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The Gothenburg congestion charge. Effects, design and politics

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ABSTRACT

This paper summarizes the traffic effects of the Gothenburg congestion charges introduced in 2013. The system is similar to the system introduced in Stockholm in 2006; both are designed as time-of-day dependent cordon pricing systems. We find that many effects and adaptation strategies are similar to those found in Stockholm, indicating a high transferability between smaller and larger cities with substantial differences in public transport use. However, there are also important differences regarding some of the effects, the accuracy of the model forecasts and public support arising from different topologies, public transport use, congestion levels and main objectives communicated to the public. Finally, the Gothenburg case suggests that whether congestion charges are introduced or not depends on the support among the political parties, and that this is determined primarily by the prevailing institutional setting and power over revenues, and to a lower extent by the public support, and benefits from congestion reduction.

1. Introduction

Gothenburg, the second largest city in Sweden, introduced a time-of-day dependent cordon-based congestion charging scheme in January 2013. There are only a few cities in the world that have previously introduced congestion charges.[1] In particular, analyses of traffic effects have only been published for the congestion charging systems in Singapore (Olszewski and Xie, 2005; Phang and Toh, 1997), London (Santos, 2005; Santos and Shaffer, 2004), Stockholm (Börjesson et al., 2012; Eliasson et al., 2009) and Milan (Carnovale and Gibson, 2013).

The Gothenburg system resembles the Stockholm system in many ways. However, the evaluation of the Gothenburg charges contributes to the literature because Gothenburg differs considerably from the cities where traffic effects of congestion charges have previously been evaluated in terms of size, public transport share and congestion levels. The justification for and main objectives of the congestion charges also differs between the cities. Gothenburg is a small city (500,000 inhabitants), where congestion is limited to a few highway junctions. The share of public transport trips in the charged OD pairs is substantially lower than in Stockholm, London and Singapore. The implication of the comparatively low public transport share is of particular interest, since this is often assumed to be a key factor for both effectiveness and public support for congestion charges (Santos, 2005).

This paper evaluates the traffic effects of the Gothenburg charges, and compares them to the transport model predictions and political targets. We consider effects on traffic volumes and travel times, as well as adaptation mechanisms and support issues. Based on differences and similarities between Gothenburg and Stockholm, we also draw lessons relating to

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[1] Other types of road pricing systems exist in many places in the world, e.g. financing road tolls or other tolling systems used as a fiscal policy to raise revenue, such as Oslo and Bergen, and HOT-lanes on US motorways.

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transferability of traffic effects, adaptation strategies, system design, and public support. This provides some indication of the transferability between cities.

A model-based study by Börjesson et al. (in press) indicates a high transferability of the effects of congestion charges between cities with different levels of congestion. This conclusion is supported by the present study. Despite the lower public transport shares, the adaptation strategies are very similar to those in Stockholm.

Santos et al. (2008) suggest that the main reason that there are so few examples of congestion charging schemes in the world is lack of public support, implying low political support (i.e. support for congestion charges among political parties). What is striking in the Gothenburg case, therefore, is that congestion charges were introduced despite low public support. We draw lessons regarding the role of the prevailing institutional setting, shaping the political support, in the process leading to the introduction of congestion charges.

The Gothenburg congestion charges followed the Stockholm charges introduced in 2006. The Stockholm charges did not pave the way for the Gothenburg charges by increasing public support, but by influencing the distribution of national transport investment grants. In a stroke this altered the political support to the extent that all political parties in the city council of Gothenburg became in favour of congestion charges.

The key factor for receiving political support for charging in Stockholm was an agreement with the national government that Stockholm would receive a major infrastructure package, funded by the congestion charging revenue leveraged with an equally large national grant. This agreement inspired the Gothenburg politicians to strike a similar deal, co-funding a large infrastructure package with revenues from congestion charges. A consultative referendum was held in September 2014, where 57% voted against congestion charges, although the support did increase after introduction of the charges just as in Stockholm (Eliasson, 2014). Since then the Gothenburg city council has decided to keep the charges in spite of the referendum result.

Raising revenue is thus the primary objective of the charges, which make them similar to the tolling schemes in the Norwegian cities (Ieromonachou et al., 2006; Larsen and Østmoe, 2001). According to the deal, the system should generate yearly revenues of 90 million EUR.[2] Given this revenue target, secondary design objective are reduced congestion and improved local environment.

Eliasson (2014) concludes that a key factor for high public support for congestion charges is to market them as morally good rather than a tax instrument. Indeed, the policy makers of Gothenburg did try to frame the congestion charges as an environmental measure. The real reason – to collect taxes to be spent on an infrastructure package with low social returns – was probably seen through by the public, partly explaining the low public support.

Goodwin (1989), Jones (1991) and King et al. (2007) argue that revenue recycling and infrastructure investments increases public support for congestion charges, but the Gothenburg case challenges this conclusion. The commitment problem, that the revenue might be diverted to other projects than promised, as suggested by Manville and King (2013), is not a likely problem in Gothenburg. Rather, the Gothenburg case supports the conclusion by Larsen and Østmoe (2001), that earmarking congestion charging for infrastructure induces a risk of realizing dubious projects that produce small benefits to the travellers and are difficult to modify, since they are included in a package deal. Possibly it also stimulates over-investments in infrastructure.

The Gothenburg case demonstrates that introduction of congestion charges depends not only, or even primarily, on the public support and benefit from congestion reduction, but also on the political support, which is determined by different factors such as the institutional setting. The importance of both public and political support may explain why many cities have not introduced congestion charges in spite of high congestion levels (Edinburgh, Manchester, Helsinki, Copenhagen and New York). In New York, 67% of the public even supported the proposed charges (Schaller, 2010).

This paper is organized as follows. Section 2 describes the design of the charging system in Gothenburg. Section 3 presents effects on traffic volumes and travel times and how they compare to model forecasts. Section 3 also describes the drivers' adaptation strategies. Section 4 compares revenues to the target and discusses system costs. The political process leading up to introduction of congestion charges is described in Section 5. Section 6 concludes the paper.

2. Design

Three objectives for the congestion charge were stated: raising revenues for the investments in the West Swedish Agreement, reducing congestion and improving the environment. No congestion reduction target was quantified, however. Many stakeholders initially seemed to have the idea that it would be easy to copy the system design from Stockholm and set up a cordon around the inner city of Gothenburg. Designing a real-world congestion charging system, however, is a difficult task and the design must be adapted to the local conditions. An important difference between the cities is that in Gothenburg, the bottlenecks are not located on arterials leading to and from the inner city, but rather on arterials leading to the hub of the highway system, to the north of the inner city; see Fig. 1.

Other differences are that Gothenburg is less than half the size of Stockholm and that Gothenburg has limited congestion and a lower public transport market share. In Gothenburg, the public transport market share in 2012 was 26% for commuting trips in OD pairs where the charges apply (Björklind et al., 2014). In Stockholm, the corresponding market share is 77% (SL,

[2] We have throughout this paper converted SEK to Euro using a conversion rate of 10 SEK/€.