

## Elasticity Case Study: Stockholm Congestion Charge

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In 2006, Stockholm introduced a congestion charging system that charged drivers a toll when crossing a cordon line around the inner city. In addition to the material presented in this case study please read chapter 7 of *Transforming Urban Transport*<sup>1</sup> for further background on the Stockholm congestion charges. Data in this case study are from Börjesson and Kristoffersson (2018).<sup>2</sup>

The level of congestion charge varies by time of day, but remained at a consistent level from day to day from 2006 to 2015. In 2016, congestion charge level increased. Table 1 shows congestion charges by time of day before and after the 2016 increase.

<sup>1</sup> Davis, Diane E., and Alan Altschuler, eds. *Transforming Urban Transport*. Oxford University Press, USA, 2019.

<sup>2</sup> Börjesson, Maria, and Ida Kristoffersson. "The Swedish congestion charges: Ten years on." *Transportation Research Part A: Policy and Practice* 107 (2018): 35-51.

Table 1: Stockholm congestion charges by year and time of day

Time	Cordon charge, 2006 - 2016	Cordon charge, 2016 - present
6:30am - 6:59am	SEK 10	SEK 15
7:00am - 7:29am	SEK 15	SEK 25
7:30am - 8:29am	SEK 20	SEK 35
8:30am - 8:59am	SEK 15	SEK 25
9:00am - 9:29am	SEK 10	SEK 15
9:30am - 2:59pm	SEK 10	SEK 11
3:00pm - 3:29pm	SEK 10	SEK 15
3:30pm - 3:59pm	SEK 15	SEK 25
4:00pm - 5:29pm	SEK 20	SEK 35
5:30pm - 5:59pm	SEK 15	SEK 25
6:00pm - 6:29pm	SEK 10	SEK 15
6:30pm - 6:29am	SEK 0	SEK 0

Based on average trip lengths and vehicle operating cost, the cost of a typical trip across the cordon line, not including the congestion charge, would have been SEK 25.5 in 2005/2006 and SEK 31.5 in 2015/2016.

In Stockholm, about 10 percent of households have access to a "company car": a car that is owned by a household member's employer and that the household has access to as a perk of employment. When a driver crosses the cordon in a company car, their employer pays the charge. Alternative-fuel vehicles were exempt from paying the charge until 2012 and taxis were exempt from the charge until 2007.

Table 2 shows the volume of non-exempt vehicles crossing the toll cordon during in 2005 (immediately before the congestion charge was implemented) and 2006 (immediately after the charge was implemented). The average toll paid by non-exempt vehicles in 2006 was SEK 12.8.

Table 3 shows the peak-period traffic volume of private vehicles across the cordon in 2015 (immediately before the charge increased), and 2016 (immedi-

Year	Average vehicle volume (veh/hr)
2005	30,021
2006	21,114

Table 2: Traffic volumes across the cordon before and after congestion charge implementation

ately after the charge increased). It also shows the average toll paid by private vehicles in the peak period for each year.

Year	Average vehicle volume during peak (veh/hr)	Average cordon charge
2015	13,570	SEK 17.9
2016	11,878	SEK 30.7

Table 3: Average volumes and charges for

### Questions for discussion

- By what percentage did the cost of traveling across the inner-city cordon change:
  - For all trips in non-exempt vehicles between 2005 and 2006?
  - For peak-period trips in private vehicles between 2015 and 2016?
- By what percent did the volume trips crossing the cordon change:
  - For all trips in non-exempt vehicles between 2005 and 2006?
  - For peak-period trips in private vehicles between 2015 and 2016?
- What was the price elasticity of demand for travel across the cordon:
  - For all trips in non-exempt vehicles between 2005 and 2006?
  - For peak-period trips in private vehicles between 2015 and 2016?
- What was the change in consumer surplus associated with:
  - The introduction of the congestion charge in 2006?
  - The increase in the congestion charge in 2016?
- For the consumer surplus changes in both 2006 and 2016, how much of the change was experienced by people who continued to drive across the cordon and how much was experienced by those who shifted to other modes or reduced their trips to and from the inner city?
- What other information would you need to fully account for the costs and benefits of the congestion charge for people who live or work in Stockholm?