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The unexpected no to congestion charges

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Abstract

Public opposition is often regarded as the main political obstacle to implementing congestion pricing, yet it remains unclear why policies with concentrated private costs can face majority opposition. Using full-population registry data linked to referendum and general-election outcomes, we analyse the 2006 Stockholm and 2014 Gothenburg congestion-charge referendums. Car ownership is by far the strongest predictor of opposition, while political ideology explains additional variation beyond self-interest. Our main finding is that turnout changes the apparent importance of self-interest: districts with higher turnout show greater support, and controlling for turnout substantially strengthens the estimated effect of car ownership. The results suggest that referendum outcomes reflect not only who bears the costs of congestion pricing, but also who participates in the political process.

JEL codes: R48; H23; D72; R41; D12

1 Introduction

Public support remains one of the main political constraints on the implementation of congestion pricing. Recent debates surrounding the introduction of congestion pricing in New York City further illustrate that political acceptability remains a central challenge for these policies (e.g., Bergquist et al., 2025). Previous literature emphasizes self-interest, showing that support for congestion pricing tends to be lower among car owners, frequent drivers, and drivers paying more in congestion charges, while it tends to be higher among those with greater time gains or better alternatives to car use (e.g., Harrington et al., 2001; Jaensirisak et al., 2005; Gaunt et al., 2007; Eliasson and Jonsson, 2011; Börjesson et al., 2015; Börjesson et al., 2016; Hess and Börjesson, 2019; see Hensher and Li, 2013, for a review). At the same time, a growing literature shows that broader attitudes and values also matter, including environmental concern, views on taxation and pricing, fairness perceptions, and trust in institutions (Börjesson et al., 2015; Börjesson et al., 2016; Hess and Börjesson, 2019).

Yet one important puzzle remains unresolved. Previous evidence shows that the direct monetary costs of congestion pricing are highly concentrated among a small minority of residents (Börjesson and Fukushima, 2026). In Stockholm and Gothenburg, fewer than half of households owned a car, while the top 10% of payers accounted for around 90% of congestion-charge revenues. Why, then, did a majority reject congestion pricing in Gothenburg? Understanding how concentrated private costs translate into majority political opposition may be central to assessing the political feasibility of congestion pricing.

Although a large literature examines public support for congestion pricing, most studies rely on survey-based or stated support rather than observed voting behaviour. This creates two concerns. First, survey respondents may not be representative of the voting population, especially as declining response rates raise concerns about nonresponse bias (Groves and Peytcheva, 2008; Keeter et al., 2017; Cavari and Freedman, 2023). Second, referendum outcomes depend not only on preferences but also on participation. If turnout differs systematically across groups with different exposure to congestion charging, analyses of referendum outcomes may understate the role of self-interest. Despite this, turnout and selective participation have received little attention in the congestion-pricing literature.

This paper addresses these issues by moving from survey-based measures of stated support to revealed voting behaviour. Using full-population registry data linked to referendum and general-election outcomes, we examine how self-interest, political ideology, selective turnout, and institutional conditions shaped congestion-pricing referendum outcomes in Stockholm and Gothenburg. The data combine district-level referendum results with information on car ownership, socio-economic characteristics, residential and workplace locations, party voting patterns, and turnout. Stockholm and Gothenburg provide a useful comparison because they introduced broadly similar congestion-charging systems under different institutional conditions and with opposite referendum outcomes.

We examine why opposition to congestion pricing can become politically dominant even when direct payment exposure is concentrated among a minority of residents. We do this by asking four related research questions: first, to what extent referendum outcomes are associated with indicators of self-interest; second, with political ideology; third, what role turnout plays in shaping opposition; and fourth, whether these relationships differ between Stockholm and Gothenburg—which may provide some indication of the importance of political and institutional conditions that differed widely between the two cities. We do not interpret self-interest and political ideology as fully separate mechanisms, since party preferences may partly reflect material interests, residential location, and car dependence (Sears et al., 1980; Chong et al., 2001; Hårsman and Quigley, 2010; Börjesson et al., 2015; Hess and Börjesson, 2019). At the same time, broader political values are often more stable than opinions on a specific policy, especially a policy such as congestion charging on which many voters may not previously have formed strong views (Heberlein, 2012).

Our contribution is threefold. First, the paper provides evidence on congestion-pricing acceptability by combining detailed registry data with actual referendum outcomes rather than relying on survey-based measures of stated support. Second, it incorporates turnout and selective participation into the analysis, thereby connecting the congestion-pricing literature to broader work on voter representation and political participation. Third, it offers a comparative explanation of why two cities with otherwise similar charging systems produced different referendum outcomes.

By identifying which aspects of support appear to be linked to self-interest, political context, and participation patterns, the paper helps clarify which lessons from the Swedish referendums may generalise to other cities and policy contexts. This is particularly relevant in places such as New York, where congestion pricing has remained politically contested in major cities for many years (Peters and Kramar, 2012), and where debates have centred on public acceptance, equity, and political feasibility. The introduction of congestion charging has further been accompanied by continued disagreement over public support and opposition (Bergquist et al., 2025; Ostrovsky and Yang, 2025).

The rest of the paper is organised as follows. Section 2 reviews the literature and develops the conceptual framework. Section 3 describes the institutional context in Stockholm and Gothenburg. Section 4 presents the data. Section 5 outlines the empirical strategy. Section 6 presents the results. Section 7

discusses the findings, and Section 8 concludes.

2 Literature review

Research on congestion-pricing acceptability has developed along several related lines, but the literature remains divided over how support for congestion charges is formed and how it should be measured. A recurring challenge concerns conceptual clarity. Schade (2017) notes that the field has often used terms such as support, acceptability, and acceptance interchangeably, while also varying in its definition of the relevant public, which may refer to motorists, residents, citizens, or voters. In line with much of the transport-policy literature, this paper uses the term acceptability as the broader concept, referring to citizens' willingness to support or tolerate congestion pricing. Empirically, we measure support using revealed voting behaviour in congestion-charge referendums, in particular the share of yes-votes among valid votes. For the purposes of this study, the relevant public is therefore the set of individuals eligible to participate in the referendum.

A first and long-standing strand of research emphasises self-interest (see the review by Hensher and Li, 2013). Car use and car ownership have been found to have a negative impact on support for congestion charges in many studies (e.g., Harrington et al., 2001; Jaensirisak et al., 2005; Gaunt et al., 2007; Eliasson and Jonsson, 2011). Moreover, Börjesson et al. (2015), Börjesson et al. (2016), and Hess and Börjesson (2019) find evidence that higher congestion charge payments decrease support. Ubbels and Verhoef (2006) found that using revenues to replace existing car taxes can increase acceptability. De Borger and Proost (2012) found that car drivers expect negative net benefits and therefore predicted opposition to congestion charging among existing drivers.

The benefits of congestion charges are likely to vary with value of time, i.e. the opportunity cost of time, which in turn depends on factors such as income and scheduling constraints. Value of time has also been found to increase support for congestion charges in Börjesson et al. (2015), Börjesson et al. (2016), and Hess and Börjesson (2019).

A second strand of research argues that self-interest, while important, does not on its own explain congestion-pricing acceptability. A broad set of studies shows that support is also shaped by environmental concern, perceived fairness, trust in government, and views on taxation and pricing as policy instruments (Eriksson et al., 2008; Schuitema et al., 2010; Eliasson, 2014; Hansla et al., 2017). Börjesson et al. (2015) conclude that attitudinal factors related to environment, taxation, equity, and pricing are strongly associated with support for congestion charging, while Hess and Börjesson (2019) show that self-interest and broader latent attitudes are closely intertwined. Hårsman and Quigley (2010) likewise show, in their study of the Stockholm referendum, that ideology and self-interest both matter for political and public acceptability. In line with these results, Hsieh (2022), in a study of road pricing acceptability in Taiwan, finds that trust in government, procedural and distributive fairness, and perceived freedom infringement are important for policy acceptability. Shatanawi et al. (2022), using evidence from Hungary, Jordan, Ukraine, and Brazil, similarly show that attitudes, expectations, and social norms are important determinants of road-pricing acceptability across country contexts. This suggests that self-interest and ideology should not be treated as fully separable mechanisms, but rather as interacting determinants of support.

A third line of reasoning, drawn primarily from political science, concerns participation. Classic theories of collective action suggest that policies characterised by concentrated costs and diffuse benefits are particularly vulnerable to minority opposition (Olson, 1965). Research on political participation further shows that turnout is systematically unequal, and that differences in mobilisation and engagement may distort collective outcomes in favour of politically active groups (Hill and Leighley, 1992; Lijphart, 1997; Hajnal and Trounstine, 2005). In direct-democratic settings, this implies that outcomes may depend not only on the distribution of preferences, but also on who turns out to vote (Matsusaka, 2005; Campbell, 2003). This perspective is especially relevant for congestion pricing, where the direct monetary costs are borne primarily by car users, while many of the benefits are broader and more diffuse. Yet referendum turnout and selective participation have received relatively little attention in the congestion-pricing literature. This gap is also relevant in the Swedish context, where turnout is high in comparative perspective but still varies across groups and residential areas. For example, Bevelander and Hutcheson (2022) use voting participation in Sweden as an indicator of political engagement, and show that it varies between immigrants, their descendants, and native-born citizens.

A related methodological issue is that most existing evidence on congestion-pricing acceptability relies on surveys or stated support. For instance, a survey conducted in the autumn of 2014, shortly after the referendum in Gothenburg, showed that 57% of respondents residing in the municipality were in favour of the charges. However, in the referendum, 56% voted against them (Börjesson and Kristoffersson, 2015). This raises two concerns. First, survey respondents may not be representative of the relevant voting population, especially when response rates are low. This could be a problem if car ownership is higher among survey respondents than in the population as a whole. Börjesson et al. (2015), for example, explicitly note that the relatively low response rates in their survey may bias the observed distribution of opinions. Second, even if survey responses capture attitudes correctly, referendum outcomes may differ from stated public opinion because political preferences only influence outcomes conditional on electoral participation. Participation itself depends on the costs and resources associated with voting (Downs, 1957; Verba et al., 1995). For road-pricing, Li (2012) finds that stated-preference evidence may align reasonably well with behaviour in some settings, but the literature provides less evidence on how stated attitudes translate into referendum choices. Actual congestion charge referendum outcomes thus provide an important complement to survey-based evidence.

A strand of literature has examined the Swedish referendum outcomes and the political contexts in which they occurred. For Gothenburg, this includes analyses of the political mobilization surrounding the congestion charge, notably the emergence of the anti-congestion-charge party Vägvalet (Hysing, 2015; Börjesson et al., 2016). Previous work has also highlighted differences in framing, legitimacy, public anchoring, and local political and geographical context as potential explanations for the contrasting political trajectories of the two cities (Hysing, 2015; Hysing and Isaksson, 2015; Jagers et al., 2016; Jagers et al., 2017).

Taken together, the literature suggests that support for congestion pricing may be shaped by four interrelated mechanisms: self-interest, broader political and normative predispositions, turnout, and local political context. However, because most existing evidence is based on survey responses rather than

revealed voting behaviour, it remains unclear how strongly these mechanisms shape actual referendum outcomes. This gap motivates the empirical analysis that follows.

3 Background

Stockholm and Gothenburg introduced broadly similar congestion-charging systems (see Figs. 1 and 2), but under markedly different political contexts and framings. In both cities, the charges took the form of time-differentiated cordon charges. In Stockholm, the charge was introduced as a trial and was primarily framed as a congestion-reduction and environmental policy. In Gothenburg, by contrast, the charge was introduced as part of the West Swedish infrastructure package, where revenue generation was central to the political rationale. Although environmental and congestion-reduction arguments were also used, Gothenburg had lower congestion levels than Stockholm, and the financing role of the charge was both central and publicly known. These differences in policy rationale, framing, revenue use, and public anchoring contributed to substantially different levels of controversy and public support in the two cities.

The two systems also differed in their spatial incidence. In Stockholm, the charge primarily applied to car trips to and from the inner city, whereas in Gothenburg the charging system also covered central bypass routes. In Stockholm, residents inside the charging zone therefore paid more on average despite lower car ownership than residents outside the zone. In Gothenburg, by contrast, residents outside the zone paid slightly more on average and also had higher car ownership. Mean payments remained relatively stable up to 50 km from the central station in Gothenburg, whereas in Stockholm they declined markedly beyond around 10 km. A majority of workers in Gothenburg commuted across the charging cordon, whereas this was not the case in Stockholm. Hence, in Gothenburg, the charge was paid by residents across a much wider area (Börjesson and Fukushima, 2026). Moreover, the share of car trips in origin–destination pairs subject to the charge was substantially higher in Gothenburg, around 60% of trips in the region compared with around 30% in Stockholm (Bastian and Börjesson, 2018; Börjesson and Kristoffersson, 2016).

3.1 Stockholm

The Stockholm congestion charge started as a trial in January 2006, with an advisory referendum scheduled for September 2006, coinciding with the local and general elections. The policy was driven politically by the Green Party at the national level. In the run-up to the trial, the charges met with substantial public and political opposition (Börjesson et al., 2012). Only 3% of newspaper articles expressed support for the charge, while 39% were critical (Winslott-Hiselius et al., 2009). Public opinion polling before the trial similarly indicated widespread opposition, with 71% of respondents disapproving of the measure (SKOP, 2005).

Once introduced, however, the charge produced an immediate 22% reduction in traffic crossing the charging cordon compared with 2005 levels. One of the most surprising lessons from the Stockholm trial was that public opinion became more favourable after implementation. In the advisory referendum following the seven-month trial, 53% of voters supported retaining the charges, and the system was reintroduced permanently in August 2007.

Before the referendum, revenue use was not a central issue and had not yet been settled. Stockholm politicians were concerned that the city would lose national infrastructure grants if it retained the charges, since the revenues might substitute for national infrastructure grants. Local political support increased only after an agreement was reached in which congestion-charge revenues were earmarked for a road bypass, with the national government contributing the remaining 50 percent of the funding.

3.2 Gothenburg

In Gothenburg, the introduction of congestion charges had a different political background. Local politicians saw that the Stockholm agreement had helped secure national grants for a large infrastructure package by combining them with congestion-charge revenues, and sought a similar arrangement for Gothenburg. The Gothenburg charges were therefore introduced to co-finance the West Swedish Infrastructure Package.

Unlike in Stockholm, the Gothenburg charge was introduced without a preceding trial period. The system was implemented in January 2013 and led to a reduction in traffic of around 10% (Börjesson and Kristoffersson, 2015). Public opposition was substantial, and although no referendum was initially planned, a petition with more than 90,000 signatures led to an advisory referendum being held in September 2014, as stipulated under Swedish local-government law. The referendum coincided with the local and general elections and took place 20 months after the charge had been introduced.

Although two pre-referendum opinion polls suggested that a slight majority of residents supported retaining the charge, the referendum result showed substantial opposition, with a majority voting against the policy (Hansla et al., 2017). However, in March 2015, the local political majority decided to override the advisory referendum and retain the system, arguing that the revenues were necessary for financing the infrastructure package.

4 Data

4.1 Sample

The empirical analysis is conducted at the district level, using parishes in Stockholm and electoral precincts in Gothenburg as the units of observation. The difference in geographic units reflects data availability and boundary consistency across cities. In Stockholm, historical electoral-district boundaries for the 2006 referendum were not available, requiring aggregation of results to the parish level. In Gothenburg, by contrast, the data could be matched directly to precinct-level electoral districts, allowing for a finer spatial resolution. The final dataset includes 27 parishes in Stockholm and 91 precincts in Gothenburg. Two parishes in Stockholm that extend both inside and outside the congestion charging zone are excluded from the analysis, since they cannot be unambiguously classified as being either inside or outside the zone.

Individual-level geocoded register data, available at 100 m x 100 m resolution, are aggregated to the district level. The register data are obtained from Statistics Sweden (SCB) and encompass nearly the entire voting-eligible population in the year of the referendums, 2006 (Stockholm) and 2014 (Gothenburg), respectively. It includes a range of variables, such as income, car ownership, household composition, workplace, and residential information. For this study, the sample is restricted to adults aged 18 and above, which is the minimum age to vote and obtain a driver's license. In the registry data, a household is defined as individuals linked through marriage or cohabitation with at least one mutual child and residing at the same address.

Employed individuals are classified as crossing the charging zone if their residence and workplace are located on opposite sides of the charging cordon, or if their shortest commuting route crosses the cordon (see Figs. 1 and 2). For each district, we calculate the average Euclidean (straight-line) distance from households to the central railway station. We also construct an indicator for whether the district is located inside the congestion charging zone.

Referendum voting outcome data for Stockholm are obtained from the City of Stockholm (2006), while referendum data for Gothenburg and the local- and general election data for both cities are sourced from the Swedish Election Authority (2014). We define local support for congestion pricing as the share of yes-votes among all valid votes in each district. Blank and invalid ballots are excluded from the analysis, since they do not convey a clear policy preference regarding the congestion charge.

4.2 Descriptive statistics

Table 1 shows summary statistics by district voting outcome in Stockholm and Gothenburg. Fringe cars are company cars available for private use. Since congestion charges are billed to the registered owner of the vehicle, the employer typically bears the direct monetary cost of the charge. Disposable income refers to annual disposable income after taxes and transfers. Individual car ownership is defined as registered ownership of at least one passenger car, while household car ownership indicates that at least one member of the household owns a passenger car.

Panel A shows district-level characteristics, while Panels B and C show individual-level and household-level characteristics, respectively. In Stockholm, a majority voted in favour of retaining the charges in 16 districts ("For-districts"), while a majority voted against the charges in 11 districts ("Against-districts"). In Gothenburg, 27 out of 91 districts voted in favour of retaining the charges.

The number of registered voters is similar across For- and Against-districts in Stockholm. In Gothenburg, however, For-districts have more registered voters than Against-districts. This reflects the spatial distribution of support: in both cities, Against-districts tend to be located farther from the central station. In Gothenburg, these more peripheral districts also tend to contain fewer registered voters. In Stockholm, by contrast, district size varies less systematically with distance from the city centre, because Stockholm is a larger metropolitan area with relatively dense residential development extending farther from the inner city.

Panel B shows that socio-economic differences between For- and Against-districts are generally modest. For-districts tend to have a somewhat higher share of single-person households, individuals with Swedish-born parents, employed individuals, and employed individuals commuting across the cordon. By contrast, Against-districts tend to have a higher share of households with children, car owners, and individuals with access to fringe cars. Income differences are relatively small, although average individual disposable income is around 8% lower in For-districts in Stockholm; no corresponding difference is observed in Gothenburg. Car ownership and average mileage per car are higher in Against-districts in both cities.

Party support also differs systematically across For- and Against-districts. Support for the larger parties, in particular the Moderate Party and the Social Democrats, tends to be higher in Against-districts, whereas support for several smaller parties—the Liberal Party, the Green Party, and the Left Party—is generally higher in For-districts. This pattern suggests that support for congestion charging does not follow a simple left–right divide. Instead, it appears to reflect a broader set of political predispositions, including attitudes towards environmental policy, taxation, market-based instruments, and trust in local decision-making.

Turnout in the concurrent general election, defined as the number of votes cast divided by the number of eligible voters, is slightly higher in For-districts than in Against-districts in Stockholm. The difference is larger in Gothenburg.

Table 1 also presents household-level statistics. These may be particularly relevant for car ownership, since individuals who do not own a car may nevertheless be affected by congestion charges if they live in a household owning a car. Household car ownership may therefore provide a broader measure of exposure than individual car ownership alone. Only 23% of individuals in Stockholm and 29% in Gothenburg own a car, whereas a larger share live in households that own at least one vehicle. As shown in Panel C, the differences in household car ownership between For- and Against-districts are similar to those observed for individual car ownership in Panel B, but somewhat larger in relative terms.

Table 1
Summary statistics by referendum outcome in Stockholm (2006) and Gothenburg (2014).

Variable	Stockholm Total	Stockholm For	Stockholm Against	% Diff.	Gothenburg Total	Gothenburg For	Gothenburg Against	% Diff.
District level								
Observations	27	16	11		91	27	64	
Households	16850	16915	16757	+ 0.9%	3346	4436	2887	+ 53.7%
Registered voters	22170	21386	23309	-8.3%	4626	5608	4212	+ 33.1%
Inside congestion zone	0.52	0.69	0.27	+ 155.6%	0.19	0.48	0.06	+ 700.0%
Distance to central station (km)	5.02	3.39	7.40	-54.2%	6.00	2.70	7.34	-63.2%
Moderate Party	0.35	0.35	0.37	7%	0.26	0.24	0.28	12%
Centre Party	0.06	0.06	0.05	-31%	0.04	0.05	0.04	-22%
Liberal Party	0.10	0.11	0.10	-5%	0.08	0.08	0.08	-7%
Christian Democrats	0.05	0.05	0.06	22%	0.05	0.04	0.06	24%
Green Party	0.09	0.11	0.07	-69%	0.11	0.14	0.09	-64%
Social Democrats	0.23	0.23	0.25	6%	0.26	0.19	0.31	39%
Left Party	0.07	0.09	0.06	-42%	0.10	0.13	0.09	-41%
Other parties	0.04	0.00	0.04	100%	0.09	0.13	0.06	-96%
Turnout	0.80	0.81	0.79	+ 2.5%	0.79	0.83	0.78	+ 6.4%
Individual								
Age	46.25	45.66	47.11	-3.1%	46.24	43.65	47.33	-7.8%
Female	0.52	0.52	0.52	0.0%	0.51	0.52	0.51	+ 2.0%
Single	0.50	0.54	0.43	+ 25.6%	0.43	0.59	0.36	+ 63.9%
Child	0.25	0.22	0.29	-24.1%	0.27	0.19	0.31	-38.7%
Employed	0.71	0.73	0.68	+ 7.4%	0.69	0.76	0.66	+ 15.2%
Average disposable income EUR	23184	22415	24302	-7.7%	24854	25069	24763	+ 1.3%
Median disposable income EUR	17888	18221	17404	+ 4.7%	21370	21780	21196	+ 2.7%
Parents born in Sweden	0.56	0.58	0.52	+ 11.5%	0.56	0.66	0.52	+ 26.9%
Car ownership	0.23	0.20	0.27	-25.9%	0.29	0.23	0.32	-28.1%
Mileage per car (10 km)	1322	1301	1351	-3.7%	1327	1251	1359	-7.9%
Employed & crossing zone	0.42	0.46	0.37	+ 24.3%	0.58	0.64	0.55	+ 16.4%
Fringe car	0.04	0.03	0.04	-25.0%	0.05	0.04	0.05	-20.0%
Household								
Single household	0.71	0.75	0.66	+ 13.6%	0.63	0.77	0.57	+ 35.1%
Child in household	0.18	0.16	0.22	-27.3%	0.21	0.13	0.25	-48.0%
Employment in household	0.70	0.72	0.66	+ 9.1%	0.67	0.75	0.64	+ 17.2%
Average disposable household income EUR	31020	29020	33920	-14.4%	37020	31960	39150	-18.4%

Notes: For- and Against-districts are defined according to whether a majority of voters supported or opposed the congestion charge in the referendum. Statistics are reported as district-level means. Household-level variables are constructed by aggregating individual register information to the household level. % Diff. = 100 × (For − Against) / Against. Positive values indicate higher values in For-districts and negative values indicate higher values in Against-districts. “Min. 1 employed & crossing zone” indicates that at least one employed household member crosses the charging zone.

Variable	Stockholm Total	Stockholm For	Stockholm Against	% Diff.	Gothenburg Total	Gothenburg For	Gothenburg Against	% Diff.
District level								
Median disposable household income EUR	21210	21080	21410	-1.5%	29440	24530	31510	-22.1%
Car ownership in household	0.30	0.25	0.36	-30.6%	0.41	0.29	0.46	-37.0%
Min. 1 employed & crossing zone	0.40	0.44	0.36	+ 22.2%	0.58	0.62	0.56	+ 10.7%

Notes: For- and Against-districts are defined according to whether a majority of voters supported or opposed the congestion charge in the referendum. Statistics are reported as district-level means. Household-level variables are constructed by aggregating individual register information to the household level. % Diff. = 100 × (For − Against) / Against. Positive values indicate higher values in For-districts and negative values indicate higher values in Against-districts. “Min. 1 employed & crossing zone” indicates that at least one employed household member crosses the charging zone.

Figures 3 and 4 provide an initial illustration of how opposition to congestion charging varies across districts. Each figure plots, at the district level, the counts of adults living in car-owning households against the count of “no” votes in the referendum, for Stockholm (2006) and Gothenburg (2014), respectively. The figures show a positive relationship between household car access and the number of no-votes. Many districts lie close to the 45-degree line, indicating that in most areas the number of no-votes closely follows the number of individuals living in a household with at least one car. However, this relationship should be interpreted with caution. The number of no-votes reflects both the share of no-votes among valid ballots and the level of voter turnout.

While the descriptive pattern is highly suggestive, it does not establish that car owners systematically opposed the congestion charge. To better assess the relative importance of car ownership, turnout, and other district characteristics, we proceed with a multivariate analysis in the next section.

5 Empirical strategy and regression model

5.1 Research questions

In this section, we link our four research questions to testable hypotheses and present the regression model used in the empirical analysis.

We examine four related questions. First, whether the different indicators of self-interest are associated with a higher share of yes-votes in the referendum outcome. Second, whether political ideology is related to share of yes-votes beyond self-interest. Third, whether turnout is systematically related to the share of yes-votes in the referendum. Finally, we assess whether these relationships differ between Stockholm and Gothenburg.

5.2 Self-interest and underlying mechanisms

We conceptualise self-interest as comprising three related dimensions:

(a) private exposure to the congestion charge—i.e., the likelihood and intensity of paying the charge and the incidence of costs (e.g., privately vs. employer-paid);

(b) benefits conditional on paying, in particular the value of reduced travel time, which depends on travellers’ opportunity cost of time, i.e., income and scheduling constraints; and

(c) potential local benefits from reduced traffic, such as improved neighbourhood conditions for residents located inside or close to the cordon.

In the empirical analysis, we rely on district-level proxies that capture different aspects of these mechanisms. We group the explanatory variables into the following three sets:

Direct self-interest indicators (Z_i) capture payment incidence and intensity (component a). These include car ownership or access, median mileage, the share of commuters crossing the congestion zone, and fringe car access. Higher median mileage is likely to be correlated with greater payment incidence. Fringe car access may reduce the perceived private cost of the charge, as the cost is typically borne by the employer.

Spatial attributes (W_i) capture both exposure and local benefits and may therefore affect support through opposing mechanisms. On the one hand, distance to the central station and an indicator for residence inside the cordon proxy exposure to the charge (component a). On the other hand, these variables may also capture potential local benefits from reduced congestion and improved environmental conditions (component c).

Socio-economic characteristics (X_i) capture heterogeneity in the value of time (component b). Median disposable income is included because higher income increases the value of time, while employment and the share of households with children under 18 may increase the opportunity cost of time through tighter scheduling constraints.

5.3 Political ideology

We hypothesise that political ideology shapes support for congestion pricing beyond direct material self-interest. Party preferences may proxy broader political and normative predispositions that influence how individuals evaluate congestion pricing as a policy instrument. In particular, party support may reflect differences in views on environmental policy, taxation, redistribution, and institutional legitimacy. Following the literature, we expect such ideological

factors to influence support both directly and indirectly, for example by shaping how individuals perceive the fairness and effectiveness of the policy. To test this hypothesis, political ideology is captured by the vector Φ_i, measured as the logarithm of party vote counts in the general election for each of the parties represented in parliament. We use general-election outcomes rather than local-election results, as they better reflect underlying political ideology.

5.4 Voter turnout

Turnout is captured by Ω_i, measured as participation in the referendum and, where relevant, in the concurrent general election. In the congestion-pricing context, selective participation may be particularly important if car owners, who bear the direct monetary costs of the charge, are more motivated to vote than non-car owners. Since car owners are a minority in both cities, higher overall turnout may bring in more voters who are less directly exposed to the charge and therefore more likely to support it. This reasoning is consistent with theories of collective action and unequal political participation discussed above (Olson, 1965; Lijphart, 1997; Matsusaka, 2005). Turnout may affect referendum outcomes both directly—if groups with systematically different preferences participate at different rates—and indirectly, by conditioning the relationship between self-interest and observed voting outcomes.

Although Sweden exhibits comparatively high electoral turnout in an international perspective, geographical variation in participation persists. Andersson et al. (2022) document substantially lower local election turnout among immigrants, while Bevelander and Hutcheson (2022) show that turnout in the 2014 local elections exceeded 85% among Swedish citizens but was markedly lower among foreign citizens.

To examine whether immigrant background is associated with turnout in our setting, we use the share of Swedish citizens with two immigrant parents. Using the parent immigration status rather than first-generation immigration status mitigates any concerns that lower turnout simply reflects the mechanical effect of non-naturalised residents being ineligible to vote in general elections.

5.5 Regression model

We estimate cross-sectional OLS regressions separately for each municipality using the following specification

$$Y_i = \alpha + Z_i' \beta_1 + W_i' \beta_2 + X_i' \beta_3 + \Phi_i' \beta_4 + \Omega_i' \beta_5 + \epsilon_i$$

where Y_i represents the share of “yes” votes (among all yes or no votes) in district i, and Z_i, W_i, X_i, Φ_i, and Ω_i denote vectors of explanatory variables capturing, respectively, self-interests, spatial attributes, socio-economic characteristics, political ideology, and turnout.

Because several covariates are correlated, we introduce the blocks of variables sequentially in the empirical analysis to examine how estimated relationships change as additional controls are included. This stepwise approach is not intended as a causal decomposition of the outcome into separate components, but rather as a way to provide transparency regarding how associations evolve.

6 Results

6.1 Self-interest

We first examine whether indicators of direct self-interest are associated with the share of yes-votes. In column (1) car ownership is negative and significant in both Stockholm and Gothenburg, confirming that greater exposure to the charge is associated with lower support. Median mileage is also negative in both cities, as expected, but only significant in Gothenburg. By contrast, the share of employed individuals crossing the congestion zone is positive and significant in both cities. Fringe car access has opposite signs across the two cities, but the Stockholm coefficient is only weakly significant.

In column (2), after including the spatial variables, the main pattern from the baseline remains, but several of the direct self-interest variables change in magnitude. This suggests that the direct self-interest variables are correlated with the spatial variables. For example, car ownership tends to increase with distance from the charging zone. As discussed above, the spatial variables may capture both payment exposure to the charge, which would imply lower support, and potential local benefits from reduced congestion and improved environmental conditions, which would imply higher support. These patterns differ across the two cities. In Stockholm, only the indicator for being inside the charging zone is negative and significant, suggesting lower support due to greater payment exposure. In Gothenburg, on the other hand, distance from the city centre is negatively associated with support. This is consistent with the discussion in Section 3: payments were higher among residents inside the zone in Stockholm, whereas in Gothenburg payments were higher among residents further out in the region. Residents further out in Gothenburg may also benefit less from improved local environmental conditions in the city centre.

Because the spatial variables capture different relationships between location, payment exposure, and local benefits across the two cities, the coefficients on car ownership and median mileage change in opposite directions in column (2). Car ownership and median mileage become more negative in Stockholm, but less negative in Gothenburg. The coefficients on the share of employed individuals crossing the congestion zone and fringe-car access remain positive and significant only in Gothenburg.

In column (3), the inclusion of socio-economic characteristics further modifies the relationships, but in different ways across the two cities, presumably reflecting different correlation patterns between socio-economic characteristics, car ownership, and car use. The negative association between car ownership and support becomes weaker in Stockholm but stronger in Gothenburg. In both cities, employment is positively associated with support, possibly because employed individuals have a higher value of time due to time constraints. In Gothenburg, income is also positively associated with the share of yes-votes, again suggesting that a higher value of time increases the benefits of reduced travel time. This effect is, however, not significant in Stockholm. In Stockholm, however, the presence of children in the household is positively associated with support, consistent with the hypothesis that time constraints increase the value of travel-time savings.

Overall, column (3) suggests that self-interest affects support for congestion charges through several mechanisms discussed in Section 5.2: payment exposure, potential benefits from improved local environmental conditions, and benefits from travel-time savings.

6.2 Political ideology

Column (4) shows that party voting patterns are strongly associated with the share of yes-votes, and that the patterns are relatively similar across the two cities. In both Stockholm and Gothenburg, support for right-wing parties and the Social Democrats is negatively associated with yes-votes, while support for the Liberal Party is positively associated with support. In Gothenburg, Green Party support is also strongly and positively associated with yes-votes, while support for the Left Party is not statistically significant in either city.

The inclusion of political variables also affects the previous coefficients. The coefficient on car ownership is attenuated in both cities, and is approximately halved in Gothenburg, suggesting that car ownership is correlated with broader political voting patterns. Overall, column (4) suggests that political ideology explains a substantial share of the variation in support for congestion charging, as reflected in the large increase in explanatory power when the political variables are included. The similarity of the party-vote patterns across the two cities is notable, given the different framing and institutional context of the charges.

6.3 Voter turnout

In column (5a), voter turnout in the general election is positively associated with the share of yes-votes in both cities, suggesting that higher participation is linked to greater support for congestion charging. This is consistent with the hypothesis that selective participation may matter for referendum outcomes if groups that are less directly exposed to the charge are less likely to vote. The effect is stronger in Stockholm. The inclusion of turnout has only a limited effect on the political coefficients, which remain strongly associated with referendum outcomes. However, the negative coefficient on car ownership increases, particularly in Stockholm, suggesting that turnout is negatively correlated with car ownership. In Stockholm, the negative coefficients on the spatial variables also increase once turnout is included.

In column (5b), once the share of Swedish citizens with two Swedish-born parents is added, the turnout coefficient becomes insignificant. This suggests that districts with a lower share of Swedish citizens with two Swedish-born parents tend to have lower turnout. This is consistent with previous evidence that electoral participation varies systematically with migration background (Aggeborn et al., 2024). The result may therefore indicate that compositional differences across districts partly account for the variation in turnout.

6.4 Comparing Stockholm and Gothenburg

Taken together, the results suggest both similarities and important differences between Stockholm and Gothenburg. In both cities, support for congestion charging is related to self-interest and political views, but the spatial expression of self-interest differs across the two contexts. In Gothenburg, support falls with distance from the city centre, consistent with the wider regional incidence of the charge. This interpretation is also consistent with mileage being a significant predictor in Gothenburg but not in Stockholm, suggesting that driving intensity was more closely linked to charge exposure in Gothenburg.

In Stockholm, by contrast, a smaller share of total car travel was exposed to the charge, and exposure was more concentrated among residents inside the charging zone. Consistent with this, districts inside the zone were less supportive of the charge.

Similar political patterns emerge in both cities, and the inclusion of party support substantially increases explanatory power. This suggests that relatively stable political orientations help explain support beyond material self-interest. For example, support among Green Party voters is consistent with the environmental objectives of congestion charging, while support among Liberal Party voters is consistent with a more favourable view of market-based policy instruments.

Turnout in the general election is positively associated with yes-votes in both cities, pointing to the role of selective participation in shaping referendum outcomes. Since turnout was also slightly higher in Stockholm than in Gothenburg, this may have contributed to the more favourable referendum outcome in Stockholm. The stronger turnout association in Stockholm suggests that the referendum outcome there may have depended more on the mobilisation of less directly exposed voters. In Gothenburg, by contrast, opposition appears to have reflected a broader political conflict surrounding the policy process and infrastructure financing, suggesting that political disagreement was less confined to directly exposed car users.

These differences also point to the importance of the institutional framework in which congestion charges are introduced. In Stockholm, the charge was introduced through a trial and was initially framed primarily as a congestion-reduction and environmental policy. In Gothenburg, by contrast, it was introduced without a preceding trial and was closely tied to infrastructure financing from the outset. The wider spatial incidence of the Gothenburg charge also meant that exposure was spread across a larger part of the region. Together, these factors may help explain why spatial location and political context play a stronger role in Gothenburg, while car ownership remains the clearest indicator of opposition in Stockholm.

Table 2
Regression results. Outcome: Share of yes-votes

Outcome: Share of yes-votes		**(1)**	**(2)**	**(3)**	**(4)**	**(5a)**	**(5b)**	**(1)**	**(2)**	**(3)**	**(4)**
Car use and ownership	Car ownership	-0.505***	-1.262***	-0.916**	-0.771***	-1.250***	-1.346***	-0.569***	-0.0126	-0.658***	-0.319**
		(0.15)	(0.41)	(0.36)	(0.17)	(0.24)	(0.14)	(0.19)	(0.25)	(0.15)	(0.14)
	Median mileage (10 km, car owners only)	-0.448	-2.027	-4.457*	0.215	-0.412	0.298	-6.312***	-3.775**	-3.546***	-1.204*
		(2.67)	(2.21)	(2.49)	(1.18)	(0.88)	(0.57)	(1.40)	(1.55)	(0.84)	(0.69)
	Share employed crossing zone (%)	0.276***	0.323	0.0793	-0.384*	-0.492***	-0.422***	0.549***	0.598***	0.398***	0.176***
		(0.10)	(0.28)	(0.20)	(0.18)	(0.12)	(0.08)	(0.10)	(0.09)	(0.06)	(0.05)
	Fringe car (%)	-1.485*	0.196	-1.950*	1.476	0.849	0.304	2.025***	1.183**	-0.552*	-0.0894
		(0.80)	(0.69)	(1.08)	(1.24)	(0.92)	(0.71)	(0.39)	(0.46)	(0.33)	(0.28)
Spatial	Distance to central station (10 km)		0.0129	0.0121	-0.0744	-0.0920**	-0.0498		-0.120**	0.0650**	0.0697***
			(0.10)	(0.09)	(0.05)	(0.03)	(0.03)		(0.05)	(0.03)	(0.02)
	Inside congestion zone		-0.0979**	-0.0257	-0.0242	-0.0646***	-0.0718***		0.0548	-0.00208	0.0129
			(0.04)	(0.04)	(0.02)	(0.02)	(0.01)		(0.04)	(0.02)	(0.02)
Socioeconomics	Child			0.544**	-0.0616	0.0309	0.0694			-0.151	-0.249**
				(0.20)	(0.21)	(0.15)	(0.07)			(0.12)	(0.10)
	Employed			0.863**	-0.447**	-0.268	-0.576***			0.711***	0.142
				(0.34)	(0.19)	(0.16)	(0.12)			(0.11)	(0.10)
	Median disp. Income (individual)			0.0669	0.184	0.0507	0.0725			0.308***	0.236***
				(0.34)	(0.11)	(0.09)	(0.07)			(0.09)	(0.07)
	Parents born in Sweden						0.445***				
							(0.09)				
Politics	ln(Right)				-0.248***	-0.167**	-0.171***				-0.0902***
					(0.05)	(0.06)	(0.05)				(0.03)
	ln(Liberal)				0.163**	0.0868	0.119**				0.0497*
					(0.07)	(0.06)	(0.04)				(0.03)
	ln(Soc. Dem.)				-0.0770**	-0.0593**	-0.0649***				-0.0982***
					(0.03)	(0.03)	(0.02)				(0.01)
	ln(Left)				0.0209	0.0396	0.0664				0.0169
					(0.05)	(0.05)	(0.04)				(0.03)
	ln(Green)				0.0289	-0.00632	-0.0187				0.102***
					(0.03)	(0.03)	(0.02)				(0.03)
	ln(others)				0.127**	0.106**	0.0637				0.0300
					(0.05)	(0.05)	(0.03)				(0.03)
	Voter turnout (General)					0.833***	0.215				
						(0.24)	(0.19)				
	Constant	0.636*	0.967**	0.0892	0.144	0.610	0.819	0.929***	0.535**	-2.018***	-1.221**

Notes: Standard errors in parenthesis. Observations are population weighted.

Outcome: Share of yes-votes	(1)	(2)	(3)	(4)	(5a)	(5b)	(1)	(2)	(3)	(4)
	(0.34)	(0.36)	(2.43)	(0.79)	(0.61)	(0.55)	(0.18)	(0.21)	(0.62)	(0.49)
Obs.	27	27	27	27	27	27	91	91	91	91
Adj. R2	0.525	0.583	0.785	0.948	0.965	0.986	0.558	0.632	0.880	0.944
Notes: Standard errors in parenthesis. Observations are population weighted.										

7 Discussion

We discuss the results in relation to the four research questions posed in the introduction. First, our findings support the large literature emphasising self-interest as a central determinant of congestion-pricing acceptability (e.g., Jaensirisak et al., 2005; Eliasson and Jonsson, 2011; Hensher and Li, 2013). Car ownership is consistently the strongest predictor of opposition in both cities, and the estimated relationships remain large even after controlling for general-election voting patterns, socio-economic characteristics, and turnout. This extends earlier evidence that individuals who are more directly exposed to congestion charges are more likely to oppose them. At the same time, the results highlight that self-interest is multidimensional rather than purely a question of paying the charge. Support is positively associated with factors that may increase the benefits of paying the charge, for instance through a higher value of time, such as employment (both cities), the presence of children in the household (Stockholm), income (Gothenburg), and commuting across the charging zone (Gothenburg).

Second, general-election voting patterns are associated with referendum outcomes, but these associations are intertwined with self-interest and residential geography. The party-specific pattern is consistent with previous literature showing that support for congestion charging cuts across the traditional left–right ideological spectrum. The negative association for right-wing parties may reflect tax opposition or scepticism toward government intervention, while the positive associations for Liberal and Green voting are consistent with support for pricing mechanisms and environmental policy, respectively. The negative association for Social Democratic voting is less straightforward and should therefore be interpreted more cautiously. Those results are consistent with Börjesson et al. (2015), who show that environmental concern and support for pricing as an allocation mechanism increase support, while tax opposition reduces support and equity concerns may work in different directions.

The relatively similar party-vote patterns across Stockholm and Gothenburg are notable despite the different referendum outcomes. This suggests that broader political and normative predispositions, proxied by party support in the general election, may shape support in relatively stable ways across contexts.

Third, turnout and selective participation play an important role. Districts with higher turnout exhibit higher support for congestion charging. Since turnout was also somewhat higher in Stockholm than in Gothenburg, differences in participation may have contributed to the contrasting referendum outcomes. More generally, these findings are relevant beyond referendums. Because turnout is measured using the concurrent general election rather than the referendum itself, the results suggest that political support for congestion pricing depends not only on citizens' preferences but also on which groups participate in elections. Politicians are likely to be particularly responsive to the preferences of regular voters, implying that selective participation may influence the political feasibility of congestion pricing even in cities where no referendum is held. The finding that the turnout effect becomes substantially smaller once migrant background is accounted for suggests that differential participation across demographic groups explains part of the turnout effect. Together, these results highlight the importance of distinguishing between preferences and participation when analysing political support for congestion pricing.

Fourth, despite substantial differences in timing, institutional context, and system design, the comparison between Stockholm and Gothenburg highlights many similarities. In both cities, car ownership, turnout, and similar general-election voting patterns are associated with referendum outcomes. Previous studies have argued that differences between Stockholm and Gothenburg partly reflect institutional context. Our results suggest that institutional context may have mattered not only through legitimacy and political conflict, but also through system design. The financing objective may have influenced the design of the Gothenburg system, which in turn exposed a broader set of travellers to the charge. Compared with Stockholm, the Gothenburg charge affected a larger share of regional travel. In Stockholm, by contrast, opposition is more strongly associated with residence inside the charging zone, consistent with a system where exposure was more spatially concentrated around the city centre.

8 Conclusion

This paper examined why congestion pricing can face majority opposition even when direct monetary costs are concentrated among a minority of residents. Using full-population registry data from Stockholm and Gothenburg, we find that congestion-pricing referendum outcomes cannot be explained by direct self-interest alone, even though car ownership is the strongest predictor of opposition. Support also depends on how costs are spatially distributed, political views, how the policy is institutionally framed, and who turns out to vote. These factors are likely to be intertwined. This helps explain why a majority could vote against the charge in Gothenburg even though car ownership was below 50%.

The comparison between the two cities suggests that institutional context may have mattered partly through system design. Previous studies have argued that the Gothenburg charge, which was introduced without a preceding trial and was closely linked to infrastructure financing, faced weaker procedural legitimacy and stronger political conflict. Our results add that this institutional context may also have mattered through the design of the system. The Gothenburg charge had a wider regional incidence than the Stockholm charge and exposed a larger share of car travel to payment, partly reflecting the greater importance of revenue generation in the Gothenburg case. Institutional context may therefore have shaped referendum outcomes not only through legitimacy and political conflict, as emphasised in previous research, but also through a system design that made direct exposure more widespread.

The findings have several policy implications. First, since opposition appears strongly linked to concentrated private costs among a minority of car users, the results suggest that turnout and broad participation may matter not only for referendum outcomes but also for how politicians assess the electoral risks of introducing congestion pricing. Second, the results suggest that political feasibility depends not only on the distribution of private costs, but also on political ideology. Third, procedural legitimacy and public anchoring matter, but so does system design. A charge that covers a broad regional area, including many trips that contribute relatively little to inner-city congestion, may face lower acceptability because more travellers are exposed to payment without necessarily experiencing clear congestion-reduction benefits. Finally, the results highlight limitations of survey-based evidence on congestion-pricing acceptability, since support estimates may depend strongly on sample composition and participation bias.

Several limitations should be noted. The analysis is observational and based on district-level variation, meaning that the estimated relationships should not be interpreted causally. In addition, party support is used as a proxy for broader political and normative predispositions rather than as a direct measure of ideology. Despite these limitations, the comparison between Stockholm and Gothenburg provides unusually rich evidence on revealed voting behaviour in real congestion-pricing referendums.

Declarations

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT in order to proofread the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Contribution

M.B. and N.F. conceived the study. M.B. led the writing of the manuscript. N.F. conducted the data analysis. Both authors interpreted the results, reviewed and edited the manuscript, and approved the final version.

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Data Availability

The data that support the findings of this study are not publicly available due to legal and ethical restrictions. The study is based on confidential individual-level register data from Statistics Sweden (SCB) and the Swedish Election Authority. Access to these data is subject to approval by the relevant Swedish authorities and applicable legal regulations.

References

1. Aggeborn, L., Andersson, H., Dehdari, S.H., Lindgren, K.-O.: Granting immigrants the right to vote in national elections: Empirical evidence from Swedish administrative data. Br. J. Polit. Sci. **54**(3), 712–729 (2024)
2. Andersson, H., Lajevardi, N., Lindgren, K.-O., Oskarsson, S.: Effects of settlement into ethnic enclaves on immigrant voter turnout. J. Politics. **84**(1), 578–584 (2022)
3. Bastian, A., Börjesson, M.: The city as a driver of new mobility patterns, cycling and gender equality: Travel behaviour trends in Stockholm 1985–2015. Travel Behav. Soc. **13**, 71–87 (2018)
4. Bergquist, M., Källman, S., Jagers, S.C.: Public attitude, behavior, and social norm changes over six months with the NYC congestion charge. Sustainable Mobility and Transport (2025)
5. Bevelander, P., Hutcheson, D.S.: Voting behavior of immigrants and their children in Sweden. J. Immigr. Refugee Stud. **20**(3), 427–443 (2022)
6. Börjesson, M., Eliasson, J., Hugosson, M.B., Brundell-Freij, K.: The Stockholm congestion charges—5 years on: Effects, acceptability and lessons learnt. Transp. Policy. **20**, 1–12 (2012)
7. Börjesson, M., Hamilton, C.J., Näsman, P., Papaix, C.: Factors driving public support for road congestion reduction policies: Congestion charging, free public transport and more roads in Stockholm, Helsinki and Lyon. Transp. Res. Part. A: Policy Pract. **78**, 452–462 (2015)
8. Börjesson, M., Eliasson, J., Hamilton, C.: Why experience changes attitudes to congestion pricing: The case of Gothenburg. Transp. Res. Part. A: Policy Pract. **85**, 1–16 (2016)

9. Börjesson, M., Fukushima, N.: Who pays congestion charges? Working paper. VTI (2026)
10. Börjesson, M., Kristoffersson, I.: The Gothenburg congestion charge: Effects, design and politics. Transp. Res. Part. A: Policy Pract. **75**, 134–146 (2015)
11. Börjesson, M., Kristoffersson, I.: The Swedish congestion charges: Ten years on. Transp. Res. Part. A: Policy Pract. **107**, 35–51 (2018)
12. Campbell, A.L.: How Policies Make Citizens: Senior Political Activism and the American Welfare State. Princeton University Press (2003)
13. Cavari, A., Freedman, G.: Survey nonresponse and mass polarization. American Political Science Review (2023)
14. Chong, D., Citrin, J., Conley, P.: When self-interest matters. Political Psychol. **22**(3), 541–570 (2001)
15. City of Stockholm: Folkomröstning, miljöavgifter/trängselskatt: Total röstsammanräkning per församling och valdistrikt valdagen 17/9. (2006)
16. De Borger, B., Proost, S.: A political economy model of road pricing. J. Urban Econ. **71**(1), 79–92 (2012)
17. Downs, A.: An Economic Theory of Democracy. Harper & Row (1957)
18. Eliasson, J.: The role of attitude structures, direct experience and reframing for the success of congestion pricing. Transp. Res. Part. A: Policy Pract. **67**, 81–95 (2014)
19. Eliasson, J., Jonsson, L.: The unexpected 'yes': Explanatory factors behind the positive attitudes to congestion charges in Stockholm. Transp. Policy. **18**(4), 636–647 (2011)
20. Eriksson, L., Garvill, J., Nordlund, A.M.: Acceptability of single and combined transport policy measures: The importance of environmental and policy specific beliefs. Transp. Res. Part. A: Policy Pract. **42**(8), 1117–1128 (2008)
21. Gaunt, M., Rye, T., Allen, S.: Public acceptability of road user charging: The case of Edinburgh and the 2005 referendum. Transp. Reviews. **27**(1), 85–102 (2007)
22. Groves, R.M., Peytcheva, E.: The impact of nonresponse rates on nonresponse bias: A meta-analysis. Pub. Opin. Q. **72**(2), 167–189 (2008)
23. Hajnal, Z.L., Trounstine, J.: Where turnout matters: The consequences of uneven turnout in city politics. J. Politics. **67**(2), 515–535 (2005)
24. Hansla, A., Hysing, E., Nilsson, A., Martinsson, J.: Explaining voting behavior in the Gothenburg congestion tax referendum. Transp. Policy. **53**, 98–106 (2017)
25. Harrington, W., Krupnick, A.J., Alberini, A.: Overcoming public aversion to congestion pricing. Transp. Res. Part. A: Policy Pract. **35**(2), 93–111 (2001)
26. Heberlein, T.A.: Navigating environmental attitudes. Conserv. Biol. **26**(4), 583–585 (2012)
27. Hensher, D.A., Li, Z.: Referendum voting in road pricing reform: A review of the evidence. Transp. Policy. **25**, 186–197 (2013)
28. Hess, S., Börjesson, M.: Understanding attitudes towards congestion pricing: A latent variable investigation with data from four cities. Transp. Lett. **11**(2), 63–77 (2019)
29. Hill, K.Q., Leighley, J.E.: The policy consequences of class bias in state electorates. Am. J. Polit. Sci. **36**(2), 351–365 (1992)
30. Hsieh, H.-S.: Road pricing acceptability and persuasive communication effectiveness. Transp. Policy. **125**, 179–191 (2022)
31. Hårsman, B., Quigley, J.M.: Political and public acceptability of congestion pricing: Ideology and self-interest. J. Policy Anal. Manag. **29**(4), 854–874 (2010)
32. Hysing, E.: Citizen participation or representative government: Building legitimacy for the Gothenburg congestion tax. Transp. Policy. **39**, 1–8 (2015)
33. Hysing, E., Isaksson, K.: Building acceptance for congestion charges: The Swedish experiences compared. J. Transp. Geogr. **49**, 52–60 (2015)
34. Jagers, S.C., Matti, S., Nordblom, K.: How policy legitimacy affects policy support throughout the policy cycle. QoG Working Paper Series 2016:15, University of Gothenburg. (2016)
35. Jagers, S.C., Matti, S., Nilsson, A.: How exposure to policy tools transforms the mechanisms behind public acceptability and acceptance: The case of the Gothenburg congestion tax. Int. J. Sustainable Transp. **11**(2), 109–119 (2017)
36. Jaensirisak, S., Wardman, M., May, A.D.: Explaining variations in public acceptability of road pricing schemes. J. Transp. Econ. Policy. **39**(2), 127–153 (2005)
37. Keeter, S., Hatley, N., Kennedy, C., Lau, A.: What low response rates mean for telephone surveys. Pew Research Center (2017)
38. Li, Z.: Congestion charging and car use: A review of stated preference and opinion studies and market monitoring evidence. Transp. Policy. **20**, 47–61 (2012)
39. Lijphart, A.: Unequal participation: Democracy's unresolved dilemma. Am. Polit. Sci. Rev. **91**(1), 1–14 (1997)
40. Matsusaka, J.G.: Direct democracy works. J. Economic Perspect. **19**(2), 185–206 (2005)
41. Olson, M.: The Logic of Collective Action: Public Goods and the Theory of Groups. Harvard University Press (1965)
42. Ostrovsky, M., Yang, F.: Effective and equitable congestion pricing: New York City and beyond. Working paper. (2025)
43. Peters, J.R., Kramar, J.K.: Just who should pay for what? Vertical equity, transit subsidy and road pricing: The case of New York City. J. Public. Transp. **15**(2), 117–136 (2012)
44. Schade, J., Schlag, B.: Acceptability of urban transport pricing strategies. Transp. Res. Part. F: Traffic Psychol. Behav. **6**(1), 45–61 (2003)
45. Schuitema, G., Steg, L., Forward, S.: Explaining differences in acceptability before and acceptance after the implementation of a congestion charge in Stockholm. Transp. Res. Part. A: Policy Pract. **44**(2), 99–109 (2010)
46. Sears, D.O., Lau, R.R., Tyler, T.R., Allen, H.M. Jr.: Self-interest vs. symbolic politics in policy attitudes and presidential voting. Am. Polit. Sci. Rev. **74**(3), 670–684 (1980)
47. Shatanawi, M., Alazzawi, A., Saleem, M.S., Al-Masaeid, H., Hamadneh, J.: The interrelationship between road pricing acceptability and automated vehicles acceptance: Evidence from Hungary, Jordan, Ukraine and Brazil. Sustainability. **14**(19), 12798 (2022)

48. SKOP: Beskrivning av tele-SKOP Stockholm: Rapport till Stockholms Handelskammare, juni/juli 2005. (2005)
49. Swedish Election Authority: Gothenburg referendum on congestion tax, 14 September 2014: Electoral constituencies and primary areas. (2014)
50. Ubbels, B., Verhoef, E.T.: Acceptability of road pricing and revenue use in the Netherlands. Eur. Transp. / Trasporti Europei. **32**, 69–94 (2006)
51. Verba, S., Schlozman, K.L., Brady, H.E.: Voice and Equality: Civic Voluntarism in American Politics. Harvard University Press (1995)
52. Winslott-Hiselius, L., Brundell-Freij, K., Vagland, Å., Byström, C.: The development of public attitudes towards the Stockholm congestion trial. Transp. Res. Part. A: Policy Pract. **43**(3), 269–282 (2009)

Figures

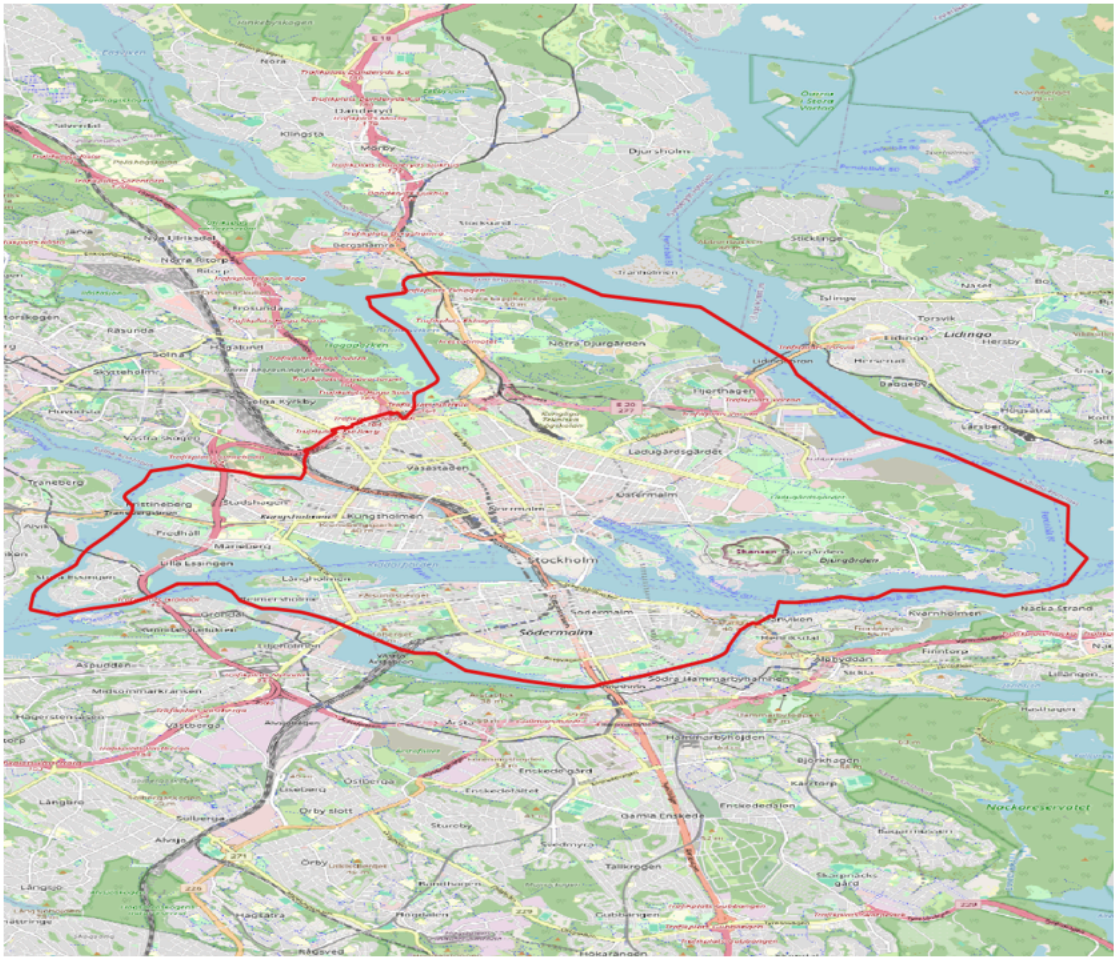


Figure 1

Congestion charge zone, Stockholm

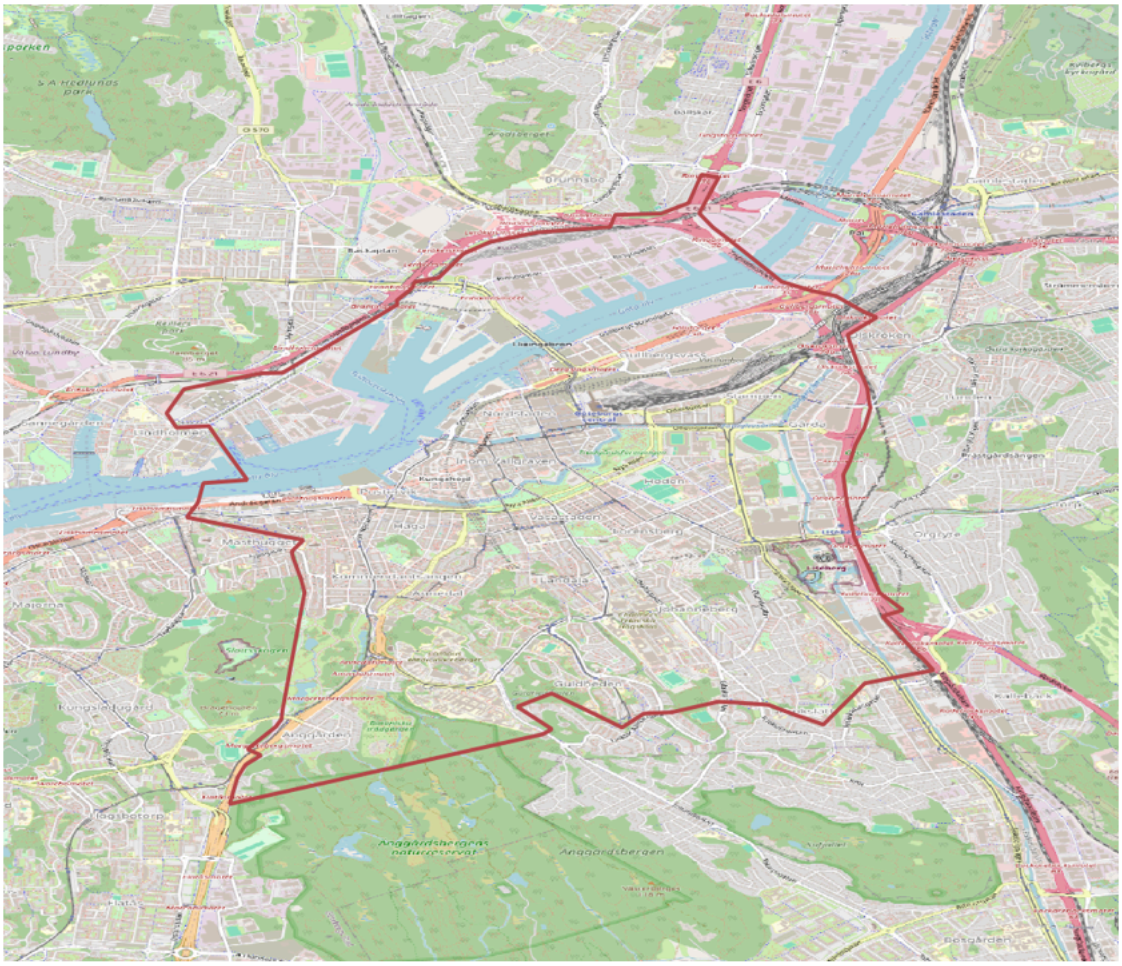


Figure 2

Congestion charge zone, Gothenburg

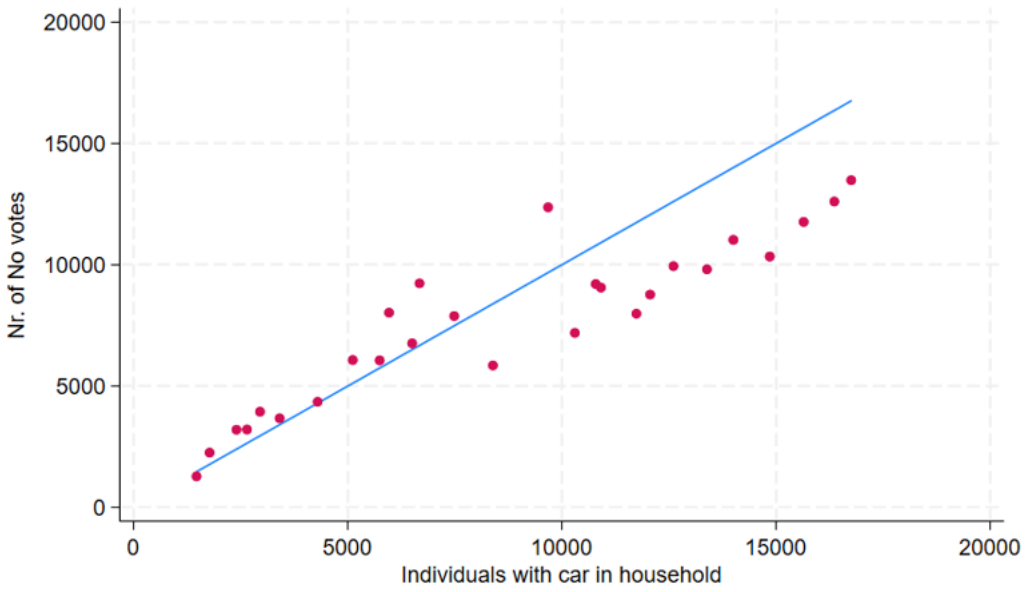


Figure 3

Number of no-votes against the number of adults living in car-owning households, Stockholm (2006).

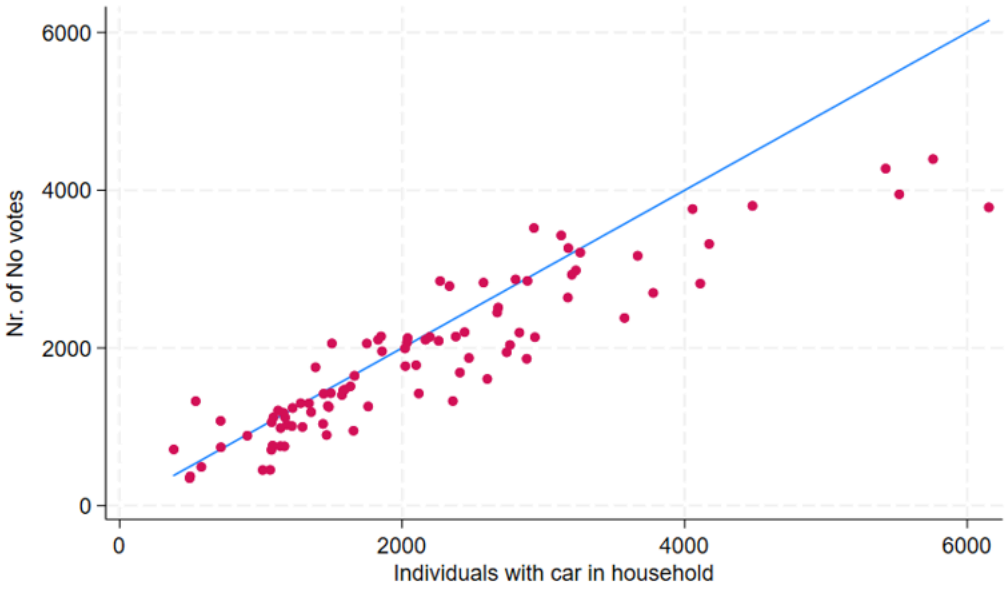


Figure 4

Number of no-votes against the number of adults living in car-owning households, Gothenburg (2014).