



Congestion Charging Secretariat

EXECUTIVE OFFICE
CITY OF STOCKHOLM

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Reference Group

Jonas Eliasson, Transek AB (secretary)
*Karin Brundell Freij, Engineering Faculty,
Lund University*
Lars Hultkrantz, Örebro University
Christer Ljungberg, Trivector AB
*Ulf Rämme, Swedish Research Institute
of Trade (HUI)*

REFERENCE GROUP'S SUMMARY

The Stockholm Trial: February

During the Stockholm Trial, so-called “monthly indicators” will be presented each month. These indicators are measurements of, for example, car-traffic volumes, car-travel times, public-transport travel, the retail market and pedestrian and bicycle flows. The undersigned have been requested by the City of Stockholm to conduct ongoing analyses and summaries of these measurements. The goal is to provide an overview of the effects of the Stockholm Trial on car traffic, accessibility, public-transport travel and so on. Of necessity, this picture will be preliminary, partly because the Stockholm Trial has been in progress for only a short while and partly because there is no time for a more wide-ranging analysis of data. The aim, rather, is to provide a preliminary survey of effects while awaiting completion of the much deeper and more comprehensive assessment to be conducted throughout the coming spring.

Sometimes, comparison is made with a “normal autumn weekday”. In this summary, a “normal autumn weekday” is defined as the mean value of weekday traffic flow during the period 1 September-16 December, except for Essingeleden (uncharged through route) and the E4 motorway which are compared with the same month in the previous year. At certain monitoring sites at the charging cordon, the reference period is limited to 1-16 December because monitoring equipment was not installed until that time. However, traffic fluctuations over the charging cordon during September-December amount to only a few percent, so they are insignificant for the assessment.

In summary, effects seen in January continued through February.

CONGESTION CHARGING SECRETARIAT

HANTVERKARGATAN 2B, SE-105 35 STOCKHOLM, SWEDEN

TFN: +46-8-508 29 000

Car traffic and car-travel times

Traffic effects described below relate to the period 26 January-24 February (i.e prior to the annual winter-vacation week for Stockholm schools)

- **Strong decline in car traffic continued**
 - The number of vehicles passing over the charging cordon in February (26 January-24 February) was about 25% lower than on an average autumn weekday in 2005.
 - In January (9-25 January) the decline was about 30%.¹
 - There is a weak upward traffic trend but it is not yet possible to determine whether this is due to the fact that the stabilization process is still in progress or whether it is mainly a matter of the general traffic increase normally seen during the entire spring period.

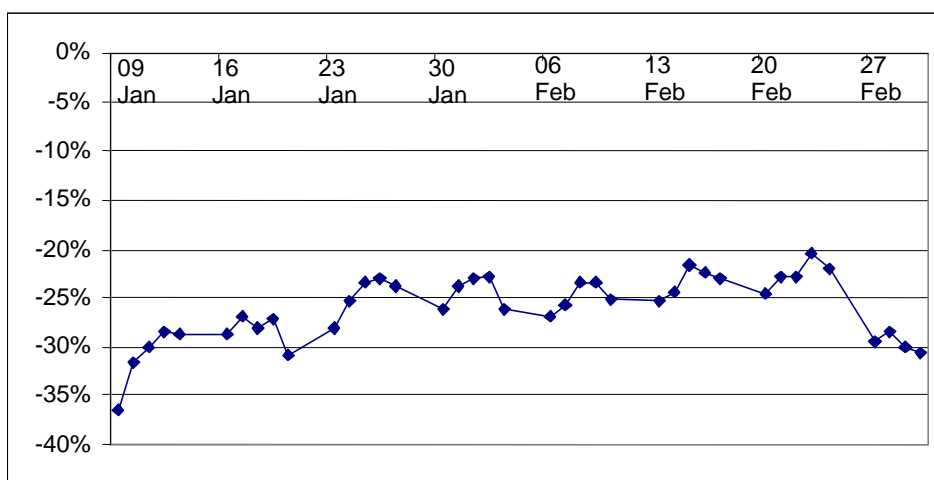


Figure 1. Number of vehicles passing over the charging cordon (weekdays, 6 a.m.-7 p.m.). Decline compared with autumn weekday in 2005 (data from the Swedish National Road Administration's payment system, 9 January-2 March).

- Compared to an autumn weekday, the decline is equivalent to about 100,000 fewer cars passing over the charging cordon. It is still not possible to confidently translate this reduction to outward/return journeys.

¹Earlier reported figures for the January traffic decline were somewhat lower (between 25 and 30%). This was because the comparative value for autumn 2005 was a little too low due to faulty monitoring equipment at Johanneshovsbron registering too few vehicles passing over the charging cordon. Luckily, there was an additional monitoring site on Johanneshovsbron (with independent equipment). The incorrect monitoring figures have now been corrected, resulting in the comparative value for autumn being subjected to a small upward adjustment (from 434,000 to 439,000).

- **Marginal effect on Lidingö traffic; radials with large proportion of through-traffic most affected**
 - The decline is biggest from the south-east (Danvikstull), followed by the southern, northern and western radials, in that order. The most likely explanation for the differences between south-east, north/south and west is that they reflect the proportion of through-traffic: traffic from the west moves to a lesser degree *through* the inner city than traffic from the south, north and, in particular, south-east.
 - Traffic to/from Lidingö declined only marginally compared to autumn 2005.

	Charging period (6.30 a.m.- 6.30 p.m.)	Morning peak period (7-9 a.m.)	Afternoon/evening peak period (3.30-6 p.m.)
Entire charging zone	-25%	-18%	-29%
Charging zone, south-east	-31%	-24%	-34%
Charging zone, north	-27%	-21%	-33%
Charging zone, west	-22%	-21%	-24%
Charging zone, south	-28%	-21%	-33%
Charging zone, Lidingö	-4%	+15%	-6%

Table 1. Percentage decline of vehicles passing the charging cordon in February compared to autumn weekday in 2005.

- **Traffic decline largest in afternoon/evening. Traffic also declined in evening after charging period.**
 - In percentage terms, the decline is somewhat smaller during the morning peak period and somewhat larger during the afternoon/evening peak period. One possible partial explanation is that during the afternoon/evening peak period there is more leisure travel (visits, entertainment, shopping), for which it is easier to choose an alternative destination. Another partial explanation is that during the morning peak period the journeys of a larger number of travellers are dictated by the need to be at a certain place at a certain time than during the afternoon/evening peak period.
 - Traffic has also significantly declined in the evening after the charging period. The reason may be fewer outward/return

journeys by car during the charging period, resulting in fewer return journeys during evenings after the charging period.

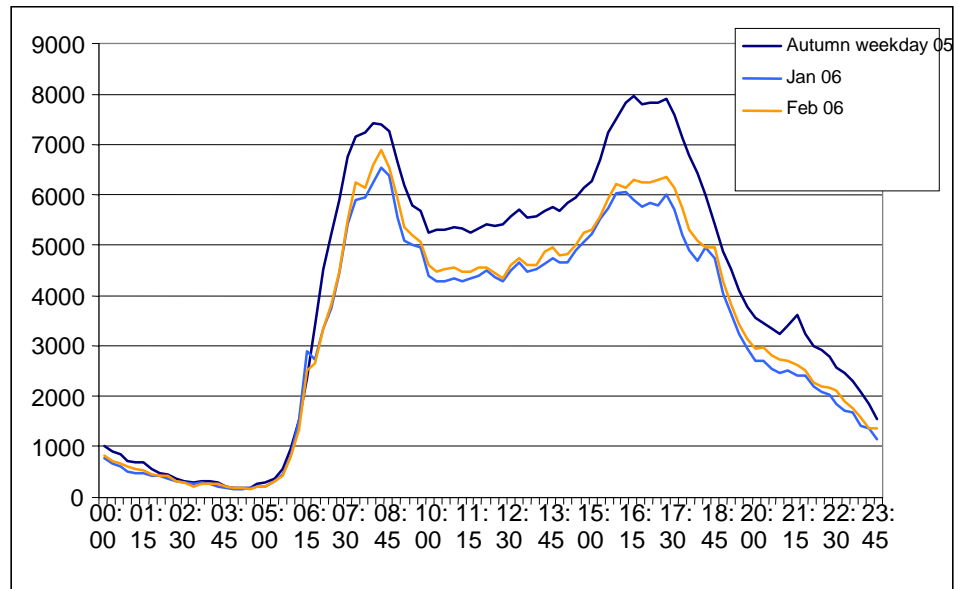


Figure 2. Number of vehicles passing charging cordon (both directions).
(Data from measuring equipment installed by City of Stockholm Traffic Office/Swedish National Road Administration)

- **Car traffic on Essingeleden unchanged compared to 2005**
- Car traffic on Essingeleden is essentially the same as in 2005 (see diagrams, below).

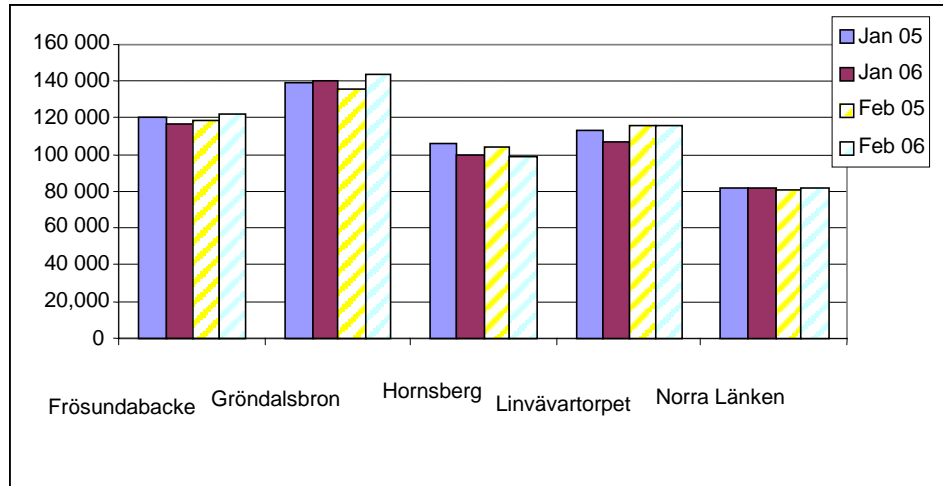


Figure 3. Number of vehicles per day (24 hours) passing charging cordon on E4 motorway; weekday average for January-February 2005/2006.

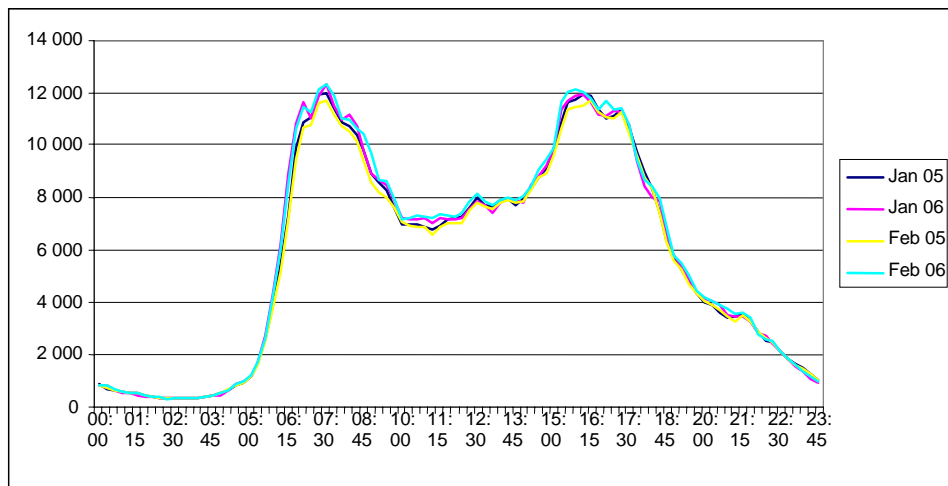


Figure 4. Number of vehicles per hour passing charging cordons on E4 motorway; weekday average for January-February 2005/2006.

- **Traffic in Södra Länken has increased compared to 2005 but it is impossible to determine whether this is due to environmental fees.**
 - Traffic in Södra Länken (Southern Link bypass tunnel) has continuously increased since it was opened in October 2004. For example, the increase during January-September 2005 was 17% (average of all monitoring sites).
 - Traffic in Södra Länken has increased compared to last autumn. Below is a comparison of traffic in January-February 2006 with the period 1 September-13 October 2005, after which a floating crane collided with a section of Essingeleden crossing a waterway, causing extended lane closures, making comparisons meaningless.

	Charging period (6.30 a.m.- 6.30 p.m.)	Morning peak period (7-9 a.m.)	Afternoon/evening peak period (3.30-6 p.m.)
Södra Länken (Jan)	3%	6%	3%
Södra Länken (Feb)	4%	7%	4%

Table 2. Percentage change in number of vehicles passing charging cordon in Södra Länken, January-February 2006, compared to the period 1 September-13 October 2005.

- Traffic in Södra Länken was essentially unchanged between January and February (differences are within normal variations).
- It is impossible to determine to what degree the increase in Södra Länken traffic compared to autumn 2005 is due to environmental fees since we do not know to what extent traffic would have risen without them.

- **Travel times have declined over a wide area, in many cases far from the inner city.**
 - The significant access improvements on radials and in the inner city could still be seen in February. Compared to autumn 2005, queue times have on average been more than halved.
 - Since travel times are strongly influenced by the state of roads it is difficult to compare January with February in any detail. From a more general perspective, however, the decline in travel times appears to be the same for both months (see diagram, below).

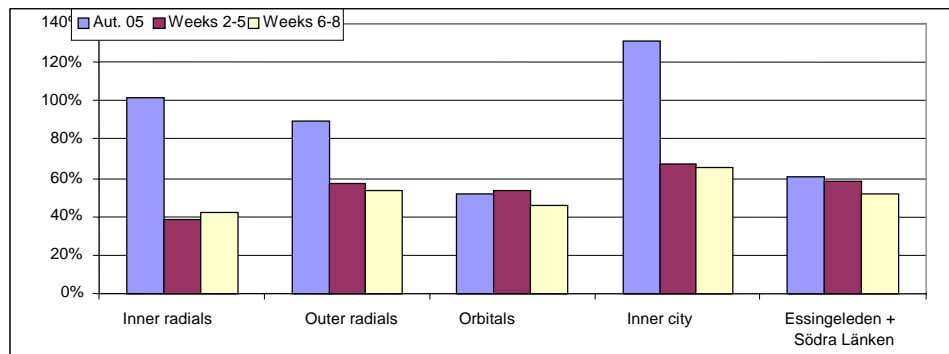


Figure 5. Congestion (average travel-time prolongation in percent in relation to congestion-free travel time) for various road types (average for morning and afternoon/evening peak periods, 7.30-9 a.m., 3.30-6 p.m.).

- Access improvements were largest in and around the inner city.
- The manifest decline in traffic towards the inner city had consequences even for areas relatively distant from the inner city: queues were clearly reduced on outer radials such as Drottningsholmsvägen, Huddingevägen, etc.

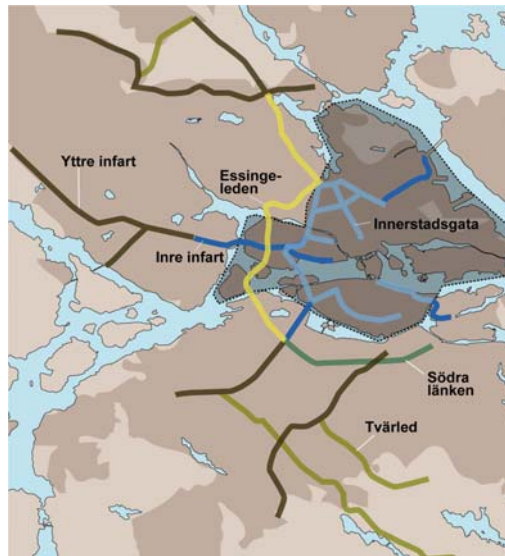
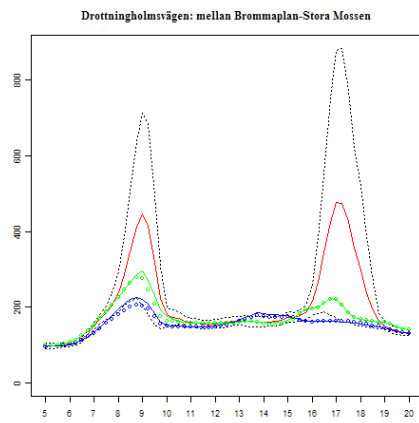
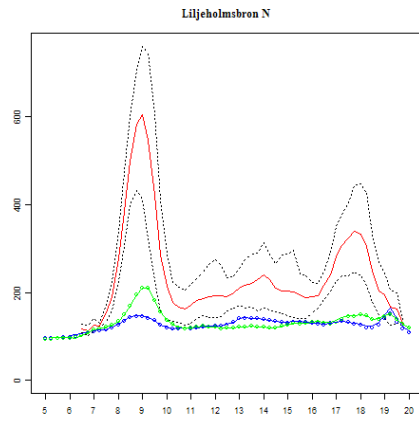


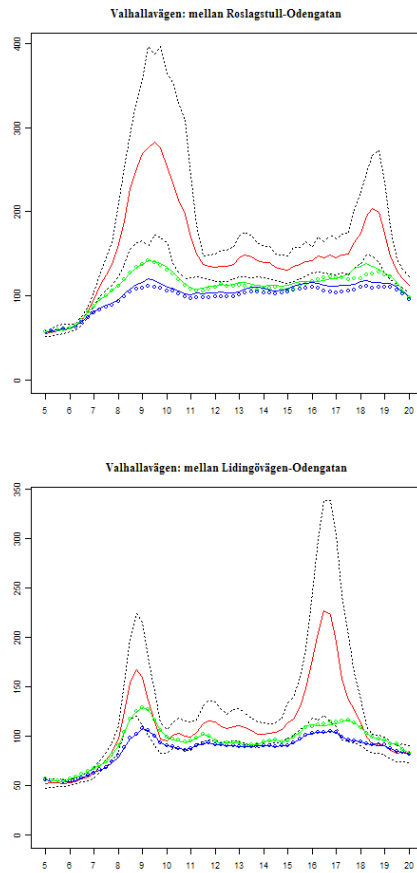
Figure 6. Map of travel-time routes

Brown = Outer radials
Blue = Inner radials
Light blue = Inner-city streets
Yellow = Essingeleden
Green = Södra Länken
Light green = Orbitals

An appendix lists the routes



Drottningholmsvägen: between Brommaplan-Stora Mossen



Y: Seconds

X: Time during the day

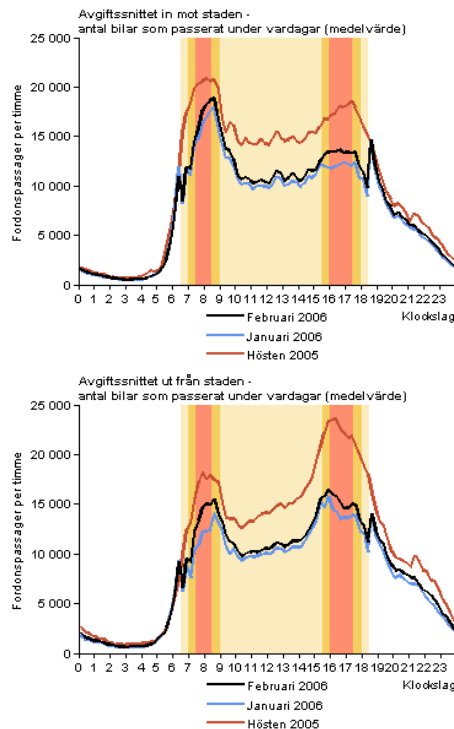
Valhallavägen: between Roslagstull-Odengatan

Valhallavägen: between Lidingövägen-Odengatan

Figure 7. Some examples of travel times during the day (24 hours). Red = autumn 2005 (dotted lines show variation between individual autumn days); blue = weeks 2-5, 2006; green = weeks 6-8, 2006.

- Fears that orbital routes (roads in a proposed “ring” farther out, encircling the inner city) would see increased congestion have not been realized: journey times on these routes are unchanged.

- **The fact that fees vary during the charging period has obviously influenced the times at which motorists travel**
 - Motorists obviously adjust the times at which they travel according to fee variation during the charging period. In the diagram below there is a distinct “hiccup” in the curve when the fee level changes.



Top: Vehicle passages per hour entering inner city area:
 number of cars passing charging cordon during weekdays (mean value)
 Black: February 2006
 Blue: January 2006
 Red: Autumn 2005
 Time of the day

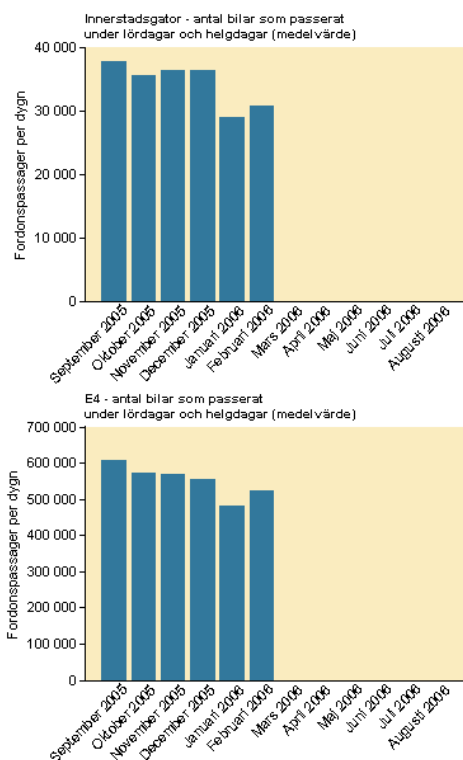
Bottom: Vehicle passages per hour leaving inner city area:
 number of cars passing charging cordon during weekdays (mean value)
 February 2006
 January 2006
 Autumn 2005
 Time

- We still lack data detailing how the times of the day at which people travel have changed but it seems likely that the fact that fees vary during the day has contributed to the strong decline

in peak-period traffic (particularly during the afternoon/evening peak period).

- **Will the effects of congestion charging decrease over time?**
 - Traffic has been essentially unchanged since the end of January but it is still too early to draw any definite conclusions concerning the long-term influence of environmental fees on traffic.
 - It is reasonable to expect that some time will elapse before the traffic system comes into balance. How long time it will take is difficult to say. Examples of a quick development and slow development: In London, balance was achieved quickly after congestion charging was implemented - results were stable after just a few weeks. Following the opening of Södra Länken, however, a traffic increase began that to a certain extent is still in progress.
 - Traffic usually increases slowly during spring, reaching maximum levels during May and early June. This means that even if the percentage decline compared to the same month in the previous year is basically unchanged, traffic will slowly increase and consequently some queues will probably occur again. When making comparisons, this should be borne in mind so that one is not tricked, for example, into comparing February-March-May 2006 and detecting a traffic decline resulting from environmental fees/congestion charges when, in reality, it may be a purely seasonal trend.

- **As yet, conclusions drawn are based solely on weekday traffic**
 - As can be seen in the diagram below, the hypothesis that weekend traffic has increased, to whatever degree, can be confidently rejected.
 - However, it is still too early to say with any certainty whether weekend traffic has undergone changes. It is more difficult to determine whether weekend traffic has undergone changes than weekday traffic because there is a larger variation in weekend traffic, both between months and individual weekends. Consequently, relatively long monitoring periods are necessary to find out whether any changes have actually taken place.



Top: Vehicle passages per day (24 hours), Inner-city streets - number of car passages during Saturdays and holidays (mean value).

Bottom: Vehicle passages per day (24 hours), E4 motorway - number of car passages during Saturdays and holidays (mean value).

The mean value in the diagram for inner-city streets relates to the number of vehicle passages, taken as whole, on Mariebergsbron, Munkbroleden, Skeppsbron, Sveavägen and Västerbron.

Public transport

- We refrain from detailed analysis/comment regarding the February figures for public transport - Stockholm Transport (SL) is best-equipped for that task. We hope to return to this subject, at least in connection with the next round of analyses in April.
- SL estimates the number of public-transport trips passing over the charging cordon with a combination of traffic counts and calculation models.
- For February, SL estimates that the number of public-transport trips passing over the charging cordon increased by 17,000 per day compared with February 2005.

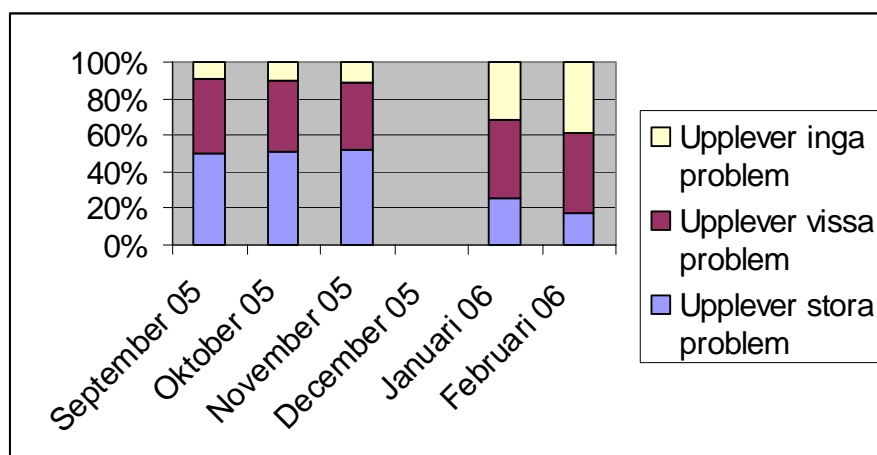
- This is a surprisingly small difference, among other things in comparison with a comparable estimate of the difference between January 2005 and January 2006. The deviation between the estimates for January and February is probably partly due to the methods used. We have not had time to analyse why developments for February 2006/February 2005 differ so much from developments for January 2006/January 2005.

Parking

- As part of the Stockholm Trial, the number of parking spaces at park-and-ride sites was increased last autumn by an additional 2,500 spaces. This seems to have led to increased use of park-and-ride sites: in December 2005 in Stockholm County about 1,000 additional cars were parked each day at park-and-ride sites compared to September 2005.
- However, following the implementation of congestion charging in January there has been no further increase in the number of motorists using park-and-ride sites - if so, it cannot be separated from the normal variation.

Opinions and attitudes

- Since environmental fees/congestion charging were implemented, the number of Stockholm County citizens who think that car-traffic congestion is a problem has significantly declined - from about 90% during autumn 2005 to about 70% in January 2006 and about 60% in February.
- The number of citizens who think there is a “big” problem with congestion has declined even more - from about 50% during autumn 2005 to 25% in January 2006 and 17% in February.
- The number who think there is *no* problem with congestion has risen from about 10% during autumn 2005 to 31% in January 2006 and 39% in February.



Yellow: Experience no problem

Red: Experience certain problems

Blue: Experience big problems

- Compared to autumn 2005, there are now a larger number of Stockholm County citizens who are positive about the decision to conduct the Stockholm Trial: about 50%, irrespective of whether the respondent passes the charging cordon or not.
- The number of citizens who know when congestion charges are levied - weekdays, 6.30 a.m.-6.30 p.m. - has increased, but the number who correctly answer the question is still under 60% and this includes those who pass the charging cordon.

Retail market

- The sales index sometimes included among market indicators provides a preliminary picture of how the retail market has developed in the inner-city compared to January 2005. However, it is still too early to safely comment on how environmental fees have influenced the inner-city retail market.
- The inner-city sales index show that sales at department and chain stores consulted declined slightly during January 2006 compared with January 2005.
- The main explanation why the inner-city sales index declined would appear to be that several of the participating stores are currently carrying out building extensions/renovations and/or have vacant premises. The sales index is based on information from selected companies and the extent to which the above-mentioned extensions/renovations, etc., influence the sales index depends on how significant the revenues of the companies in question are for the selection as a whole.

- The companies consulted are too few to draw any reliable conclusions about developments but it is probable that revenues have partly gone to other retailers in the inner city that are not included in our sales index.
- In connection with the ongoing review of the effect of environmental fees on the retail market in the Stockholm region, the Swedish Research Institute of Trade (HUI) is collecting its own data. This covers shopping centres and department stores throughout the charging zone. HUI's data indicates that the inner-city retail market has increased by over 5% in January 2006 compared with January 2005.

Appendix

Group	Route	Group	Route
Inner-city streets	Flemmingatan W	Outer radials	Bergslagsvägen: between Islandstorget-Brommaplan
	Flemmingatan E		Bergslagsvägen: between Lövvästvägen-Islandstorget
Hornsgatan: between Hornstull-Ringvägen	Bredäng- Nyboda		
Hornsgatan: between Ringvägen-Hornstull	Drottningholmsvägen: between Brommaplan-Stora Mossen		
Odengatan: between Odengatan-St Eriksplan	Drottningholmsvägen: between Dr.holmsbron-Brommaplan		
Odengatan: between Valhallavägen-Sveavägen	E18, between Järva krog and Ulvsundaleden		
Ringvägen W	E18/Hjulstavägen S		
Ringvägen E	Huddingevägen: between Magelungsvägen-Örbyleden		
St Eriksgatan: between Flemmingatan-St Eriksplan	Huddingevägen: between Ågestavägen-Magelungsvägen		
St Eriksgatan: between St Eriksplan-Norrtull	Huddingevägen: between Örbyleden-Gullmarsplan		
St Eriksgatan: between St Eriksplan-Odengatan	Kista - Järva krog		
Sveavägen: between Odengatan-Sergelstorg	Bergslagsvägen: between Brommaplan-Islandstorget		
Sveavägen: between Odengatan-Sveaplan	Bergslagsvägen: between Islandstorget-Lövvästvägen		
Sveavägen: between Sergelstorg-Odengatan	Drottningholmsvägen: between Stora Mossen-Brommaplan		
Sveavägen: between Sveaplan-Odengatan	Drottningholmsvägen: between Brommaplan-Dr.holmsbron		
Valhallavägen: between Lidingövägen-Odengatan	E18, between Järva krog and Stocksund		
Valhallavägen: between Odengatan-Lidingövägen	E18, between Ulvsundaleden and Järva krog		
Valhallavägen: between Odengatan-Roslagstull	E18/Enköpingsvägen N		
Valhallavägen: between Roslagstull-Odengatan	E18/Hjulstavägen N		
Västerbron S St Eriksgatan/Flemmingatan	Huddingevägen: between Örbyleden-Magelungsvägen		
Stadsgården W	Järva krog - Kista		
Sveaplan-Norrtull	Nyboda - Bredäng		
Sveaplan-Roslagstull			
Norrtull-Sveaplan			
Stadsgården E			
Inner radials	Liljeholmsbron N	Essingeleden/ Södra Länken	Gröndal - Norrtull
Stora Mossen - Essingeleden - Fridhemsplan at St Eriksgatan/Flemmingatan	Stora Mossen - Essingeleden - Lindhagensplan - Norr Mälarsestrand - Kungsholms Torg		Norrtull - Järva krog
Stora Mossen - Essingeleden - Lindhagensplan - Norr Mälarsestrand - Kungsholms Torg	Värmdövägen W		Nyboda - Gröndal
Värmdövägen W	Fridhemsplan at St Eriksgatan/Flemmingatan - Essingeleden - Stora Mossen		Gröndal - Nyboda
Fridhemsplan at St Eriksgatan/Flemmingatan - Essingeleden - Stora Mossen	Kungsholms Torg - Norr Mälarsestrand - Lindhagensplan - Essingeleden - Stora Mossen		Järva krog - Norrtull
Kungsholms Torg - Norr Mälarsestrand - Lindhagensplan - Essingeleden - Stora Mossen	Lidingövägen N		Norrtull-Gröndal
Lidingövägen N	Liljeholmsbron S		Södra Länken W westward
Liljeholmsbron S			Södra Länken W eastward
			Södra Länken E westward
			Södra Länken E eastward
		Orbitals	Kymlingelänken N
			Magelungsvägen W
			Magelungsvägen E
			Älvsjövägen W
			Älvsjövägen E
			Örbyleden E

