How does economic activity adapt to pollution pricing? Evidence from London's ULEZ

Jakob Schneebacher[1,2], ⓡ Fizza Jabbar[1], and ⓡ Joel Kariel[1]

[1]Competition and Markets Authority (CMA)

[2]King's College London (KCL)

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Abstract

Policymakers around the world are exploring ways to tackle greenhouse gas emissions, but when evaluation focuses on narrow margins, policies can have unintended consequences. We exploit the phased introduction of London's Ultra-Low Emissions Zone (ULEZ) and a shift-share event study design to study how the ULEZ changes economic activity along all major margins and provide a framework for evaluating the policy through future phases in near-real time. The phased introduction of the ULEZ affects who can drive into particular areas of London without paying a fee, affecting commuter-belt postcodes heterogeneously based on pre-existing economic choices. Affected individuals can react by purchasing ULEZ-compliant vehicles, switching to public transport, working from home or changing the location of their home or employer. We estimate elasticities on all these margins. In preliminary work, we show that the initial introduction of the ULEZ had large, significant positive effects on the adoption of ultra-low emissions vehicles. However, there is no evidence of an effect on house prices. A public, pre-registered analysis plan allows us to evaluate the effect of ongoing policy changes in near-real time.

JEL: H23; R40; R48; Q58

Keywords: low emission zones; pollution pricing; spatial economics

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1 Introduction

There are high social costs to air pollution.[1] Due to both the intensity of pollution exposure and the number of people exposed, these costs are greatest in urban areas. Governments have implemented a variety of policy responses in the transportation sector, a key source of urban air pollution. In Europe, "low emissions zones" now prohibit or heavily tax the use of highly-polluting vehicles in many city centers. There are several ways households and firms may adapt to such corrective taxes: driving less, switching to other transit modes, changing their home/work location, investing in less-polluting vehicles or by keeping behaviour constant and paying the pollution price. In this project, we estimate economic responses to the introduction and subsequent expansions of London's Ultra Low Emissions Zone (ULEZ).

We exploit the phased introduction of London's ULEZ and a shift-share event-study design (Borusyak, Hull, and Jaravel 2022) to study the adaptation of economic activity along all major margins and provide a framework for monitoring the effectiveness of this policy throughout future phases in near-real time. The phased introduction of the ULEZ changes which vehicles can drive into particular areas of London without paying a fee, affecting commuter-belt postcodes heterogeneously based on their location and pre-existing economic choices. Affected individuals can react by purchasing ULEZ-compliant vehicles, switching to public transport, working from home more, by changing the location of their home or employer, or pay the charge to drive into the Zone.

The ULEZ, described by the BBC as "the most radical plan you've never heard of," was introduced in October 2017 as a £10 fee to drive a highly-polluting vehicle into central London during peak congestion hours.[2] In April 2019, the fee rose to £12.50 and expanded to all hours. However, the ULEZ exempts residents from taxation and thus applies only to commuters. In 2021, the ULEZ expanded in size by about tenfold

[1] Chay and Greenstone 2005; Currie and Neidell 2005; Currie and Walker 2011; Deschenes, Greenstone, and Shapiro 2017; Alexander and Schwandt 2019; Deryugina, Heutel, Miller, Molitor, and Reif 2019.

[2] https://www.bbc.com/news/uk-england-london-47638862.

and is no longer exempt to residents. It expanded further on 29 August 2023 to cover all London boroughs, and most of Greater London.

There is distinctive geographic variation in the pattern of the ULEZ "treatment," as those commuting into the ULEZ face the strongest incentives to substitute towards less-polluting vehicles, public transport, or towards working patterns that require less physical presence in Central London. We propose to use this policy variation to analyse how individuals adjust their economic activity in response to the policy.

Large investment responses to the ULEZ are immediately visible in public-use tabulations of Driver and Vehicle Licensing Authority (DVLA) data by postcode district on vehicle registrations. These data are counts of the number of all registered vehicles and all tax-exempt vehicles (ULEVs) by postcode and quarter; it is illegal to drive an unregistered vehicle. To identify treated postcodes, we use data from the 2011 UK Census on commuting flows by origin and destination and calculate the share of commuters in each postcode who commute by car to destinations in the ULEZ. Figure 1 is suggestive of a sharper rise in ULEVs in regions where individuals are more exposed to the ULEZ due to their commuting behaviour.

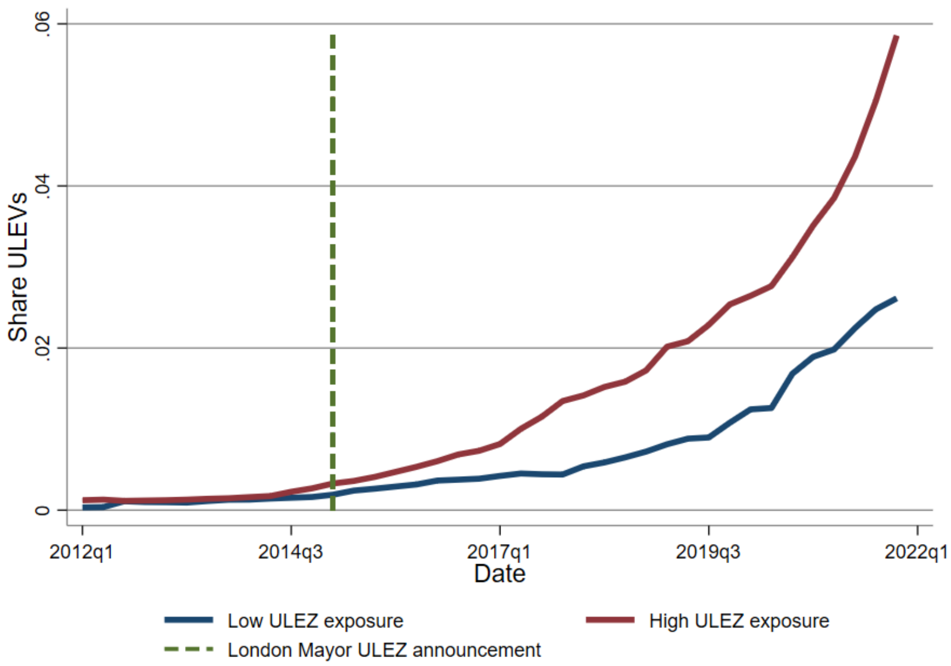

Figure 1: Adoption of ultra-low emissions vehicles in high and low ULEZ exposure postcode districts

However, there is little evidence of significant divergence in the trends of sold house prices using Price Paid Data (PPD) from HM Land Registry. These data include all non-commercial property sales by postcode district. Figure 2 plots the average house sale price for postcode districts with high or low exposure to the ULEZ based on 2011 commuting data.

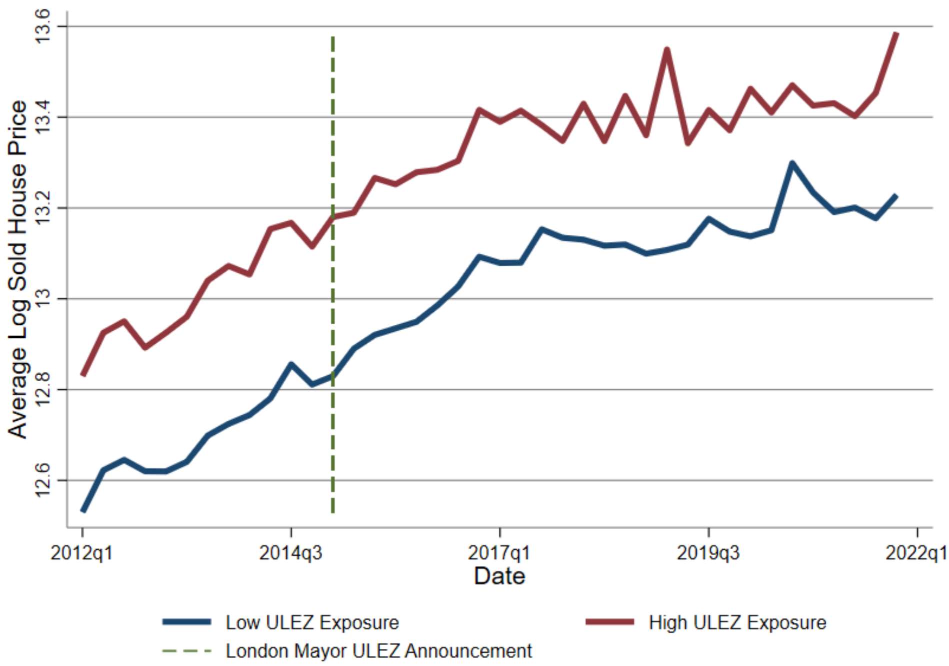

Figure 2: Average log sold house price in high and low ULEZ exposure postcode districts in London

We use two empirical research designs to estimate the causal impact pollution pricing has on economic activity. For outcomes measured at the commuter home postcode district (such as ULEV registration, public transport use, house transactions and prices and homeworking), we employ a shift-share differences-in-differences design (Bartik 1991; Borusyak, Hull, and Jaravel 2022; De Chaisemartin and d'Haultfoeuille 2022; Roth, Sant'Anna, Bilinski, and Poe 2023). We interact pre-existing commuter patterns at the postcode district level with time-varying coverage of the ULEZ. For outcomes measured at the employer postcode, we instead employ a regression discontinuity design (Frölich and Huber 2019; Cattaneo and Titiunik 2022) and compare establishment counts just inside and outside the ULEZ as the boundaries change.

In preliminary results, we show that there is a large, positive and significant effect of ULEZ exposure on ULEV adoption. Initial results suggest an average 1.3% rise in the share of electric vehicles by the end of 2019, for each 1% increase in the share of affected commuters in a postcode district. The median postcode district has 1% of commuters affected by the ULEZ, and 0.3% of vehicles are ULEVs. Thus the impact is also significant in economic terms. On the other hand, we find no evidence that the introduction of the ULEZ has differentially affected the value of sold residential properties. The rest of the empirical analysis is still work in progress.

There is much existing research on policies aimed at changing driving behaviour, especially taxing certain vehicles or taxing driving in specific zones. The closest research to ours are Barahona, Gallego, and Montero (2020) and Herzog (2023). The former paper investigates the effect of a policy introduced in 1992 in Santiago, Chile. This policy restricted the use of certain vintages of vehicles which were deemed more-polluting. They find the policy was effective at encouraging switching towards cleaner vehicles, and that this was welfare-improving. Likewise, the ULEZ places limits on older vintages of vehicles. Herzog (2023) focuses on the same geographic setting as we do, by investigating the introduction of the earlier Congestion Charge (CC) in London in 2003. They find evidence the policy reallocated commuters between driving and public transport, with differential impacts across skill groups, leading the benefits to accrue progressively. Road traffic was reduced by approximately 1%, taking into account endogenous sorting and substitution towards un-taxed driving routes. For more information on the background and impact of London's CC, we refer the interested reader to Leape (2006).

The impact of such policies on housing has also been investigated (Tang 2021; Gruhl, Volhausen, Pestel, and Moore 2022; Aydin and Kurschner Rauck 2023), with evidence that house prices respond positively. Driving taxes and low-emission zones are often motivated by aiming to reduce air pollution, and the evidence suggests mixed results on this front (Simeonova, Currie, Nilsson, and Walker 2019; Wolff and Zhai 2021; Gu, Deffner, Kuchenhoff, Pickford, Breitner, Schneider, Kowalski, Peters, Lutz, Kerschbaumer, Slama, Morelli, Wichmann, and Cyrys 2022; Bernardo, Fageda, and Flores-Fillol 2021).

This paper makes three contributions. First it provides causal evidence of how the economic geography of work changes in one of the world's largest cities in response to pollution pricing. It thus fills a gap in the emerging literature on the spatial impacts of climate change (Castro-Vincenzi 2022; Desmet and Rossi-Hansberg 2023; Ponticelli, Xu, and Zeume 2023) and climate mitigation policies (Arkolakis and Walsh 2023; Colas and Saulnier 2023; Gilbert, Gagarin, and Hoen 2023). Second, it provides a rich set of policy-relevant elasticities that can inform the large literature on the optimal design of pollution pricing (Peltzman and Tideman 1972; Van Der Ploeg and Withagen 2014; Clausing and Wolfram 2023). Third, alongside a few likeminded papers (Clemens and Lewis 2022; Fetzer, Gazze, and Bishop 2023; Fetzer 2023; Fetzer, Palmou, and Schneebacher 2023) this paper provides a framework for how to analyse policy responses in near-real time using a combination of real-time, granular data sources and transparent, pre-registered research design.

The rest of this paper is organised as follows. Section 2 provides an overview of the ULEZ and its introduction. Section 3 presents our framework. Section 4 describes the data we use. Section 5 discusses our empirical approach. Section 6 outlines out main hypotheses. Section 7 presents our empirical results. A final Section 8 concludes and outlines next steps.

2 The introduction to the ULEZ

The Ultra Low Emission Zone (ULEZ) is an area of London for which an emission-standard based daily levy of £12.50 applies to non-compliant vehicles. The zone operates 24 hours a day, 7 days a week. The daily charge currently applies to residents of the ULEZ as well as commuters. The criteria for charging the levy is based on European emission standards. A penalty charge of £180 is applied for non-compliance. This charge is in addition to the Congestion Charge (CC) and applies to cars, motorcycles, vans, specialist vehicles (up to and including 3.5 tonnes) and minibuses. Vans and minibuses are also be subject to Low Emission Zone (LEZ) charges.

Boris Johnson, then Mayor of London, announced the zone (covering the same central area as the Congestion Zone in 2015) would come into e ect in September 2020. Sadiq Khan, Johnson's successor, introduced the Toxicity charge or `T-charge', a £10 emissions surcharge for older, more polluting vehicles in October 2017, which covered the same area as the Congestion Zone. The T-charge was replaced by the ULEZ when it came into e ect in April 2019, ahead of schedule. The ULEZ was expanded out to the North and South Circular roads in 2021. In November 2022, Sadiq Khan announced the expansion of the zone to cover all 32 London boroughs from the 29 August 2023. This matches the existing Low Emissions Zone (LEZ) boundary.

The expanded ULEZ is part of the e ort to help improve air quality in and around London and reduce the impact on the health of residents and visitors to the city. The ULEZ is principally aimed at reducing levels of two key air pollutants from vehicle exhausts: nitrogen dioxide (NOx) and ne particle matter (PM). These pollutants have been linked to premature deaths and stunted growth of children lungs.

Figure 3: The geographic footprint of the ULEZ over time (source: Sky News)

3 Conceptual framework

Given widespread beliefs in the public debate that the primary impact of the ULEZ is on commuting behaviour (https://www.theguardian.com/environment/2023/aug/29/it-has-come-in-too-quickly-sense-of-injustice-in-uxbridge-on-day-1-of-ulez), we focus our analysis on the economic geography of work across Greater London. Individuals currently driving into London for work in non-ULEZ compliant vehicles have the following options when the policy applies to them:

1. Commuting mode margin:
   (a) Purchase an ULEZ-compliant vehicle.
   (b) Switch to public transport.
   (c) Work from home more often.
2. Commuting distance margin:
   (a) Change employer location (for instance, by switching jobs).
   (b) Move home.
3. Do nothing and pay the ULEZ charge.

The following sections outline available data sources for all relevant margins. Not all data sources are at present publicly accessible. Where data access presents an insurmountable hurdle, the nal paper will note this discrepancy from the pre-registered analysis plan and unobservable margins will be carefully modelled as part of the residual.

4 Data

The following data sources will be used across all speci cations:

1. Postcodes subject toULEZ (initially, and then two expansions).

2. Postcode district crosswalks to output areas (OAs), lower- (LSOAs) and middle-super layers (MSOAs). These areas have 310, 1,500, 7,500 average residents, respectively.

3. Population at OA level, to construct ULEZ exposure and weights.

4. 2011 Censuscommuting behaviour to compute commuting shares.

4.1 Electric vehicle adoption

We propose to use administrative data from the UK Driver and Vehicle Licensing Agency (DVLA) to estimate the substitution towards electric vehicles in response to the ULEZ. Large investment responses to the ULEZ are immediately visible in public-use tabulations of DVLA data by postcode district on vehicle registrations. These data are counts of the number of all registered vehicles and all tax-exempt vehicles (ULEVs) by postcode and quarter. It is illegal in the UK to drive an unregistered vehicle. To identify treated postcodes, we use data from the 2011 UK Census on commuting ows by origin and destination and calculate the share of commuters in each postcode who commute by car to destinations in the ULEZ.

Figure 4 shows the sharp increase in registered ultra-low emission vehicles (ULEVs) in the late 2010s in London. This is not simply a function of more vehicles registered in the capital; ULEVs are taking up a greater share of all new registrations, rising to over 1% in 2019 and over 2% in 2021, as seen in Figure 5. The geographic distribution of ULEV adoption in Greater London is contained in the appendix.

4.1.1 Vehicle data sources

1. Vehicle registrations by postcode district and quarter, 2012 - 2022 (VEH0122).

2. Ultra-low emission vehicle registrations by postcode district and quarter, 2012 - 2022 (VEH0134).

Figure 4: Adoption of ultra-low emissions vehicles in London

Figure 5: Adoption of ultra-low emissions vehicles in London

4.2 Home location

To establish if a ected individuals move residence in order to escape the ULEZ, we use the Price Paid Data (PPD) from HM Land Registry. The PPD includes information on property sales in England and Wales submitted to HM Land Registry for registration and excludes all commercial transactions and not for value sales. We use the `standard' price paid entries from 2012 to 2022 to compute quarterly postcode district-level average price paid and counts of sales. We then regress prices on property characteristics (e.g., dwelling type, tenure type) before averaging in order to mitigate composition e ects.

Figure 6: Price of sold houses and number of transactions in London

4.3 Substitution towards public transport

Commuters may also substitute towards public transport in response to the tax on highly-polluting vehicles. We propose to use Transport for London (TfL) underground station-level average entry data to track the response of commuters who face the strongest incentives to substitute. A freedom of information (FOI) request has been submitted for this data. We will then compute centroid postcode distance to underground stations in order to assign each postcode to its nearest station.

4.4 Working from home

Individual-level homeworking rates for the UK are collected at a monthly basis by the UK Survey on Working Arrangements and Attitudes (UK SWAA), collected by a team of academic researchers at https://www.wfhresearch.com . We have approached the researchers for data at small geographic aggregations. Failing that, the UK Labour Force Survey (LFS) provides annual homeworking rates at the individual level with geographic identifiers.

4.5 Establishment location

The Longitudinal Business Database (LBD) is a new, quarterly firm-level set of data spines by the UK Office for National Statistics (ONS) based on the UK's business register, the Inter-Departmental Business Register (IDBR). [3] It inherits firm and establishment postcodes from the IDBR and will be accessible through the ONS Secure Research Service (SRS). Recent analysis by the ONS uses establishment postcodes to identify labour reallocation dynamics (https://escoe-website.s3.amazonaws.com/wp-content/uploads/2023/05/23161728/Jones-Site-Level-Business-Dynamism.pdf). We have requested access to this version of the LBD in the SRS. With it, we will be able to compute quarterly establishment counts by postcode and Standard Industrial Classification (SIC) section, unweighted and employment weighted.

5 Empirical Approach

Our primary empirical approach is a shift-share event-study design of the following form:

$$\text{Outcome}_{it} = {}_i + {}_t + \text{ULEZ}_i + {}_t\text{ShareDriveULEZ}_i + "_{it} \quad (1)$$

where Outcome_{it} is one of the outcomes of interest in postcode district i, ULEZ_i is an indicator that i is in the 2019/2021/2023 ULEZ, and ShareDriveULEZ_i is the

[3] For more information about the LBD, see Lemma, Lui, Romaniuk, Schneebacher, and Wolf 2023.

share of commuters in i who drive into the 2019/2021/2023 ULEZ. $_t$ is the coe cient of interest. This event-study design works for the following outcomes: adoption of ULEVs, commuter numbers (with postcode districts assigned to nearest underground stations), working-from-home rates and housing transaction prices.

Figure 7: ULEZ exposure by postcode district

Since we do not observe commuter in ows, for establishment locations a di erent empirical approach is needed. We will therefore use a regression discontinuity design (RDD) at the postcode level around the boundary of the ULEZ.

6 Main hypotheses

Our main null hypotheses state that the introduction of the ULEZ does not a ect economic activity on any of the three commuting mode margins and any of the two commuting distance margins. Our set of secondary null hypothesis is that economic activity does not react to announcements (strong version) or reacts equally across all margins (weak version). Our nal set of secondary hypotheses states that postcodes do not react di erentially to policy announcements based on policy-relevant characteristics (e.g., the share of existing vehicle types eligible for di erent scrappage payment schemes).

1. $H_{0;1}$: There is no di erential change in economic behaviour (in terms of purchasing electric vehicles, using public transport, working from home, work location or home location) for those that are `treated' by the introduction of the ULEZ compared to those that are not.

2. $H_{0;2}$: Outcome variables of interest do not react (or do not react di erentially) to news announcements about upcoming policy changes.

3. $H_{0;3}$: Outcome variables of interest do not react di erentially based on policy-relevant characteristics of the postcode.

7 Preliminary results

This section presents the rst set of our results. To get a sense of the correlations in the data, Figure 8 presents a scatter of the share of ULEVs in a postcode district and the exposure to the initial ULEZ expansion. The relationship is positive and statistically signi cant.

Figure 8: Relationship between ULEV adoption and ULEZ exposure.

Figure 9 shows time-varying coe cients from a di erences-in-di erences event study of ultra-low vehicle adoption on ULEZ exposure, for the rst ULEZ expansion announcement in Q1 2015. This speci cation controls for postcode district and quarter xed e ects, and whether or not an observation falls within the ULEZ itself.

Figure 9: Baseline regression coe cients on ULEV adoption around rst ULEZ announcement (Q1 2015)

These results suggest an average 1.3% rise in the share of electric vehicles by the end of 2019, for each 1% increase in the share of a ected commuters in a postcode district.

There is be a positive relationship between the average sale price of residential homes and ULEZ exposure across postcode districts in London, as in Figure 10.

However, Figure 11 presents the time-varying coe cients from the event study for the sale price of residential properties on ULEZ exposure. These initial results show no evidence that house prices have yet been causally impacted by the introduction of the zone.

Our results suggests that Londoners react to the initial introduction of the ULEZ-compliant vehicles but do not relocate in such numbers that pricing e ects can be detected. In ongoing work, we investigate the number of housing transaction (an indicator of sorting). We also test to what extent Londoners change their commuting

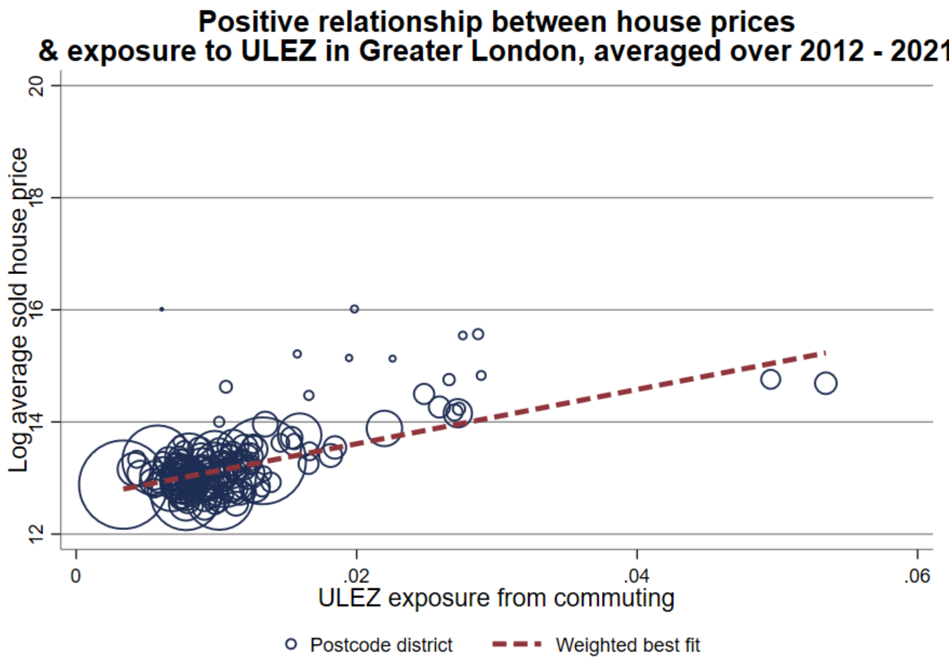

Figure 10: Positive relationship between log house price and ULEZ exposure by post-code districts in London

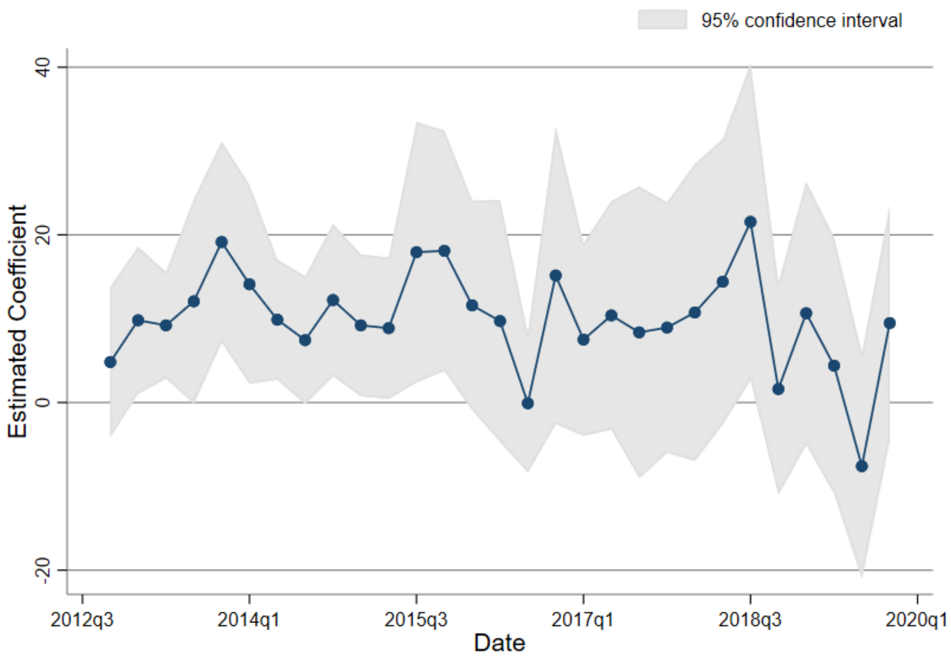

Figure 11: Baseline regression coefficients on price of sold houses around first ULEZ announcement (Q1 2015)

behaviour (by switching to public transport or working from home more) or employers relocate to establishments outside the ULEZ.

8 Conclusion and next steps

Air pollution carries high social costs, especially in urban areas. As a result, governments now increasingly experiment with policies that alter incentives to pollute. One high-profile example is London's Ultra Low Emissions Zone (ULEZ). Economists generally understand that people adapt their behaviour to incentives on many margins, often in unexpected ways (Dharmasena and Capps Jr 2012; Smith 2022; Malovaná, Bajzík, Ehrenbergerová, and Janku 2023). In this paper, we aim to evaluate how economic activity adapts as commuting incentives changes substantially, heterogeneously and dynamically for many Londoners. We bring together timely and granular data from many sources to estimate short and long-run elasticities for ultra-low emissions vehicle adoption, public transport use, homeworking patterns and the location of commuter homes and workplaces. To estimate the impact of the policy on behaviour, we use the time series of announcements and implementation dates alongside variation in the geographical reach of the ULEZ over time and pre-existing commmuting patterns.

In preliminary results we show that the announcement of the first ULEZ expansion in 2015 led to a large, positive and significant increase in the adoption of ultra-low emissions vehicles. However, we have not found evidence of an impact on the sale price of residential properties. In ongoing work we explore similar margins for public transport usage and establishment locations. For later expansions, we hope to add homeworking data as well. Beyond the backwards-looking estimation of these elasticities, the near-real time nature of most of our data sources allows us to evaluate future changes to London's ULEZ almost concurrently. In order to structure this analysis, we have publicly posted a pre-analysis plan (PAP).

The introduction of London's ULEZ features many interesting and time-varying design choices: in geographic coverage, in the treatment of residents versus commuters and in the incentives offered for the disposal of polluting vehicles. London's size and economic importance for the UK also make it a unique laboratory for pollution pricing. We hope that the estimates obtained in this project can inform better and more timely policy design choices, in the UK and abroad.

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A Additional policy details

A.1 Scrappage and retrofit schemes

A scrappage scheme was introduced to help those on income support or disability benefit to comply with ULEZ standards. The original 2019 scheme offered up to £7,000 compensation for a car or van plus up to £2,500 if it was replaced by an electric vehicle. However, when ULEZ was expanded in 2021, the £61m scrappage scheme reduced the compensation to £2,000 for cars (and for a limited number of vans and £15,000 for heavy vehicles).

The ULEZ schemes also allows some vehicles to retrofit emissions reduction technology to meet Euro VI-equivalent levels of emissions. A vehicle with retrofitted emissions technology needs to be certified by the Government's Clean Vehicle Retrofit Accreditation Scheme (CVRAS). The CVRAS register contains approved and Clean Air Zones (CAZ) compliant companies and emission reduction systems, based on make, model and engine type. The CVRAS certifies emission technologies for black taxis, vans, minibuses, motorhomes, buses, coaches, HGVs and refuse vehicles.

Financial assistance to scrap or retrofit non-compliant vehicles in preparation for the latest expansion of the ULEZ (August 2023) was announced at the end of July 2023, and offers £2,000 for scrapping a car and £1,000 for motorcycles, and £5,000 for wheelchair accessible vehicles. Parts of the scrappage payment is converted to an annual bus and tram pass. Between £5,000 and £9,500 grant is available for scrappage or retrofit of vans and minibuses used by small businesses, sole traders, and charities. It was initially open to people on low incomes, disability benefits and child benefit as well as some businesses but was extended to all Londoners and small businesses on the 21 August 2023.

A.2 Policy details

The vehicle emissions standards are taken from the vehicle logbook data held by the Driver and Vehicle Licensing Agency (DVLA).

Cars. As petrol and diesel engines produce different types of emissions, they require different standards. The ULEZ requires cars to meet minimum 'Euro' emissions standards; the ULEZ standard for passenger cars is Euro 4 (NOx) for petrol cars and Euro 6 (NOx and PM) for diesel cars. Cars featuring older technology are less likely to meet the Euro 4 standards. Petrol cars that meet ULEZ standards are generally those that were first registered with the DVLA from January 2006 (although some cars registered as early as 2001 may also meet the standards). Diesel cars registered with he DVLA after September 2015 generally meet the ULEZ standards.

Large vans and minibuses. Euro 6 for diesel engines and Euro 4 for petrol engines. Non-compliant vehicles would be required to pay a daily charge of £12.50.

Motorcycles. Motorcycles, mopeds, motorised tricycles and quadricycles (L-category) need to meet minimum Euro 3 emissions standards for NOx. Euro 3 engines are those registered with the DVLA after July 2007.

Lorries, coaches and larger vehicles over 3.5 tonnes Gross Vehicle Weight (GVW). Heavy goods vehicles (HGVs), lorries, vans, motor caravans, motorised horseboxes, and other specialist vehicles below 3.5 tonnes.

A.3 Exemptions

- 'Historic vehicles' aged 40 years or older (if registered as historic vehicle tax class).
- Hybrid electric vehicles(HEVs), Plug-in hybrids electric vehicles (PHEVs) and fully battery-powered electric vehicles (EVs or BEVs).
- LPG (Liquefied Petroleum Gas) conversions, depending on the individual model and engine.
- London-licensed taxis.

- Specialist agricultural vehicles or other specialist vehicles (Motorised horseboxes, breakdown and recovery vehicles, snow ploughs, gritters, refuse collection vehicles, road sweepers, concrete mixers, fire engines, tippers, removal lorries, cranes).

- Military vehicles.

- Some showman's vehicles are eligible for 100% discount.

- Residents parked in the zone that do not drive.

- Buses, coaches and minibuses over 5 tonnes GVW.

- NHS patient that are clinically assessed as too ill to travel to an appointment on public transport are eligible to claim back any ULEZ charge.

ULEZ exemptions will be in place until 2025 for community transport vehicles and until 2027 for people receiving certain disability benefits and vehicles for people with disabilities.

A.4 Grace periods

Grace periods covering vehicles for disabled people are in place until 25 October 2027. Some businesses and charities also have a short grace period. Small business (50 employees), micro businesses (up to 10 employees), charities and sole traders with a registered address in London boroughs and city of London fall in this category if they ordered a new minibus or light van or retrofitted their light van or minibus and the delivery is due after 29 August 2023. There will be no exemption from the charges beyond 29 May 2024.

B ULEZ introduction timeline

- 27 October 2014: Mayor and TfL announce consultation on ULEZ.
- 30 December 2014: Reminder of ULEZ consultation ending soon.
- 26 March 2015: Mayor confirms ULEZ.
- 26 October 2015: Mayor and TfL finalise ULEZ requirements for taxi and mini-cabs.
- 17 February 2017: Mayor confirms £10 T-charge from October 23rd.
- 4 April 2017: Mayor launches consultation for replacing T-charge with ULEZ from 2019.
- 23 October 2017: T-Charge comes into effect.
- 3 November 2017: Mayor announces ULEZ will start in 2019.
- 30 November 2017: Mayor launches ULEZ expansion consultation.
- 8 June 2018: Mayor announces ULEZ to expand up to North and South Circular.
- 29 November 2018: First ULEZ signs go up in London.
- 8 March 2019: TfL reminds of ULEZ one-month countdown London ULEZ.
- 8 April 2019: ULEZ comes into force.
- 16 May 2019: TfL announces that 74 per cent of vehicles comply in first month.
- 15 May 2020: The Congestion Charge, Ultra Low Emission Zone and Low Emission Zone are reinstated.
- 6 August 2020: TfL announces installation of new infrastructure.
- 18 October 2021: TfL urges drivers to check their vehicle ahead of Ultra Low Emission Zone expansion on 25 October.

- 20 May 2022: TfL seeks views on expanding ULEZ.
- 25 November 2022: Mayor announces that ULEZ will be expanded London-wide.
- 30 January 2023: Mayor announces the scrappage scheme.
- 23 March 2023: Tfl data shows over 90% of cars driving in outer London already meet ULEZ standards.
- 21 April 2023: Tfl announces £18m allocated from scrappage scheme ahead of ULEZ expansion.
- 28 July 2023: High Court rules in favour of ULEZ expansion.
- 4 August 2023: Mayor announces expansion of scrappage scheme to all Londoners.
- 23 August 2023: Scrappage scheme becomes open to all Londoners.
- 29 August 2023: ULEZ expands London-wide.