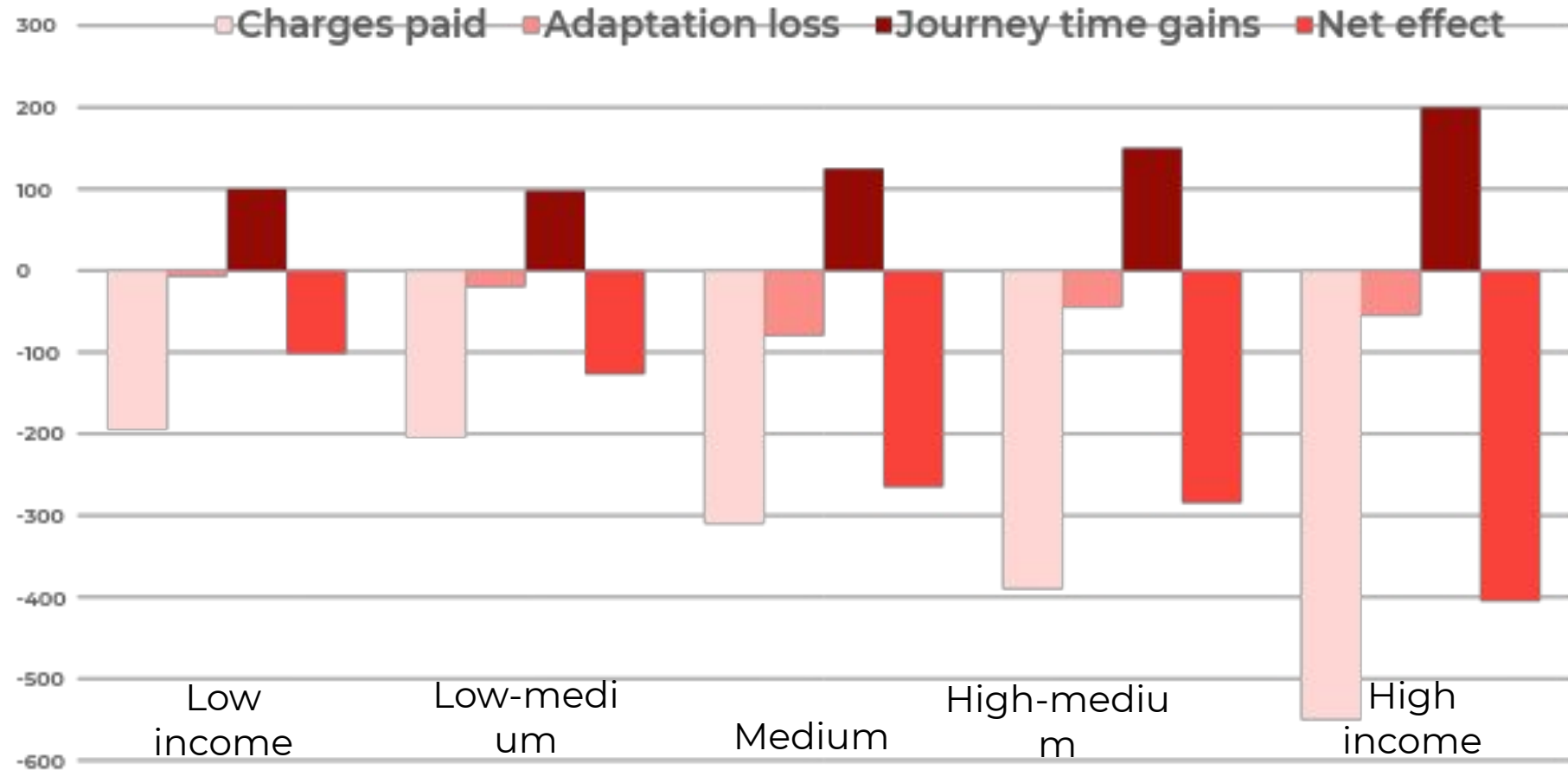
Designing effective, equitable congestion pricing



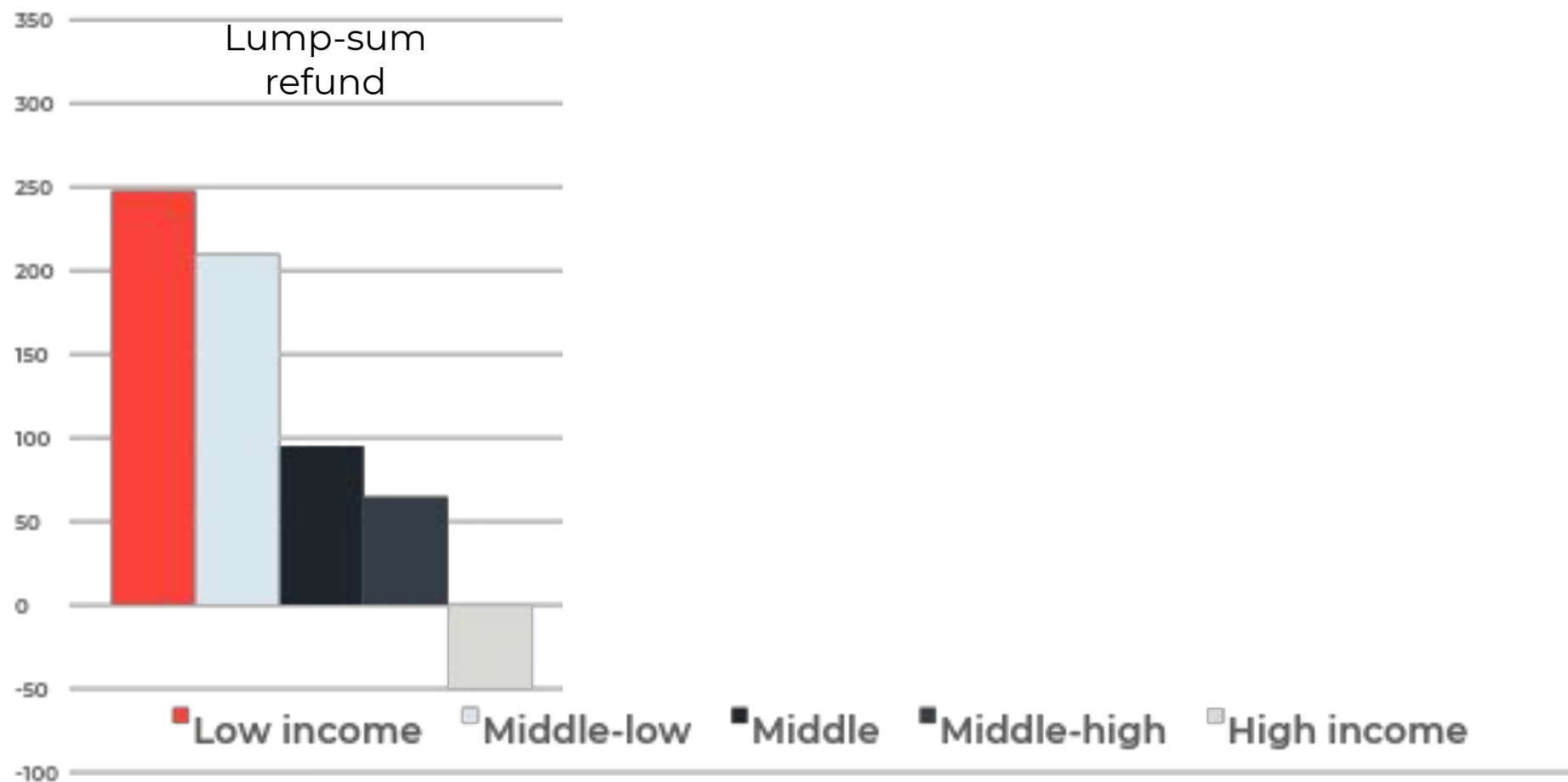
Distribution of costs & benefits



Stockholm: high income groups lose more than low income groups – *before revenue recycling*



So there is potential for redistribution - modelled net effect of revenue recycling scenarios

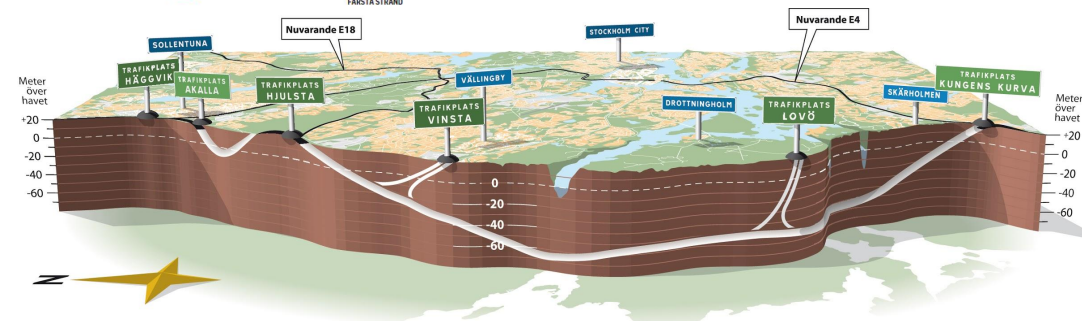


How do London and Stockholm use the revenues?



350 more buses to CATCH
The Charge is helping it happen

MAYOR OF LONDON



Did these investments lead to a progressive outcome?

Pricing is never introduced in a vacuum – we need to better understand the equity of sustainable urban mobility

16



Public transit – *safe, affordable and cost effective to build and operate*



Compact cities – *but how to make them affordable and inclusive?*



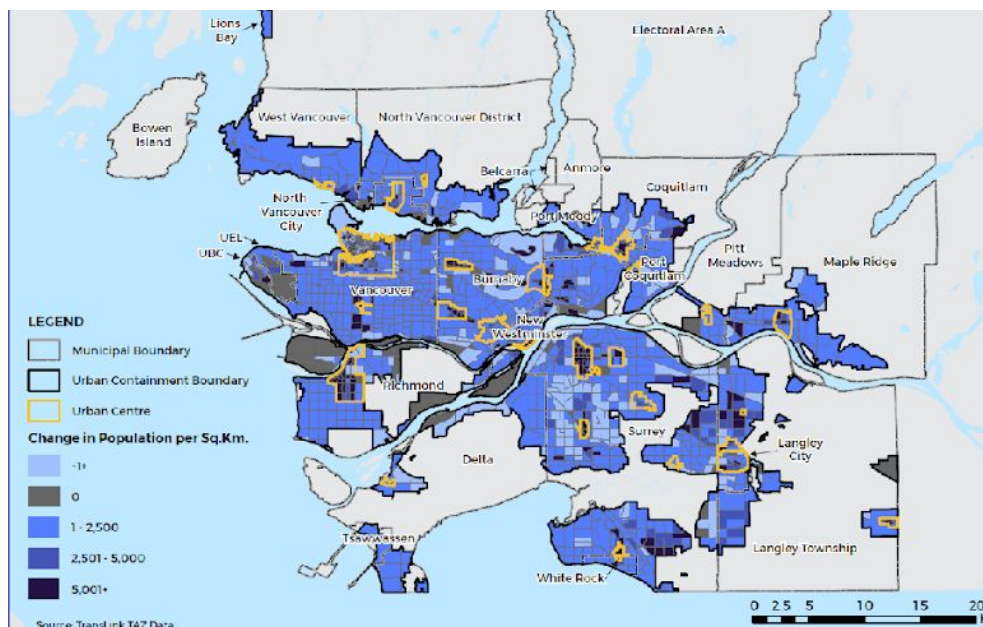
Manage demand for car use – *but “just enough” and how to make it acceptable?*



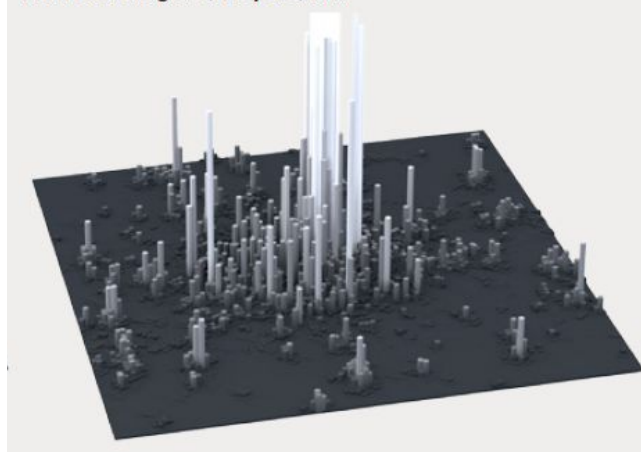
Walkable and cycle friendly – *but also safe, accessible and what about peripheral areas?*

Pricing in a polycentric west coast city

- European cities are not as monocentric as you think!
- Start where you can demonstrate the impact



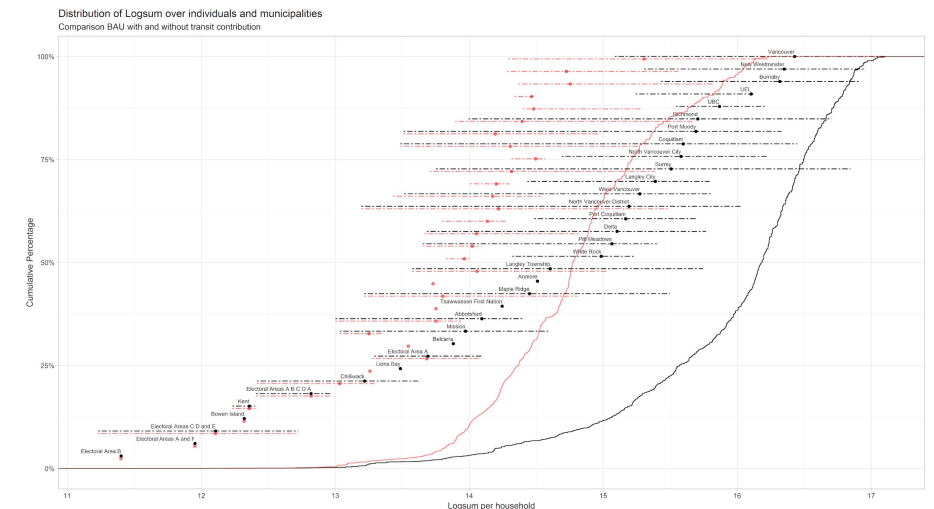
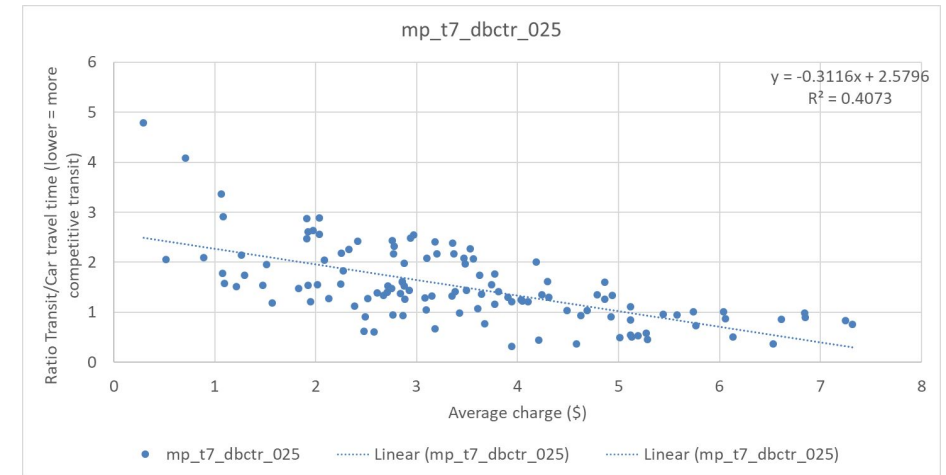
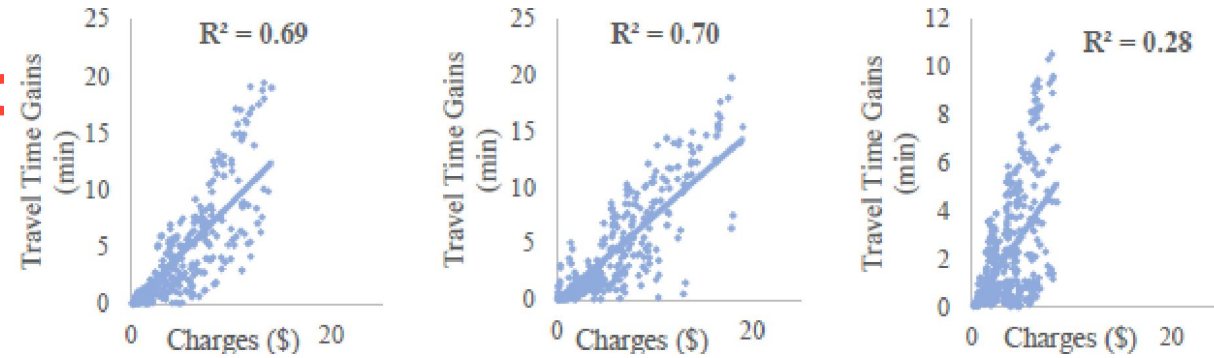
LONDON
Employment density
Peak: 141,600 people/km²
Metro. average: 2,125 jobs/km²



- Clearly define objectives
 - *What, where?*
- Design to:
 - *Maximise winners*
 - *Provide lots of alternatives (not just transit!)*
- With the right tools, systems can be designed to improve equity outcomes

Pricing in a polycentric west coast city - equity analysis tools

- Ensure those paying see time savings
- Ensure charges are related to the availability of alternatives
- Assess who pays and who benefits
 - *By whatever dimensions you have data for*
- Calculate the cost of correcting any imbalance (in Vancouver ~16-22% of net revenues)



AFTONBLADET

Lördag 14 januari 2006



STOCKHOLM BILTULLARNA

Nu har folk insett fördelarna

Summary

- Pricing supports multiple sustainable city goals
- Evidence on equity is mixed, but
 - *There are ways to improve equity*
 - *No-one has set out with this as a primary aim*
- How you use the revenues really matters
 - *We need better methods to measure that*
- Maximising winners + lots of alternatives is key to acceptance

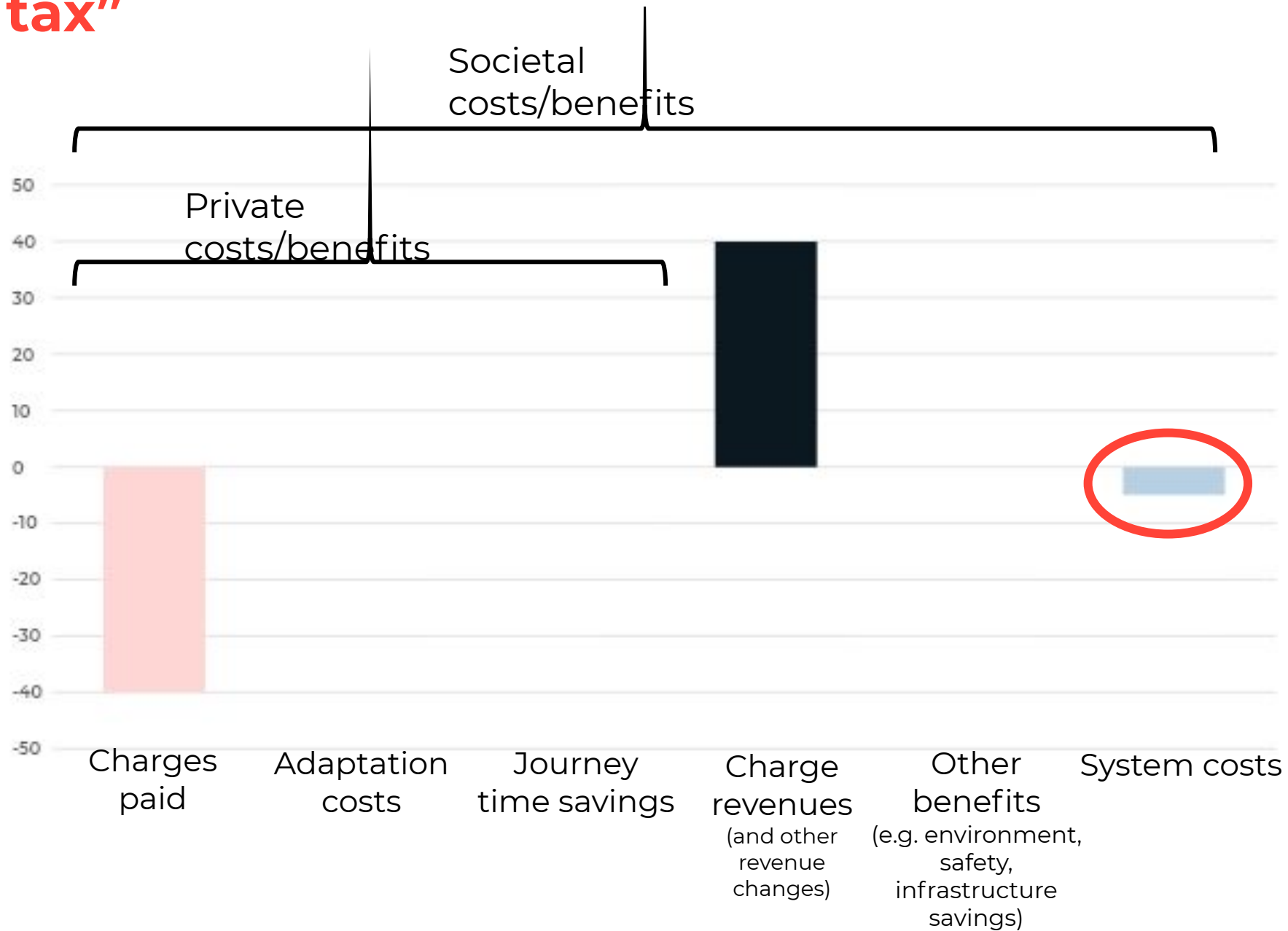
Thank you!

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wsp.com



Without demand management, pricing is "just a tax"



... and not necessarily a very efficient one

Calculating the costs & benefits of congestion pricing

