# The Political Consequences of Green Policies: Evidence from Italy*

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**Abstract**

For many governments, enacting green policies is a priority, but such policies often impose on citizens substantial and uneven costs. How does the introduction of green policies affect voting? We study this question in the context of a major ban on polluting cars introduced in Milan. The policy was strongly opposed by the populist party Lega, portraying it as a "radical-chic-leftist" initiative that penalizes the common people. Using a set of inferential strategies, we show that owners of banned vehicles—who incurred a median loss of €3,750—were significantly more likely to vote for Lega in the subsequent elections. This electoral shift did not stem from increased environmental skepticism, but rather from the perceived unfairness of the policy and its pocketbook implications. Indeed, recipients of compensation from the local government were not more likely to switch to Lega. The findings indicate that the design of green policies' distributive consequences is key in making them politically sustainable.

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# Introduction

The existential threat posed by climate change and environmental degradation is growing ever more present. While some of the harsh impacts are already being felt—extreme temperatures, massive wildfires, devastating floods—addressing this threat poses a formidable challenge on two main fronts: technological and political. On the former, much has been written, particularly on the difficulty of developing cost-effective low carbon technologies to replace the reliance on fossil fuels. Yet even where progress is made on the technological front, the political challenge remains a major barrier to progress.

In France, for example, President Macron introduced in October 2018 a carbon tax hike, with the aim of incentivizing motorists to make environment-friendly behavioral changes. Yet widespread demonstrations and road blockades soon erupted across the country, sparking the "Yellow Vests" movement that protested against the policy, arguing that it disproportionately burdened working class households. As the demonstrations spread nationally, the government abandoned the proposed policy change. Elsewhere, the Chilean government confronted mass demonstrations in 2019 due to rising metro fares, prompted by the government's decision to power the national network with renewable energy.

These examples highlight a larger issue: while governments in many countries increasingly view environmental protection as a central priority, advancing it is often politically challenging. One reason is that these policies typically offer distant rewards but entail immediate costs, which are often high and unevenly distributed. What is the political effect of introducing green policies? How does their distributional impact shape environmental attitudes and voting behavior?

The growing adoption of environmental policies can instigate a backlash, one that we conjecture is particularly well aligned with the right-wing populist agenda. That is because green policies are fast becoming synonymous with scientific expertise, technocratic

management and involvement of multilateral international institutions, all frequent targets of populist ire (Bonikowski and Gidron, 2016). Indeed, there is evidence that right-wing populist parties and candidates often take a skeptical stance on environmental issues. For instance, UKIP leader Nigel Farage described the fight against climate change as "one of the biggest and stupidest collective misunderstandings in history".[1] US President Donald Trump repeatedly expressed climate change skepticism.[2] In a study of thirteen right-wing populist parties—among them the Austrian Freedom Party, the Danish DPP, France's Front National, and the Swiss People's Party—the authors conclude that the parties' positions on global warming are "clearly anti-environmental" and that eleven of the parties are "overwhelmingly against environmental taxes" (Gemenis, Katsanidou, and Vasilopoulou, 2012). As green policies often place high costs on the less well off, in taking such a stance parties may hope to attract a sizable swath of discontented voters. Whether that approach succeeds in doing so is an open question.

To address this issue, our study exploits a quasi-natural experiment to provide insight on whether and how the introduction of green policies with uneven costs affects vote choice, as well as environmental attitudes and behavior. Specifically, we focus on the *Area B* policy advanced in July 2018 in the city of Milan by the social democratic mayor Giuseppe Sala. The policy restricted certain polluting vehicle models from circulating within a large area that covers over 70% of the city of Milan, and where 97% of the city population resides. The policy entailed significant economic losses for owners of the banned car models, who reported a median cost of €3,750, corresponding to about 17% of residents' median annual gross income.

The policy drew a sharp rebuke from opposition politicians, most vocally from represen-

[1] Bloomberg.com (11/20/2016), Jess Shankelman, "Global Trumpism seen harming efforts to reduce climate pollution".

[2] Vox.com (06/01/2017), Dylan Matthews, "Donald Trump has tweeted climate change skepticism 115 times. Here's all of it."

tatives of the far-right populist party Lega. Massimiliano Bastoni, Lega representative in the regional council, summarized his party's criticism of the policy and its political backers by warning "...This initiative will create only inconveniences and disasters, depressing the economy and penalizing the weaker social segments... Could you expect anything different from the radical-chic left, that just claims to be the people's friend, but is actually not?"[3] In subsequent elections held the following year, such criticism became a prominent feature of Lega's attack on the incumbent leftist Democratic Party (PD) and its environmental policy approach.

We investigate the electoral impact of the Area B policy, and use this case study to provide insight into the broader political dynamics surrounding the introduction of green policies. To do so, we utilize an original survey with a targeted sampling design that we conducted among residents of Milan. The survey collected detailed information about respondents' car ownership, environmental views and political behavior. Employing a set of inferential strategies, we estimate the electoral impact of the introduction of the Area B ban. Specifically, we exploit arbitrary discontinuities in the rules dictating the car models that would be covered by the ban, and employ a difference-in-differences estimation to identify the policy's effect on voting behavior.

Our analysis reveals that the introduction of the Area B ban by the Social Democrats led to an increase in support for the populist right party Lega in the following elections. Specifically, owners of banned cars were 13.5 percentage points more likely to vote for Lega in the European Parliament elections of 2019. This represents a substantial increase above the baseline support rate for Lega.

To investigate the mechanisms underlying this electoral shift, we collected information about respondents' views on a host of environmental issues. In addition, we embedded in

[3] Facebook.com (02/22/2019), Lega Lombarda - Salvini Premier Page, "Sala regala ai milanesi solo disagi e disastri."

the survey two studies that enabled us to track residents' propensity to obtain information about, or expend money on, local and global environmental initiatives. Notably, we found no attitudinal or behavioral differences between car owners that were affected by the ban and owners that were not. If anything, affected car owners exhibited slightly more environment-friendly behavior. In other words, the adverse pecuniary impact of the Area B policy did not shift those car owners to Lega by leading them to adopt the party's relatively skeptical view on green issues.

Instead, our results suggest that the shift to Lega reflects disaffection with the perceived unfairness of the policy and with its pocketbook implications. Owners of vehicles affected by the Area B ban objected to the mayor's approach of placing the bulk of the cost of his environmental policy on a narrow sub-set of residents. In general, they tend to think that the government–spreading the costs across all residents via the general tax system–or big businesses should take more responsibility in advancing environmental action. Furthermore, the electoral response to the policy closely tracked its distributional impact. Affected car owners who received compensation from the municipality for their costs were not more likely than unaffected car owners to shift their support to Lega. Due to the way compensation was dispensed (which required a formal application process), we cannot ascertain that this differential electoral response represents a causal effect of the compensation scheme. However, this evidence does suggest that policies that offset some of the costs incurred by residents can significantly alleviate the political blow-back from green policies.

Our study contributes to a growing stream of research that focuses on the domestic (rather than interstate) dynamics surrounding environmental politics (Bechtel and Urpelainen, 2015; Bernauer and Gampfer, 2015). Notably, much of this work analyzes the determinants of public support for green policies (Kotchen, Turk, and Leiserowitz, 2017; Kono, 2020; Beiser-McGrath and Bernauer, 2020), with a particular focus on the influence of parties' stance or other elite cues on the environmental positions voters take (e.g., Birch, 2020; Guber,

2013). However, very little research analyzes how the actual introduction of green policies affects electoral outcomes (but see Stokes, 2016). Our findings add to this strand of work by showing that the introduction of a green policy can have a substantial impact on the voting behavior of those affected by the policy. Furthermore, the findings highlight the importance of the way environmental policies are designed—particularly whether they include sufficient mechanisms to spread out the transition costs—if these policies are to be politically viable in the longer run.

The findings also relate to the discussion over the possibility that an anti-green backlash could hurt left-wing parties (Kono, 2020). By this view, green policies may create a schism in the support base of the left between a more environmentally-minded middle class and a more pocketbook-minded working class. While we find that the Social Democrats' introduction of Area B led to an increase in support for the populist right party Lega, our analysis indicates that, in fact, the shift was not a result of left-leaning voters abandoning their party. Instead, Lega's green-skeptical stance appeared to have primarily mobilized 'on the fence' voters who had previously not been supporting any of the large political parties. These findings suggest that even without a reckoning among traditional left voters, right-wing populists can attract new voters by spearheading the opposition to the green agenda.

## The Politics of Environmental Policy

Despite a strong scientific consensus that environmental degradation is leading to severe economic and ecological damage, policymakers are struggling to adopt the swift policy measures experts are describing as necessary to deal with the looming catastrophe. Most notably, advancing actions toward reduced reliance on fossil fuels and a mitigation of greenhouse gas emissions is proving a formidable political challenge.

To understand the nature of this challenge, much of the earlier research on the politics of

environmental protection has focused on the international perspective, viewing it primarily as a collective action problem between states (e.g., Ostrom, 2010; Stern, 2007). These studies view the mitigation of climate change, specifically the reduction in greenhouse-gas emissions, as a global collective good, whose production requires cooperation between countries and is therefore characterized by free-riding concerns (Keohane and Victor, 2016).

Yet later studies have pointed instead to the importance of the domestic debate surrounding environmental policy, arguing that a focus on the international level alone ignores key obstacles that are crucial to understanding the political feasibility of environmental policies (e.g., Bernauer and Gampfer, 2015; Bechtel and Urpelainen, 2015). This view holds that in choosing whether or not to support policies such as carbon pricing or regulations on emissions, politicians are primarily responding to the preferences of their constituents, and doing so largely irrespective of the actions other countries are taking (Colgan, Green, and Hale, 2021).

Consequently, the literature on the domestic politics of climate change has mostly focused on detecting the chief determinants of citizens' willingness to support and pay for environment-friendly policy (for a review, see Drews and Bergh, 2016). These determinants include personal beliefs and knowledge about climate change, ideological orientations and values, as well as personal experiences with extreme weather events (Inglehart, 1995; Egan and Mullin, 2017; Hazlett and Mildenberger, 2020; Hoffmann et al., 2021). Other scholars expanded this line of investigation, utilizing survey experiments to assess how the features of the policy's design affect public support for domestic and global climate mitigation efforts. A key finding in their analyses is that considerations regarding the potential costs of the policy play a crucial role in shaping people's preferences (Bechtel and Scheve, 2013; Tingley and Tomz, 2014; Kotchen, Turk, and Leiserowitz, 2017).

These studies highlight two major difficulties in promoting politically viable green policies. First, policies geared toward environmental protection often require a massive upfront

outlay, with most of the benefits being felt only well into the future (Hovi, Sprinz, and Underdal, 2009). Second, the distribution of the costs of these policies is often highly uneven, with significant distributive consequences felt not only across but also *within* countries (Aklin and Mildenberger, 2020; Vona, 2019; Maestre-Andrés, Drews, and Bergh, 2019; Beiser-McGrath and Bernauer, 2020). This problem is exacerbated by the fact that environmental policies are often regressive, imposing a heavier burden on low-income individuals (see Markkanen and Anger-Kraavi, 2019 for an overview). Several studies have thus explored how such distributive conflicts play out in shaping the choice of policy. For example, analyzing roll-call votes from U.S. congress, scholars find that representatives whose constituencies are expected to bear the brunt of the costs (e.g., areas with a high degree of carbon-intensive employment) are less likely to support environment-friendly legislation (Kono, 2020; Cragg et al., 2013).

Notably, the implicit assumption underlying these findings—that the distributive costs of environmental measures will translate into an electoral response—has hardly been tested. Are politicians' right to worry about an electoral backlash if they support climate policies that impose high costs on their constituents? To what extent do voters' responses vary as a function of how the burden of costs is distributed?

We know little about these issues, as not much attention has been given to date to the question of how the introduction of green policies with distributional costs affects citizens' preferences and voting behavior. A notable exception is Stokes (2016), who uses the spatially uneven consequences of a renewable energy policy in Ontario, Canada, as a natural experiment. She shows that voters living in proximity to wind energy projects were more likely to retrospectively punish the incumbent provincial government for liberalizing the installation of wind turbines. Specifically, she documents a NIMBY effect that persists 3 km from wind turbines, resulting in a 4 to 10% drop in vote share for the incumbent party in precincts with a proposed or operational turbine, as compared to similar precincts without one. These findings shed light on the electoral impact of distributional conflicts induced by green policies

on a geographical basis. While the green policy Stokes (2016) examines generated aggregate gains in terms of lower carbon emissions, it also created geographically-concentrated losers, namely residents living near the wind turbines who suffered from noise and the unaesthetic impact of the turbines on the landscape.

The findings by Stokes (2016) speak directly to cases in which environmental policies entail distributional consequences that are geographic-based. An important question that remains open is what the electoral consequences are when the costs of the green policy are spread unevenly across individuals without a geographic dimension. That is indeed the case for many green policies (e.g., carbon taxes), and most prominently for traffic bans such as the one we study in this paper. In our setting, losers (i.e., owners of banned cars) reside next to citizens who are not harmed by the policy, as they all live in the same area. Hence, the political conflict the Area B policy instigates is not a NIMBY-type of problem. Thus, the relevant unit of analysis is individuals rather than electoral precincts, necessitating the use of individual-level data. This research design then also allows us to directly test the mechanisms through which the distributional consequences of the policy may translate into voting behavior.

# The Area B Policy and the Political Context

## The Area B Policy

In the last decade, studies conducted by the European Environment Agency have placed the city of Milan consistently among the worst cities in Europe in terms of air pollution. In May 2018, Italy was referred to the EU Court of Justice due to non-compliance with the EU's air pollution limits in its Northern area, where Milan is located. In an effort to improve the quality of the air in the city, Milan mayor Giuseppe Sala announced in July 2018 the

introduction of a new environmental policy: Area B.

Area B is a restricted traffic area which covers 72% of the city's territory, where 97% of the population resides.[4] The policy identifies the most polluting categories of vehicles and bans them from accessing and circulating within the area.[5] Area B is active from Monday to Friday from 7:30 to 19:30, excluding holidays.[6]

Restrictions on the free circulation of vehicles within Area B are based on the European system of exhaust emissions standards, i.e., the so-called "Euro categories." Starting in 1992, every several years the EU has introduced new and increasingly stringent regulations (from Euro1 to Euro6 categories) defining the maximum permitted levels of various pollutants.[7] All new vehicles produced and sold in Europe at any point in time have to comply with the most recent emission standards. That is, they have to belong to the current active Euro category. Figure 1 provides a graphical representation of the evolution of standards from 1993 onwards.[8]

The implementation of Area B began on February 25, 2019. In the first stage of the policy, the traffic ban applied to the following car models: Diesel-Euro0, 1, 2 and 3 (i.e., cars produced until the end of 2005), and Petrol-Euro0 (produced before January 1993). These car models are identified in yellow in Figure 1. Diesel-Euro4 cars, identified in red, were added to the list of banned vehicles on October 1, 2019. These will constitute our main focus in the empirical analysis, where the aim is to compare owners of affected cars to owners of relatively-similar-yet-unaffected cars. Specifically, our treatment group will

[4] See the map in Figure SI-1 in the Online Appendix.

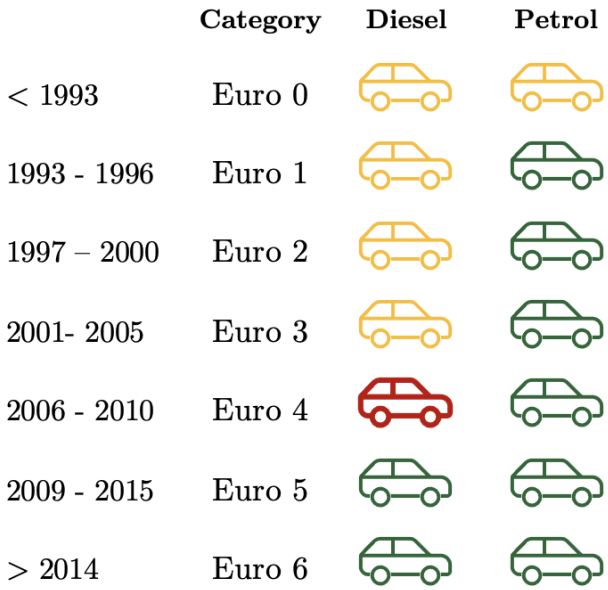
[5] Area B is not a congestion-charge type of policy, hence vehicles not covered by the ban are not required to pay any entry fee to access the area, and vehicles that are banned cannot get access upon payment of a fee.

[6] To ease the transition, in the first year of the policy's introduction banned vehicles were allowed 50 days of access to Area B.

[7] These include nitrogen oxides, total hydrocarbon, non-methane hydrocarbons, carbon monoxide, and particulate matter, measured in emitted grams per kilometer.

[8] Only in three years, e.g., 2009, there is overlap between two categories, in which case they are both legal. Specifically, this means that the production of older car models can continue, while all new models need to comply with the newest standards in order to be approved and launched on the market.

Figure (1) Area B Traffic Ban




*Notes:* Graphical representation of the impact of Area B. Yellow and red cars are banned, while green cars can still circulate.

consist of owners of Diesel-Euro4 cars, while the control group will consist of Petrol-Euro4, Diesel-Euro5, and Petrol-Euro5 car owners.[9]

In parallel with the traffic ban, a compensation scheme for the owners of banned vehicles was devised. In 2019, and then again in 2020, city residents affected by the ban could apply for compensation from the Municipality of Milan. The Municipality financed each call for applications with a budget of respectively €1 million and €8.5 millions. While the 2019 call was open only to low-income car owners, with an adjusted household income below €25,000 per year (€28,000 if aged 65+), in the second year the income criterion was dropped. The compensation scheme foresees a variety of monetary incentives for affected car owners to purchase a new or second-hand car, a new moped or e-bike, or public transit yearly passes.

[9]Diesel-Euro4 cars were not affected by the emissions scandal known as Dieselgate, which erupted in 2015. Indeed, this scandal involved only cars belonging to the Diesel-Euro5 group and, among those, only cars produced by Volkswagen. Shortly after, Volkswagen offered owners of such cars a technical fix that would reduce emissions below legal thresholds. This fix was provided free of charge.

## The Political Context and the Debate Revolving Area B

Although the need for action had been made clear by the legal procedures at the EU level, the design and introduction of Area B was, and still remains, highly controversial, with supporters and opponents of the policy divided along partisan lines. On the left, mayor Sala, from the Democratic Party, emphasized the need to take immediate action and enact the Area B policy. On the right, representatives of Lega, widely considered the least environmentally-conscious party in the Italian parliament, championed its opposition to Area B and embarked on a signature-gathering initiative to abolish the policy.[10]

The Governor of Lombardy (Milan's region) and prominent Lega member, Attilio Fontana, highlighted how Area B would place a disproportionate burden on the shoulders of relatively poorer citizens, who would suffer greatly from a reduction in their mobility. In his words: "Area B penalizes the weaker in society. Milan is becoming a city for the rich only."[11] Along similar lines, Lega member of parliament, Fabrizio Cecchetti, accused the Democratic Party and mayor Sala as living "in their radical-chic world, without realizing what the real needs of Milan citizens are."[12] Instead of Area B, Lega proposed some alternative measures to deal with the problem of pollution, ranging from increasing investment in public transportation to providing free filters with an improved technology to every vehicle owner, so as to reduce emissions without banning car circulation.

The intense political confrontation on the Area B policy has not lost much relevance in the Milan political debate. Since the initial implementation of the policy, with spurring demonstrations, protests, and legal actions, Area B has remained an electorally salient issue within the city, along with environmental issues more in general.

The electoral trends of the last decade in Italy have seen the emergence of a strong and

[10] The partisan division on the policy also translated into a confrontation between different institutions, with the municipal government clashing with the Lega-led regional government.

[11] Affaritaliani.it (02/26/2019), "Area B, Fontana accusa: "Milano rischia di diventare città solo per ricchi".

[12] Lanotteonline.it (02/20/2019), "Milano: Cecchetti, Lega prosegue raccolta firme contro Area B".

heterogeneous populist front, at the expense of more traditional parties on both sides of the left-right political space. Within this context, Lega has been one of the most successful forces. Under the leadership of Matteo Salvini, this far-right party went from being a regional party to being competitive on the whole national territory. It redefined its political platform by reducing its emphasis on federalism, and by focusing on a very vocal opposition to immigration, austerity policies, regulations that could disrupt economic activities, and any limitation of sovereignty coming from European institutions. Pertinently, environmental concerns have received little attention in Lega's new political platform. As an important case in point, in 2016 Lega members were the only Italian representatives in the European Parliament who voted against the ratification of the Paris Agreement. This new direction for the party appeared to pay electoral dividends: at the 2018 national elections Lega received 17.4% and almost 5.7 million votes, and at the 2019 elections for the European Parliament it received 34.3% and almost 9.2 million votes, becoming the largest party in Italy.

At the same time, the social democratic party PD, which was part of the government coalitions between 2013 and 2018, saw its support dwindle. Pundits attribute this decline to a growing anti-elite sentiment in the Italian public, coupled with a fractured party leadership and an incoherent platform on a range of issues. Among the few issues on which the Democratic Party did adopt a clear progressive stance was climate change and protection of the environment. The national government led by the Democratic Party was a major proponent of Paris Agreement, on which it signed in 2016. Exploiting the absence of a strong green party in the Italian political arena, the PD made the fight against climate change and the transition to a greener economy one of its signature issues in both the 2018 and 2019 party manifestos.

# Empirical Approach and Data

To assess the impact of the Area B car ban on residents' environmental views and voting behavior, we administered a web-based survey of 1,073 car owners in Milan. The survey was carried out by YouGov in January 2021.[13] All survey respondents reside within Area B.[14] Within our sample, 293 respondents owned a Diesel-Euro4 car at the time in which the Area B policy was announced (July 2018), and constitute our "treatment" group of residents affected by the ban. As the main control group we consider 412 owners of cars in three model categories—Petrol-Euro4, Petrol-Euro5, and Diesel-Euro5 cars—which are similar to Diesel-Euro4 cars in terms of emission category or fuel type, but were not covered by the traffic ban. As another type of control group, we also interviewed 303 owners of new cars in the Euro6 category (both Diesel and Petrol). These car owners serve as a useful placebo test, for reasons we detail below. Finally, 65 respondents did not know the fuel or emission category of their car, and were only able to report whether or not their car was affected by the Area B ban. Since these cars could be outside our target group of comparison (e.g., they could be older car models covered by the ban that we do not consider in our analysis), we estimate all specifications once without and once with those 65 respondents. In the latter case, we allocate respondents to treatment and control based on their self-report on whether or not their car was affected by the ban. Our findings are robust to using either approach.

In cases where respondents owned more than one car, the survey question explicitly noted that the answers should pertain to their main personal car, i.e., the one they used most often. Thus, we classify a respondent as treated if their main personal car at the time the policy

[13] The survey has received IRB approval. It was administered to the YouGov panel according to the standard YouGov policy on privacy protection and participants' informed consent. More details on compliance with the Principles for Human Subjects Research can be found in the Online Appendix.

[14] Moreover, all respondents reside outside of Area C, which corresponds to the very center of the city. In Area C, cars can only circulate upon the payment of a congestion fee, and restrictions for polluting vehicles have been in place since 2012.

was announced was included in the Area B ban.[15]

To identify the effect of the Area B policy, our main analysis focuses on the owners of four car types: Diesel-Euro4 (treated), Petrol-Euro4, Diesel-Euro5, and Petrol-Euro5 cars. In selecting these four groups, our aim is to compare affected car owners to owners of relatively-similar-yet-unaffected cars. We do so by estimating difference-in-differences specifications of the following form:

$$Outcome_i = \alpha + \beta Diesel_i + \gamma Euro4_i + \delta Diesel * Euro4_i + \theta X_i + \varepsilon_i, \quad (1)$$

where $i$ denotes individual respondents, $Outcome_i$ is either vote choice or individual attitudes and behavior. $Diesel_i$ is an indicator equal to one if respondent $i$ owned a Diesel car at the time of the Area B policy announcement; $Euro4_i$ is an indicator that equals one if respondent $i$ owned a Euro4 car at the time of policy announcement. The $Diesel * Euro4_i$ term identifies the treated car owners, i.e., those who owned a Diesel-Euro4 car. Finally, $X_i$ is a vector of individual controls, including age, gender, education, and income.

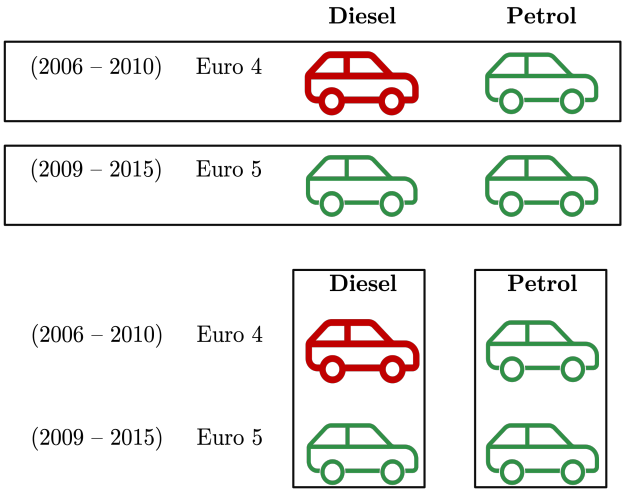
The $\delta$ coefficient captures the treatment effect of the policy. It can be interpreted in two ways, visualized in Figure 2. In the first interpretation (upper panel), $\delta$ is the difference in the differences of outcomes by emission category, that is, between Diesel vs. Petrol owners of Euro4, and Diesel vs. Petrol owners of Euro5. The intuition underlying this estimation is as follows: all Euro5 owners are unaffected by the ban, so the difference between Diesel vs. Petrol owners of Euro5 models should reflect potential differences in orientation by type of fuel. In the case of Euro4 cars, Diesel owners are treated while Petrol owners are not. The difference-in-differences then captures the effect of the policy, net of any potential difference in orientations between owners of Diesel and Petrol cars (under the assumption that these

[15] Clearly, since the announcement of the policy, many treated respondents may have changed their car and purchased instead a model that is not covered by the ban. That is of course part of the treatment. What matters for our purposes is the model of the car that was owned at the time of policy's announcement.

different orientations play a constant role across Euro4 and Euro5).

In the second interpretation of the treatment effect (bottom panel), $\delta$ represents the difference in the differences of outcomes by the car's type of fuel, that is, between owners of Euro4 vs. Euro5 Diesel cars, and between owners of Euro4 vs. Euro5 Petrol cars. The underlying intuition in this case is as follows: all owners of petrol cars are unaffected, so the difference between Euro4 vs. Euro5 among petrol owners should reflect only differences in orientation by emission category (e.g., older vs. newer cars). However among owners of Diesel cars, only those who owned Euro4 models were treated by the ban, while owners of Euro5 models were not. Thus, the difference-in-differences captures the effect of the Area B policy, net of any potential difference in orientations between Euro4 and Euro5 owners (in this case, under the assumption that the different orientations play a constant role across Diesel and Petrol).

Figure (2) Difference-in-Differences Approach




*Notes:* Graphical representation of the impact of Area B. Red cars are banned, while green cars can still circulate.

Table 1 compares the characteristics of the different groups of car owners in terms of their age, gender, education, and income. These are the same variables that we use as controls in the main analysis (i.e., vector $X_i$ in Equation 1). As the table makes clear, there are

some differences across groups. In particular, Diesel-Euro4 car owners (i.e., the treatment group), are on average more educated, somewhat wealthier and under-represented among the very young and 55+ age groups.[16] Reassuringly, earlier studies (e.g., Colantone and Stanig, 2018) show that individuals with these characteristics tend to be *less* likely to support a radical-right party such as Lega. Hence, the composition of the treatment group should in fact work against finding a pro-Lega effect of the policy.[17] In line with this observation, our estimated effects are more precisely estimated when including individual-level controls.

Figure 3 shows descriptive evidence on the costs incurred by treated car owners due to the Area B policy. These costs were substantial, with about 16% reporting losses between 1.5 and 2.5 thousand euros; over 22% with losses ranging between 2.5 and 5 thousand, and another 19% with losses above 5 thousand euros. Less than 10% reported no losses as a consequence of the introduction of the car ban, perhaps because their car had already an ex-ante market value close to zero. Overall, treated car owners reported a significant pecuniary loss as a result of the Area B policy, with the mid-point of the median category indicating a hefty loss of €3,750.

# Results

## Voting

Our main interest is in the impact of the Area B policy on individual vote choices. We focus on the May 2019 elections to the European Parliament, the sole elections that took

[16] Note that our research design led us to exclude from the survey owners of older banned cars (i.e., Diesel Euro 0-3 and Petrol Euro 0). Those individuals presumably have relatively lower incomes and thus could arguably display a stronger political reaction to the policy. By excluding them from the treatment group, we are possibly underestimating the overall effect of the policy on support for Lega.

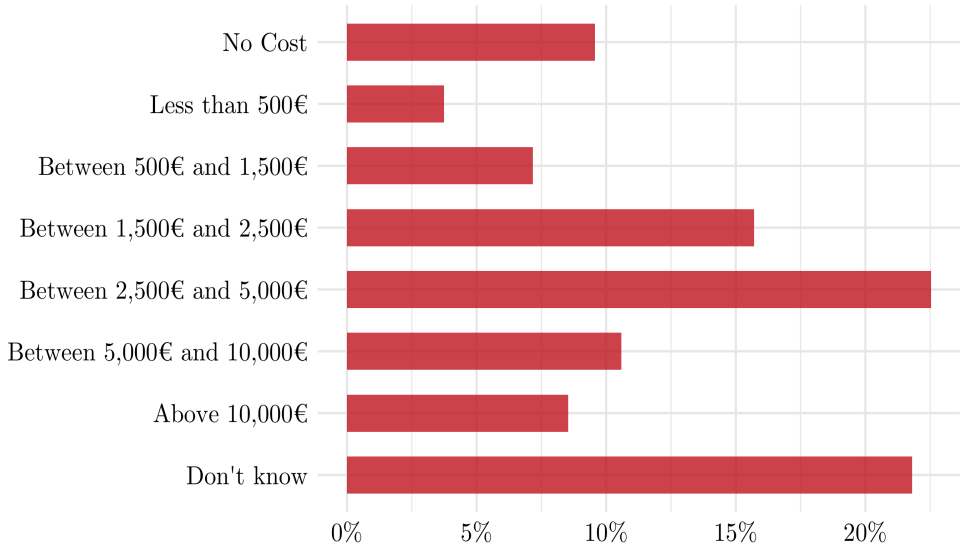
[17] We also tested this proposition more formally. First, we predicted support for Lega among participants in the control group using a model that consisted only of the controls (age, gender, education (four levels) and income (16 levels)). We then used the estimated parameters to predict Lega support among all observations. We then compared the predicted probabilities of support among the two groups, finding that the treated were significantly less likely (16.8%) than the control (23.7%) to support Lega based on their demographic characteristics.

Table (1) Descriptive Statistics of the Sample

| | **Full Sample** | **Diesel Euro 4** | **Diesel Euro 5** | **Petrol Euro 4** | **Petrol Euro 5** |
|---|---|---|---|---|---|
| **Age** | | | | | |
| 18-24 | 2.7 | 1.4 | 1.7 | 2.5 | 2.3 |
| 25-34 | 10.8 | 6.1 | 13.3 | 15.5 | 19.4 |
| 35-44 | 34.7 | 43.3 | 21.7 | 31.9 | 23.5 |
| 45-54 | 31.3 | 41.9 | 35 | 22.9 | 26.4 |
| 55+ | 20.5 | 7.2 | 28.3 | 27.0 | 28.2 |
| **Gender** | | | | | |
| Male | 52.2 | 69.3 | 61.7 | 43.4 | 44.7 |
| Female | 47.8 | 30.7 | 38.3 | 56.6 | 55.3 |
| **Education** | | | | | |
| High school diploma | 33.7 | 16 | 36.7 | 48.4 | 41.2 |
| Bachelors | 27.2 | 30.7 | 27.5 | 23.0 | 27.1 |
| MA or higher | 38.5 | 52.6 | 35 | 27.9 | 30.6 |
| Unknown | 0.6 | 0.7 | 0.8 | 0.8 | 1.2 |
| **Income** | | | | | |
| Less than 14.999 €per year | 6.9 | 4.4 | 5.8 | 18.9 | 11.8 |
| From 15.000 €to 29.999 €per year | 20.3 | 7.8 | 24.2 | 29.5 | 30 |
| From 30.000 €to 44.999 €per year | 21.7 | 30 | 16.6 | 19.7 | 21.2 |
| From 45.000 €69.999 €per year | 14.9 | 14.7 | 20 | 9 | 12.9 |
| From 70.000 €and more | 26.8 | 38.6 | 20 | 5.7 | 11.8 |
| No Answer / DK | 9.3 | 4.4 | 12.5 | 17.2 | 12.4 |
| N | 1073 | 293 | 120 | 122 | 170 |

*Notes:* Descriptive statistics on the composition of the sample, overall and by type of car. All figures are shares, summing up to 1 within each column, by section.

Figure (3) Cost of the Area B Policy




*Notes:* Each bar represents the share of treated respondents reporting Area B costs in the range displayed on the left of the figure.

place in Milan between the Area B policy announcement (July 2018) and the time of the survey (January 2021). At the time of these elections, the policy had been announced for almost a year. Importantly, EU Parliament elections tend to be fought largely on national political issues, by the same parties competing at the national elections (see, e.g., Reif and Schmitt, 1980; Eijk, Franklin, and Marsh, 1996; Gabel, 2000; Hix and Marsh, 2007; Ehin and Talving, 2021). Moreover, given that EU elections do not have direct consequences on the composition of national parliaments and governments, voters tend to vote less strategically than in national elections (Carrubba and Timpone, 2005; Hobolt and Wittrock, 2011). Taken together, these two features make EU Parliament elections a good thermometer for parties' electoral support and future prospects (Marsh, 1998; Somer-Topcu and Zar, 2014).

Our main dependent variable is an indicator that takes the value 1 if the respondent reports voting for Lega, and zero otherwise. We also investigate potential treatment effects on support for other parties. In particular, to assess potential anti-incumbent effects, we

examine support for the Democratic Party, the party of the city's mayor.

To account for individual trajectories over time, we also collected information on respondents' vote choice in three earlier elections that were held in Milan before the Area B policy was announced: legislative and regional elections held in March 2018, and municipal elections that took place in June 2016. This information allows us to: (1) control for past vote choice in the main analysis; (2) analyze the treatment effect on voters' likelihood of switching parties; and (3) run placebo analyses on pre-trends (i.e., choices made before the treatment occurred).

Table (2) Voting for Lega in EU Elections of 2019

| | *Dep. var.: Vote for Lega EU 2019* | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Diesel X Euro 4 | 0.119 | 0.183* | 0.154* | 0.115* | 0.094 | 0.146* |
| | (0.077) | (0.076) | (0.076) | (0.053) | (0.057) | (0.063) |
| Diesel | −0.093 | −0.105 | −0.082 | −0.024 | 0.003 | −0.001 |
| | (0.058) | (0.056) | (0.055) | (0.039) | (0.042) | (0.048) |
| Euro 4 | −0.048 | −0.048 | −0.019 | 0.007 | 0.026 | −0.028 |
| | (0.058) | (0.056) | (0.056) | (0.039) | (0.043) | (0.048) |
| Age | | 0.002 | 0.001 | 0.001 | 0.003** | 0.002 |
| | | (0.002) | (0.002) | (0.001) | (0.001) | (0.001) |
| Female | | 0.189** | 0.167** | 0.147** | 0.173** | 0.201** |
| | | (0.037) | (0.036) | (0.026) | (0.028) | (0.031) |
| Past Lega Vote | | | | 0.812** | 0.780** | 0.730** |
| | | | | (0.032) | (0.034) | (0.040) |
| Education F.E. | No | Yes | Yes | Yes | Yes | Yes |
| Income F.E. | No | Yes | Yes | Yes | Yes | Yes |
| Past Lega Vote | No | No | No | L2018 | R2018 | M2016 |
| Observations | 602 | 602 | 665 | 583 | 551 | 533 |
| $R^2$ | 0.005 | 0.130 | 0.153 | 0.601 | 0.577 | 0.494 |

*Notes:* Columns 2-6 report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. Column 3 includes respondents that did not report their car's fuel and/or emission category. Columns 4-6 include dummies for past Lega vote in legislative, regional, and municipal elections, respectively. *p<0.05; **p<0.01.

Table 2 reports estimates of Equation 1 on voting. The dependent variable is a vote for Lega in the 2019 elections. The specification in column 1 does not include individual-level controls. These are introduced in column 2, which reports our benchmark estimates where we control for respondents' age, gender, education and income. In column 3 we re-estimate the benchmark specification, this time including in the sample the additional respondents who were unable to report the type of fuel and/or emission category of their car. We assign these respondents to treatment or control based on their self-reports of whether or not their car was affected by the ban. In columns 4-6, we replicate the benchmark specification of column (2) and add to it indicators that denote a vote for Lega in one of the three previous elections, respectively.

The treatment effect in Equation 1 is captured by the parameter $\delta$, i.e., the coefficient on the interaction term $Diesel * Euro4$. This coefficient is positive across the board, and precisely estimated when including individual controls. The only exception is column 5, where the coefficient is only significant at the 10% level. In terms of magnitude, the average estimated effect is 13.5 percentage points, a substantively sizable shift considering that the baseline rate of support for Lega in the sample was 24.4%. Put differently, owning a car affected by the vehicle ban raised the probability of voting for Lega in the subsequent elections by 55% above the baseline rate. Given the standard errors, the actual increase in vote for Lega could of course be smaller, albeit still statistically significant.

Interestingly, the indicators for Diesel and Euro4 are never significant, showing no systematic differences in voting preferences as a function of the type of fuel or emission category itself. In contrast, the three indicators for past Lega vote in columns 4-6 are positive and highly significant, as one would expect. In fact, their estimated coefficients suggest a relatively high degree of persistence in support for Lega.

So far we have examined the empirical relationship between owning a car banned by the Area B policy and vote for Lega. Next, we use the information on voting preferences in earlier

elections to analyze the probability of the policy leading residents to *switch* their votes from other parties to Lega. Results are reported in Figure 4. In panel [a] we focus on respondents who: (1) voted both in the legislative elections of 2018 and in the EU elections of 2019; and (2) did not vote for Lega in the legislative elections of 2018. The dependent variable is an indicator equal to one if the respondent switches to Lega in the first elections after the Area B policy is introduced. From left to right, the specifications in the three coefficient plots follow columns 1-3 of Table 2, i.e., excluding individual controls, including them (our benchmark specification), and including respondents with missing car details. Panel [b] and [c] replicate the same approach as in panel [a], but focus on switching from regional elections of 2018 and municipal elections of 2016, respectively. Consistent with the previous analysis, the coefficient on the interaction term $Diesel * Euro4$ is positive in all specifications and precisely estimated when including individual controls. Note that the indicators for Diesel and Euro4 are never significant.

The benchmark estimates indicate that being affected by the traffic ban raises the probability of switching to Lega by about 15 percentage points when using the two elections of 2018 as the baseline, and by 18.6 points if the baseline is the municipal elections of 2016. These effects are substantively large, implying more than a two-fold increase in the probability of switching above the baseline rate.

To examine whether this effect was unique to Lega, Table 3 shows the electoral impact of the policy on the three other major parties competing in the 2019 elections: the center-left Democratic Party; the mainstream-right Forza Italia; and the populist-left Five Star Movement. For each party, we report the benchmark specification with controls, as in column 2 of Table 2, and three additional specifications where we control for past vote in each earlier election. The estimated treatment effects are never statistically different from zero, suggesting that the policy had no discernible impact on voting for these parties. The null result on the Democratic Party is particularly interesting, as it suggests that voters

did not penalize the party of the incumbent mayor, who was directly accountable for the introduction of the traffic ban.

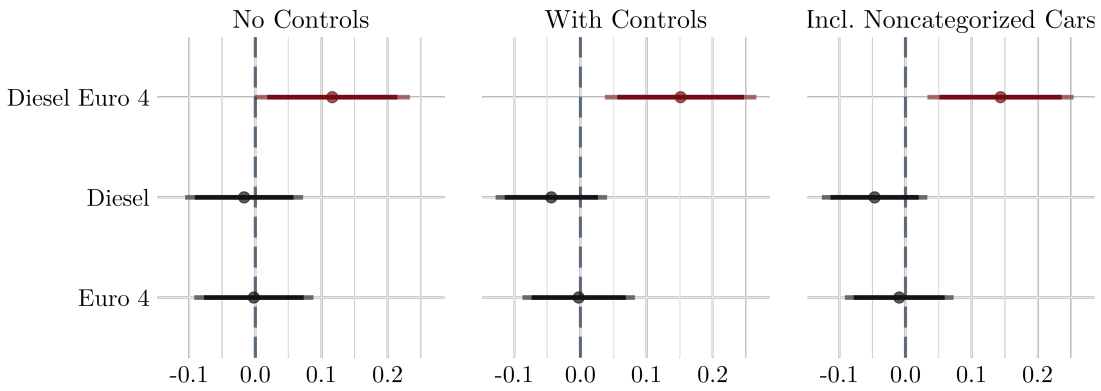
The question these findings raise, then, is where the switchers to Lega came from. To address this question, Figure 5 provides descriptive evidence on the electoral flows in our sample, from the legislative elections of 2018 to the EU elections of 2019.[18] As the figure shows, only 3% of switchers toward Lega came from the Democratic Party; 18% were previously voters of the Five Star Movement, and 16% were former supporters of Forza Italia. An additional 7% of the Lega vote came from Brothers of Italy, another far-right party. The bulk of switchers, 49%, came from "Other" parties, namely small outfits that were not specified in our list of eight possible options (e.g., Civica Popolare Lorenzin and Popolo della Famiglia). Overall, this evidence indicates that the response to the Area B policy was not a shift of center-left voters toward Lega. Rather, it seems to reflect a coalescence of voters that were less committed to the mainstream parties. These voters rallied in support of the populist right party that represented the most visible and vocal opposition to the new policy that adversely affected them.

More generally, our results highlight the fact that the introduction of green policies may induce a backlash in different ways. In addition to an anti-incumbent response, as found by Stokes (2016), the backlash may also take the form of rising support for green-skeptical parties by citizens who did not previously support mainstream forces. This may occur even without a drop in support for the incumbent, and nonetheless hamper the political sustainability of environmental action.

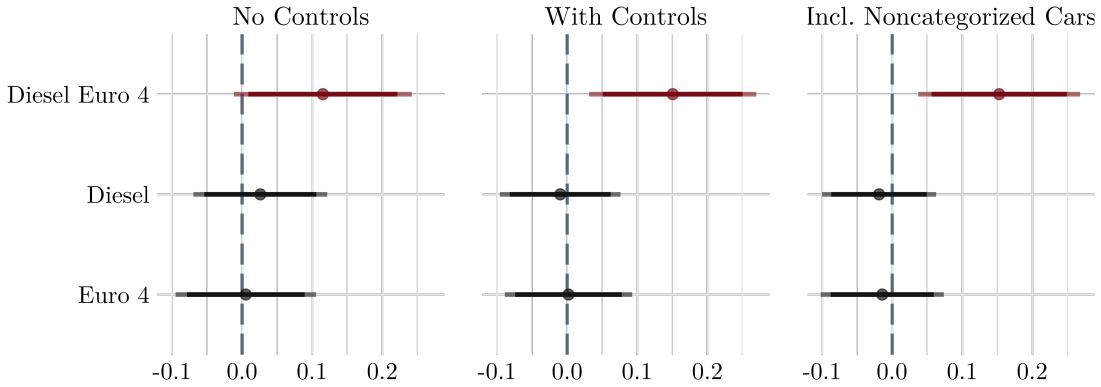
[18] We see very similar patterns when we focus instead on the regional elections of 2018 or on the municipal elections of 2016 as the baseline. See Figures SI-2-SI-3 in the Online Appendix.

Figure (4) Switching to Lega in 2019

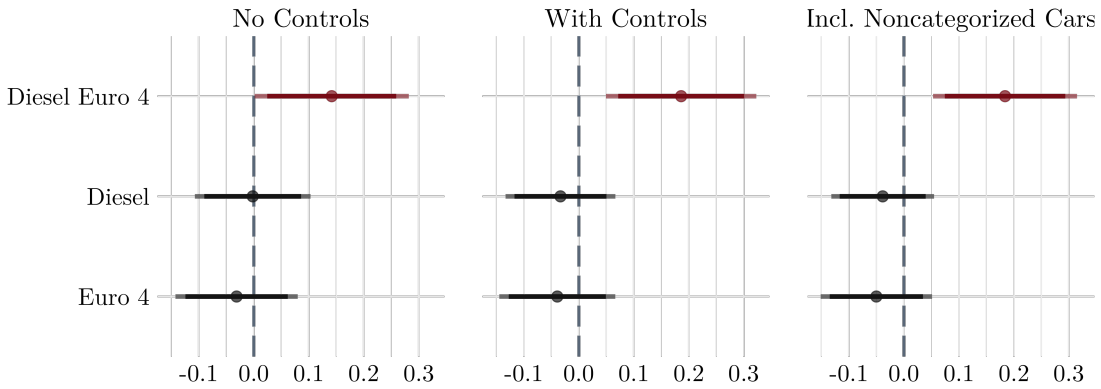
(a) From Legislative Elections 2018




(b) From Regional Elections 2018




(c) From Municipal Elections 2016



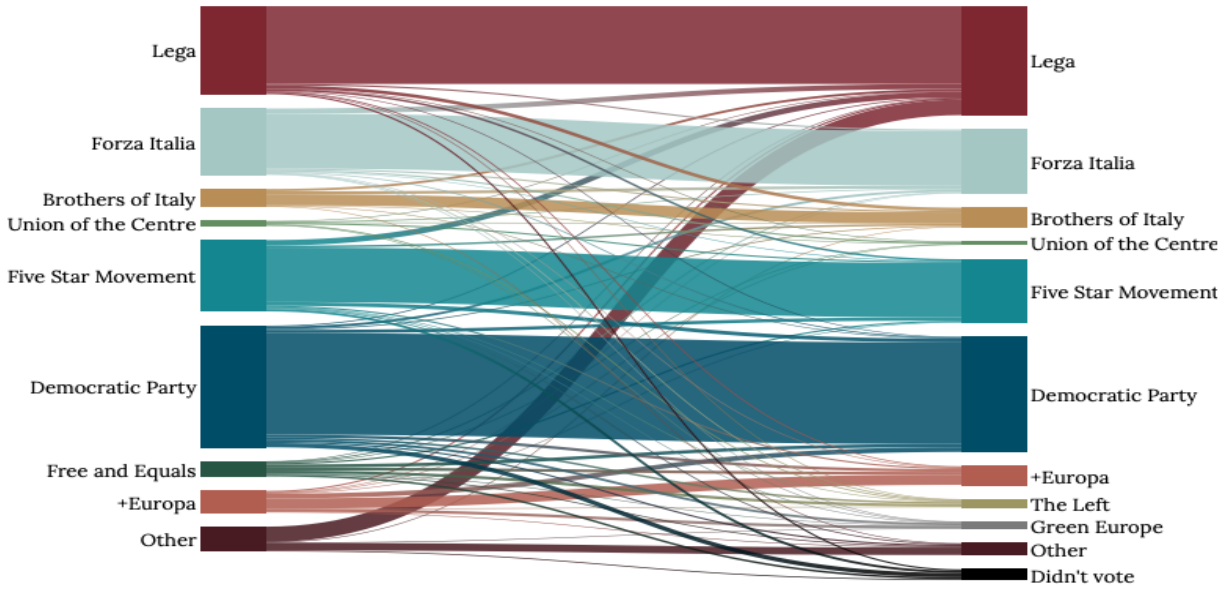

*Notes:* Coefficient estimates refer to regressions where the dependent variable is an indicator for vote switching to Lega in 2019. Each panel refers to a different earlier election, and reports three different specifications, as in columns 1-3 of Table 2. Full results in Table SI-1 of the Online Appendix.

Table (3) Voting for Other Major Parties in EU Elections of 2019

| | *Dep.var.: Vote for Other Parties EU 2019* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Voting for Democratic Party | | | | Voting for Forza Italia | | | | Voting for Five Star Movement | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Diesel X Euro 4 | 0.067 | 0.033 | 0.056 | 0.017 | −0.052 | 0.003 | 0.051 | −0.005 | −0.090 | −0.005 | 0.012 | −0.011 |
| | (0.072) | (0.046) | (0.050) | (0.052) | (0.062) | (0.034) | (0.042) | (0.043) | (0.065) | (0.040) | (0.041) | (0.042) |
| Diesel | −0.007 | −0.032 | −0.026 | −0.040 | 0.030 | −0.038 | −0.070* | −0.007 | 0.054 | 0.020 | 0.025 | 0.022 |
| | (0.054) | (0.034) | (0.037) | (0.039) | (0.046) | (0.025) | (0.031) | (0.032) | (0.048) | (0.030) | (0.030) | (0.031) |
| Euro 4 | 0.069 | −0.002 | 0.002 | 0.076 | −0.063 | 0.001 | −0.021 | −0.020 | 0.021 | −0.003 | −0.058 | −0.024 |
| | (0.053) | (0.034) | (0.038) | (0.039) | (0.046) | (0.025) | (0.032) | (0.032) | (0.048) | (0.030) | (0.031) | (0.032) |
| Age | 0.008** | 0.002 | 0.003* | 0.006** | -0.002 | 0.000 | -0.001 | -0.000 | -0.005** | -0.001 | -0.001 | -0.002 |
| | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Female | -0.062 | 0.001 | -0.008 | -0.025 | -0.097** | -0.020 | -0.014 | -0.046* | 0.006 | 0.003 | 0.014 | 0.017 |
| | (0.036) | (0.023) | (0.024) | (0.026) | (0.031) | (0.017) | (0.021) | (0.021) | (0.032) | (0.020) | (0.020) | (0.020) |
| Past Vote | | 0.782** | 0.726** | 0.739** | | 0.847** | 0.753** | 0.738** | | 0.770** | 0.845** | 0.808** |
| | | (0.027) | (0.028) | (0.030) | | (0.022) | (0.026) | (0.025) | | (0.024) | (0.029) | (0.028) |
| Education F.E. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Income F.E. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Lagged Vote | No | L2018 | R2018 | M2016 | No | L2018 | R2018 | M2016 | No | L2018 | R2018 | M2016 |
| Observations | 602 | 583 | 551 | 533 | 602 | 583 | 551 | 533 | 602 | 583 | 551 | 533 |
| $R^2$ | 0.291 | 0.724 | 0.708 | 0.700 | 0.262 | 0.800 | 0.714 | 0.728 | 0.135 | 0.692 | 0.680 | 0.685 |

*Notes:* All columns report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. Columns 2-4, 6-8, and 10-12 include dummies for past vote in legislative, regional, and municipal elections, respectively. *p<0.05; **p<0.01.

Figure (5) Electoral Flows from Legislative 2018




*Notes:* The figure reports electoral flows from the legislative elections of 2018 (left side) to the EU elections of 2019 (right side).

## Robustness

To further substantiate a causal interpretation of our findings, we perform several placebo tests. The first test is one where we compare the impact of the policy in a similar way as we have done before, only in this case we compare owners of Euro5 and the newer Euro6 cars, i.e., all cars that were not affected by the Area B ban.

Table 4 reports estimates of the following specification:

$$Vote\_Lega\_EU2019_i = \alpha + \beta Diesel_i + \gamma Euro5_i + \delta Diesel * Euro5_i + \theta X_i + \varepsilon_i. \quad (2)$$

Compared to the baseline specification in Equation 1, here the $\delta$ parameter would capture potentially different voting behavior by owners of Diesel-Euro5 cars, compared to owners of

Table (4) Vote Lega EU 2019 - EURO 5-6

| | *Placebo Test: Euro 5-6* | |
|---|---|---|
| | (1) | (2) |
| Diesel X Euro 5 | −0.005 | −0.025 |
| | (0.077) | (0.079) |
| Diesel | −0.089 | −0.066 |
| | (0.052) | (0.056) |
| Euro 5 | 0.002 | 0.018 |
| | (0.051) | (0.052) |
| Age | | 0.000 |
| | | (0.002) |
| Female | | 0.059 |
| | | (0.039) |
| Education F.E. | No | Yes |
| Income F.E. | No | Yes |
| Observations | 495 | 495 |
| $R^2$ | 0.011 | 0.093 |

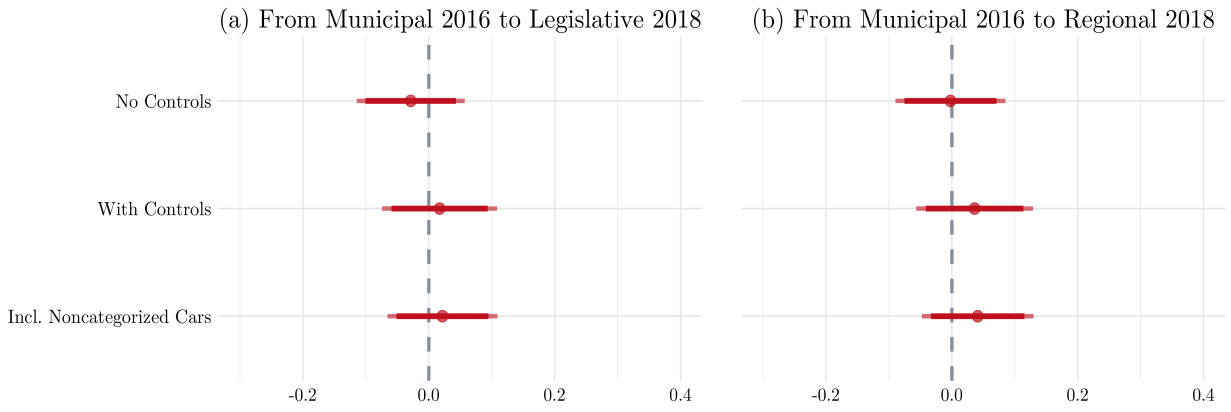
*Notes:* Estimates of Equation 2.
*p<0.05; **p<0.01.

Petrol-Euro5 cars and owners of Euro6 cars, both Diesel and Petrol. As noted, none of these cars were affected by the Area B traffic ban. Hence, in this case Diesel-Euro5 car owners constitute a "fake" treatment group. If we were to find a positive and significant estimate of the $\delta$ parameter, it would be concerning as it would suggest the presence of a general shift toward Lega among owners of relatively older Diesel cars, independent from the impact of the Area B policy. Reassuringly, that is not the case: the $\delta$ estimates reported in Table 4 are not statistically distinguishable from zero, showing a pattern that is very different from the one we observe with the real treatment group.

As a second robustness test, we focus on pre-trends. In Figure 6 we return to the baseline estimation of Equation 1, where we compare Diesel-Euro4 car owners, affected by the traffic ban, to unaffected owners of Petrol-Euro4 and Euro5 cars, both Diesel and Petrol. As before,

we examine the probability of vote switching toward Lega from one election to the other, similar to the analysis presented in Figure 4. However, in this case we consider vote switching over elections that were held *before* the announcement of the Area B policy. Specifically, in the left panel the dependent variable is an indicator variable that equals one if the respondent switches to Lega in the legislative elections of 2018, coming from a vote to another party in the municipal elections of 2016; in the right panel the dependent variable captures switching to Lega from the municipal elections of 2016 to the regional elections of 2018. Positive and significant estimates of the $\delta$ parameter would raise concerns, as they would point to a shift toward Lega by Diesel-Euro4 car owners that pre-dates the announcement of the Area B policy. This would constitute a violation of the parallel trends assumption of the diff-in-diff analysis. Reassuringly, the $\delta$ estimates reported in Figure 6 are always close to zero and well below statistical significance.

Figure (6) Vote Switching Before Area B




*Notes:* Treatment effect estimates from regressions where the dependent variable is an indicator for vote switching to Lega before Area B. Each panel considers switching between different elections and reports results from three different specifications, as in columns 1-3 of Table 2. Full results in Table SI-2 of the Online Appendix.

## Mechanisms

Having analyzed the treatment effects of Area B on voting, we now turn to investigate possible mechanisms through which the traffic ban may have raised support for the populist right party Lega. We focus on two potential mechanisms. First, exposure to the traffic ban may have induced a shift toward less environment-friendly attitudes and behavior, which in turn translated into higher support for Lega, a party widely recognized for its skepticism toward the environmental agenda (Atkins and Menga, 2022; Bulli, 2019; Valbruzzi et al., 2019).

A second potential mechanism holds that being affected by the traffic ban may have generated hostility not to environmentalism in general, but specifically to a green policy approach that places disproportionate costs on some people, often those with lesser means. Such a shift in views could tilt voters toward Lega, the most vocal opponent of the Area B policy and a party that frequently portrays itself as the representative of the "common man." Importantly, and as noted earlier, Lega did not actually deny the need for taking some action to reduce air pollution in the city of Milan; instead, its criticism centered on the specific design of the Area B policy, which concentrated heavy losses on some, particularly less well-off citizens.

Starting with the first mechanism, we examine the impact of the Area B policy on residents' environmental views and behavior. The top panel of Figure 7 reports estimated treatment effects based on the specification outlined in Equation 1, with individual controls as in the benchmark specification estimates of column 2 in Table 2. The dependent variables are reported on the left of the panel, beside each $\delta$ coefficient estimate. Beginning at the top of the figure, the first four rows focus on the policy's impact on environment-friendly behavior. Specifically, the dependent variables reflect respondents' report of how frequently—on a five-point scale ranging from 'never' to 'always'—they carry out each of the following: (1)

buy products made using recycled materials and/or packaged without plastic; (2) take short showers to preserve water; (3) use home appliances in Eco mode; and (4) use reusable bottles for water. All the estimated effects are non-significant, indicating no systematic differences in behavior between car owners in the treatment and control groups.

Turning to attitudes, the dependent variable in row 5 is an indicator that equals 1 if the respondent partially or fully agrees with the statement that the government and local institutions should adopt emission-reducing initiatives aimed at achieving climate neutrality in Italy by 2050. In row 6 we consider agreement with the statement that adoption of green policies against pollution and climate change will have a "very positive" impact on citizens. In both cases the estimated effects are very small and not statistically distinguishable from zero, indicating no systematic differences in attitudes on those issues between the treated and non-treated respondents.

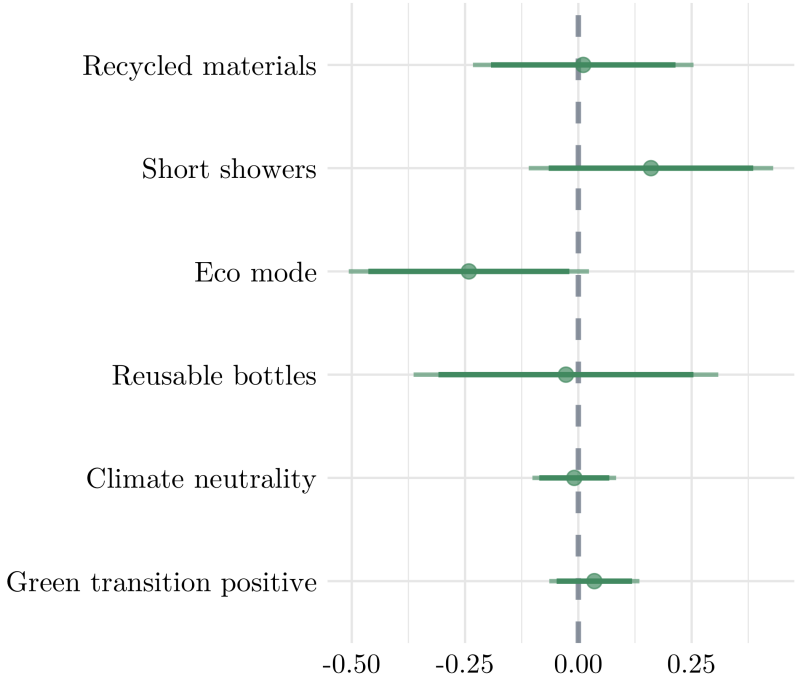
To further understand how Area B affected locals' environmental stance, we also embedded in the survey two more behavioral measures. These were designed to shed light on the impact of Area B on respondents' concern with environmental action at the global versus the local level. Indeed, incurring high costs due to Area B could in theory have turned residents against local air quality concerns while maintaining interest in and support for climate action at the global scale.

The first set of quasi-behavioral measures is based on a collaboration with ZeroCO2, a company that offers customers the option of reducing their carbon footprint by paying for the planting of trees in their name in various parts of the world, an action that helps reduce CO2 concentration in the atmosphere.[19] After providing information about the company and its services, we prompted respondents with the option to: (1) click on the company's website; (2) watch a short video (40 seconds) about the company; express interest in: (3) following

[19] As party of the service ZeroCO2 offers, when customers purchase a tree they can monitor through pictures the tree's growth over several years.

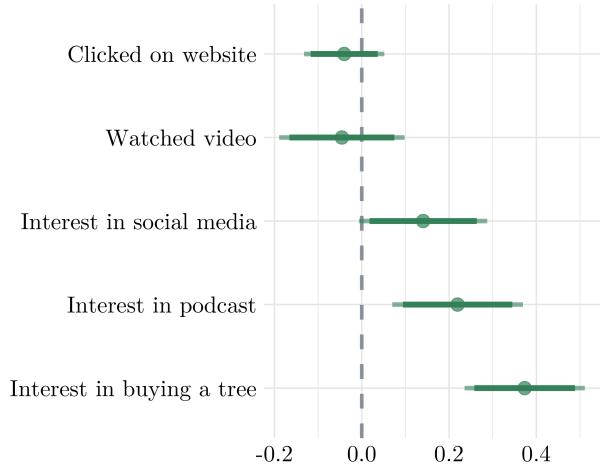
Figure (7) Environmentalism

(a) Environment-friendly behavior and attitudes




Environmental Action at:

(b) Global Level (ZeroCO2)




(c) Local Level (Genitori Antismog)


*Notes:* All panels of this figure report estimated treatment effects according to the benchmark specification of column 2 in Table 2. Dependent variables are indicated on the left of each panel, in correspondence of each coefficient. Full results in Tables SI-3-SI-5 of the Online Appendix.

the company's page on social media (e.g., Instagram); (4) listening to the company's podcast on environmental sustainability; or (5) planting a tree at a price of 13,6 euros (discounted by 15% compared to the normal price of 16 euros charged by ZeroCO2 for pine trees). If people adversely affected by the Area B policy grew consequently more hostile to environmentalism, we would expect them to exhibit less interest in the services offered by ZeroCO2.

Panel [b] of Figure 7 displays the estimated treatment effects on five indicators based on the survey items just described. All estimates refer to the benchmark specification outlined in Equation 1. As the figure shows, treated respondents were as likely as others to click on ZeroCO2's website, and to watch the video about the company. However, they were more likely to express an interest in purchasing a tree, as well as in listening to the company's podcast or in following the company on social media.[20]

Very similar evidence emerges from a second experiment embedded in the survey. In this case, we investigate potential shifts in attitudes and behavior concerning environmental action at the local level, within a context that is more closely related to the Area B policy. Specifically, we drew respondents' attention to Genitori Antismog (Italian for "antismog parents"), a nonpartisan association that has been active in Milan for about twenty years, and has two main goals: (1) encourage politicians to tackle air pollution in Milan by acting as a watchdog on legislative initiatives; and (2) informing citizens on environmental issues, with specific attention to children via collaborations with local schools. In this case, we prompted respondents with the options to: (1) click on the association's website; and express interest in: (2) subscribing to its newsletter; or (3) donating money to the association. Panel [c] of Figure 7 displays the estimated treatment effects on these three outcomes, using the benchmark specification. As the figure shows, treated respondents were as likely as others

[20] ZeroCO2 allowed us to obtain information on how many respondents actually purchased a tree from a dedicated web-page that was accessible only by our survey participants, directly from the YouGov platform. Only one respondent actually purchased a tree from the dedicated link we provided in the survey. However, more individuals may have done so from the ZeroCO2 website after completing the survey.

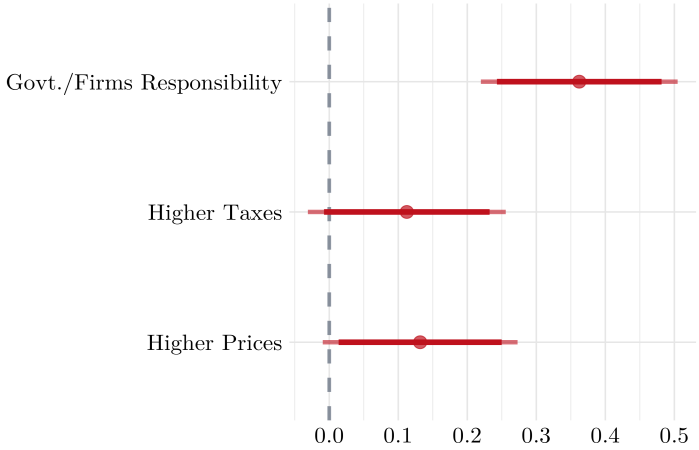
to click on the association's website, but were significantly more likely to express interest in subscribing to the newsletter and donating to the association.

In sum, these results indicate that owning a car banned by the Area B policy did not make residents more hostile to environmental issues in terms of attitudes or behavior. If anything, treated respondents appear to display a higher degree of interest in environmental action, suggesting that personal exposure to the ban may have increased their awareness of, or concern with, environmental issues. Overall then, an anti-green shift in attitudes and behavior does not seem to be the main channel through which exposure to Area B translated into higher support for Lega.

Next, we examine the second mechanism: disaffection from a policy approach that places the transition costs on a small segment of residents, leading them to vote for Area B's chief opposition. To assess this explanation, in the top row of Figure 8 the dependent variable is an indicator that takes the value 1 if the respondent partially or fully agrees with the statement that preserving the environment is the "responsibility of governments and big firms more than of citizens." The treatment effect is positive and precisely estimated, indicating that those hurt by the car ban were a whopping 36 percentage points more likely to share this view. In the central row, the dependent variable is an indicator that equals one if the respondent is ("fairly" or "very") willing to pay higher taxes in order to finance public initiatives aimed at preserving the environment. The treatment effect is again positive, but imprecisely estimated. The same applies to the bottom row, where the dependent variable is an indicator denoting if the respondent is willing to pay more for environment-friendly goods and services (13.2 pp, $p<0.1$).

Overall, car owners affected by the ban appear more likely to support an active role of government and big firms for environmental action, even if this entails higher taxes, or higher prices to be paid for environment-friendly goods and services. These findings suggest a preference for a different, possibly fairer, approach to green policies, such as financing them

Figure (8) Prices, Taxes, and Responsibility




*Notes:* Treatment effect estimates according to the benchmark specification of column 2 in Table 2. Dependent variables are indicated on the left of the figure, in correspondence of each coefficient. Full results in Table SI-6 of the Online Appendix.

in a more progressive fashion, perhaps through the general tax system.

Relatedly, in line with Lega's stance on these issues, the political reaction of affected drivers appears to reflect dissatisfaction with the pocketbook losses they incurred. Table 5 provides further evidence consistent with this interpretation. Specifically, in column 1 we augment the benchmark specification of column 2 in Table 2 with an indicator variable *Compensated*, which is equal to 1 for treated respondents who have received economic support from the municipality of Milan for substituting their cars (and zero otherwise). In columns 2-4 we do the same thing with the benchmark specification used in Figure 4, where we consider vote switching toward Lega from earlier elections. As the table shows, treatment effect remains positive and precisely estimated in all columns. At the same time, the compensation dummy is always negative and significant, and has a similar magnitude as the treatment effect. This suggests that treated respondents who received economic support were not more likely than control respondents to shift to Lega. This finding should be interpreted with caution, as receiving support required a formal application process, which may raise an issue of self-selection into compensation. Yet, at a minimum, our results

suggest that devising proper compensation schemes for negatively affected citizens may be an effective way to foster the acceptability and political sustainability of green policies.

Overall, our findings are consistent with the view that issues related to social justice and fairness are central to populist mobilization (see, e.g., Altomonte, Gennaro, and Passarelli 2019; Betz 2019). In this respect, Lega's opposition to the Area B policy seems to have been appealing to the narrow segment of citizens who felt they were bearing a disproportionate share of the policy's cost. Along with the pecuniary grievance, affected citizens may have also perceived the policy as singling them out as those most responsible for pollution in the city. This sentiment may have reinforced the shift toward Lega, a party that explicitly criticized the inherently unfair design of the policy. As emphasized for instance by Betz (2021), Franzese (2019), Frieden (2019) and Gidron and Hall (2017), when it comes to social justice and populism, issues of recognition, dignity, and status also play a prominent role.

# Conclusion

Despite momentous consequences at stake, political leaders are struggling to take the actions needed to deal with the threat of environmental degradation and climate change. One common explanation is that many of the necessary actions entail substantial transition costs, and place burdens on the public that politicians fear would generate significant political blow-back. Yet to date we know strikingly little on citizens' electoral response to costs imposed on them due to environmental policies. This study offers new insight on this question.

Examining the impact of Area B, a traffic ban policy in Milan, we find that car owners who incurred sizable pecuniary losses due to the ban were significantly more likely in the next elections to vote for Lega, a right-wing populist party and chief critic of the policy. Also, for affected residents who voted for other parties in earlier elections, the likelihood of switching to Lega was significantly higher.

Table (5) Compensation

| | *EU Parliament 2019* | | | |
|---|---|---|---|---|
| | Vote for Lega | Switch to Lega | Switch to Lega | Switch to Lega |
| | (1) | (2) | (3) | (4) |
| Diesel X Euro 4 | 0.207** | 0.165** | 0.167** | 0.204** |
| | (0.076) | (0.058) | (0.060) | (0.070) |
| Compensated | −0.254** | −0.144** | −0.181** | −0.167** |
| | (0.079) | (0.055) | (0.054) | (0.061) |
| Diesel | −0.110 | −0.045 | −0.012 | −0.035 |
| | (0.056) | (0.043) | (0.043) | (0.051) |
| Euro 4 | −0.048 | −0.001 | 0.005 | −0.038 |
| | (0.055) | (0.043) | (0.046) | (0.053) |
| Age | 0.001 | 0.001 | 0.003* | 0.002 |
| | (0.002) | (0.001) | (0.001) | (0.001) |
| Female | 0.171** | 0.150** | 0.198** | 0.182** |
| | (0.038) | (0.028) | (0.029) | (0.034) |
| Education F.E. | Yes | Yes | Yes | Yes |
| Income F.E. | Yes | Yes | Yes | Yes |
| Switch from: | | L2018 | R2018 | M2016 |
| Observations | 602 | 483 | 450 | 452 |
| $R^2$ | 0.145 | 0.235 | 0.326 | 0.232 |

*Notes:* In column 1 the dependent variable is an indicator for voting Lega in the EU elections of 2019. In columns 2-4 the dependent variables are indicators for switching to Lega from the legislative 2018, regional 2018, and municipal elections 2016, respectively. All regressions include individual controls, as in the benchmark specification of column 2 in Table 2. *p<0.05; **p<0.01.

These findings highlight the electoral incentives politicians may see in opposing certain green policies and criticizing their economic repercussions. In cases where voters feel unambiguous financial pain from such policies, the electoral implications can be significant. The agenda associated with right-wing populist parties—skepticism toward scientific expertise, disdain of multilateral efforts, and its mantle as representing the interests of the common people—situates them well to gain from such backlash against green policies.

Notably, our evidence indicates that the electoral shift to Lega did not happen because

affected car owners adopted a more hostile stance toward environmental issues in general. In fact, we find some evidence that, if anything, those car owners adopted more environment-friendly views and behavior. Notably, this pattern is consistent with recent evidence regarding members of the French "Yellow Vests" movement, which sprung in 2018 in opposition to the government's decision to impose higher fuel taxes and attacked the policy as disproportionately hurting lower- and middle-income people. Using survey evidence, Gilets et al. (2019) find that despite their opposition to the fuel tax, Yellow Vest activists expressed significant concern with ecological issues and supported various green policies. What they demanded, however, was greater fairness in the way such policies were designed and implemented. According to our results, similar dynamics were also at play in Italy, suggesting that political opposition to green policies does not necessarily stem from a general disregard of the environmental threat.

Rather, our results suggest that the electoral shift induced by Area B reflected a pocketbook response and disaffection with the policy approach perceived to unfairly impose its high transition costs on a narrow subset of the public. Indeed, we find that car owners that received financial assistance from the municipality to defray the costs of the car ban were not more likely to switch to Lega than unaffected car owners.

One possible, perhaps contentious implication of these findings, is that if policymakers seek to make meaningful progress on central environmental goals (e.g., 1.5C target), they should be cognizant of the political trade-offs that green policies entail. Whereas some policies may offer a desirable environmental benefit, if they trigger a political backlash that puts in power parties opposed to the green agenda, advancing these policies may prove detrimental to the broader cause of environmental protection.

In fact, it is hard to overstate the importance of paying attention to the political aspects of the transition to a greener economy. Take for example the workers employed by companies that extract, refine, distribute and produce electricity from fossil fuels. In 2019, that number

in the U.S. alone was 2.8 million (Hanson, 2021). This figure is comparable on per capita basis also in Australia and the UK. If the livelihoods of these workers and their families will come under threat due to a transition to cleaner energy sources, without sufficient policies in place to cushion the blow, the political blow-back could be substantial. As our findings show, even when dealing with a green policy designed to provide a tangible localized improvement to residents' well being, those made to incur sizable economic sacrifices responded electorally in a swift and clear manner. If environmental policies are to be politically viable, policymakers should aim to reduce the concentration of the costs and spread them out across larger segments of the public, as well as dedicate sufficient funds to compensation schemes targeted at the losers from the policy. As without reinforcing that political viability, the battle for environmental protection would be that much harder.

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# Online Appendix

## A Details on Principles for Human Subjects Research

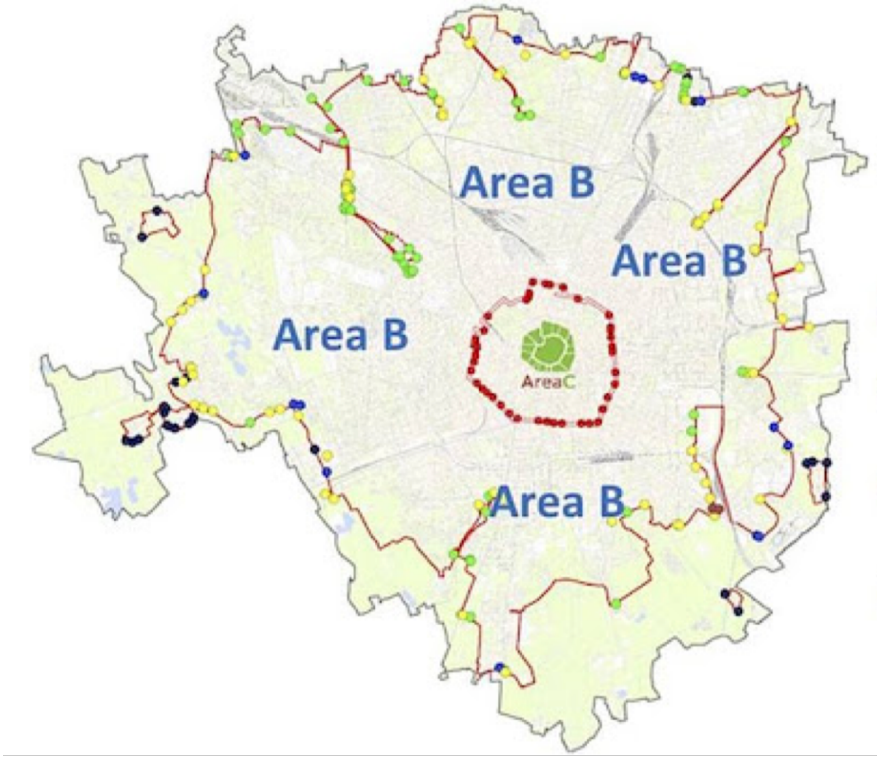
Our survey was administered by YouGov to their panel participants who reside in the city of Milan, within Area B and outside of Area C.

Concerning the Principles for Human Subjects Research, we clarify the following:

- All survey participants provided informed and voluntary consent when included in the YouGov panel, as per the YouGov policy on informed consent and privacy protection. When taking the survey used for this study, respondents were informed that their answers would be used to provide information to YouGov clients for a study regarding mobility within the city of Milan.
- When taking a survey, panel participants receive a number of YouGov points on their YouGov account. Such points can be accumulated over time and redeemed for cash and other rewards. Participants in the survey used for this study received YouGov points as compensation. YouGov reports on its website that participants receive up to 400 points for completing a 10-15 minute survey. 5000 points correspond to a $50 payout. More information can be obtained at this link: https://my.yougov.com/en-my/account/faq/
- The survey does not entail any deception.
- The survey does not ask participants to engage with any material that could impose psychological distress or harm.
- The survey was administered by YouGov, in line with YouGov policy on privacy, which can be accessed here: https://account.yougov.com/us-en/account/privacy-policy
- The survey had no impact on the political process.
- The research protocol received IRB approval before its implementation.
- In terms of relevant laws/regulations awareness, the survey has been taken in compliance with the General Data Protection Regulation (GDPR) of the European Union, that is legally binding in Italy.
- Given all the above information, we do not claim any exception to the Principles for Human Subjects Research.

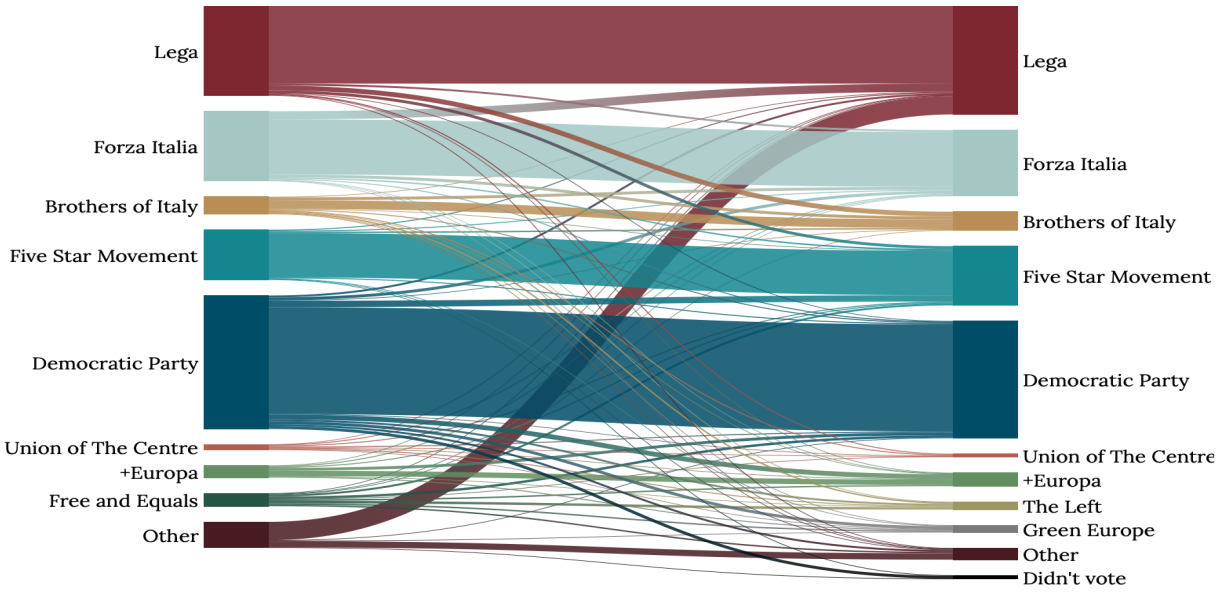
# B Additional Figures and Tables

Figure (SI-1) The Area B Policy



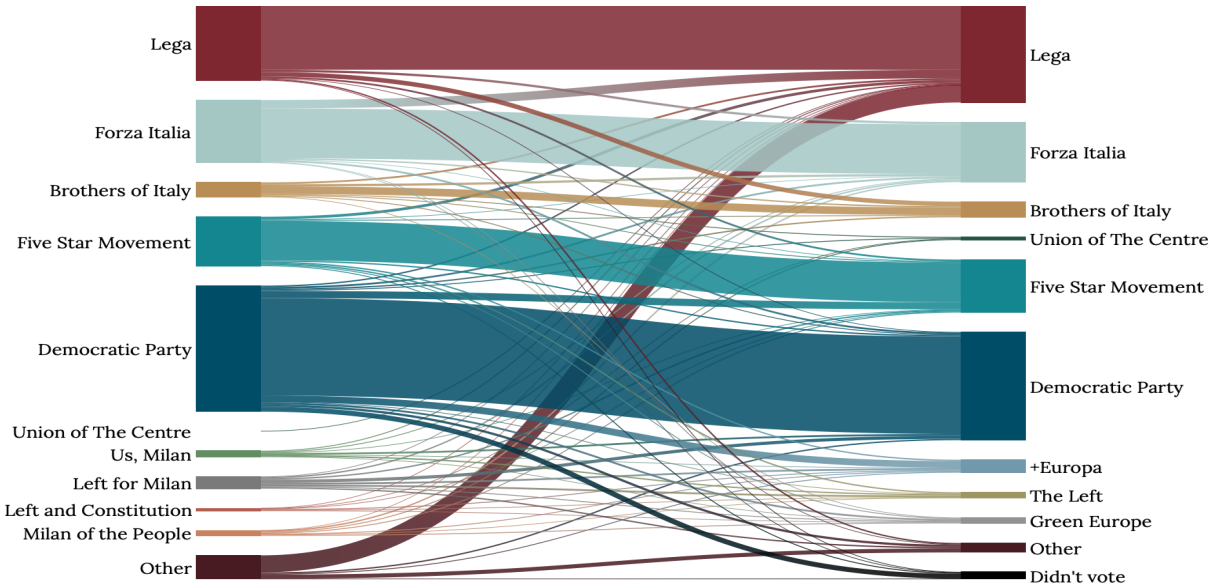

*Notes:* The map represents the city of Milan and is sourced from the municipality website. The large area with red borders is Area B, our focus of interest. The other outlined area in the very center of the city is Area C, excluded from our analysis.

Figure (SI-2) Electoral Flows from Regional 2018




*Notes:* The figure reports electoral flows from the regional elections of 2018 (left side) to the EU elections of 2019 (right side).

Figure (SI-3) Electoral Flows from Municipal 2016




*Notes:* The figure reports electoral flows from the municipal elections of 2016 (left side) to the EU elections of 2019 (right side).

Table (SI-1) Switching to Lega in EU Elections of 2019

| | *Dep. var.: Switching to Lega in 2019 from earlier elections* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Legislative Elections 2018 | | | Regional Elections 2018 | | | Municipal Elections 2016 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Diesel X Euro 4 | 0.116 | 0.151** | 0.144* | 0.115 | 0.151* | 0.153** | 0.142* | 0.186** | 0.184** |
| | (0.060) | (0.058) | (0.056) | (0.065) | (0.061) | (0.059) | (0.072) | (0.070) | (0.067) |
| Diesel | −0.017 | −0.044 | −0.047 | 0.026 | −0.010 | −0.019 | −0.002 | −0.033 | −0.039 |
| | (0.045) | (0.043) | (0.041) | (0.049) | (0.044) | (0.042) | (0.054) | (0.051) | (0.048) |
| Euro 4 | −0.002 | −0.003 | −0.009 | 0.005 | 0.002 | −0.014 | −0.031 | −0.039 | −0.050 |
| | (0.046) | (0.043) | (0.042) | (0.051) | (0.046) | (0.045) | (0.057) | (0.054) | (0.052) |
| Age | | 0.002 | 0.002 | | 0.004** | 0.004** | | 0.003 | 0.003* |
| | | (0.001) | (0.001) | | (0.001) | (0.001) | | (0.001) | (0.001) |
| Female | | 0.161** | 0.148** | | 0.216** | 0.204** | | 0.198** | 0.187** |
| | | (0.028) | (0.027) | | (0.029) | (0.028) | | (0.034) | (0.032) |
| Education F.E. | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Income F.E. | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 483 | 483 | 511 | 450 | 450 | 478 | 452 | 452 | 479 |
| $R^2$ | 0.030 | 0.224 | 0.213 | 0.049 | 0.308 | 0.293 | 0.031 | 0.218 | 0.214 |

*Notes:* Columns 2-3, 5-6, and 8-9 report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. Columns 3, 6, and 9 include respondents that did not report their car's fuel and/or emission category. *p<0.05; **p<0.01.

Table (SI-2) Switching to Lega Before Area B

| | *Dep. var.: Switching to Lega from municipal elections 2016 to* | | | | | |
|---|---|---|---|---|---|---|
| | Legislative Elections 2018 | | | Regional Elections 2018 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Diesel X Euro 4 | -0.029 | 0.017 | 0.022 | -0.002 | 0.036 | 0.041 |
| | (0.044) | (0.047) | (0.045) | (0.045) | (0.047) | (0.045) |
| Diesel | 0.036 | 0.025 | 0.018 | 0.010 | 0.029 | 0.021 |
| | (0.033) | (0.034) | (0.032) | (0.034) | (0.035) | (0.032) |
| Euro 4 | -0.009 | -0.035 | -0.037 | -0.024 | -0.057 | -0.056 |
| | (0.035) | (0.036) | (0.034) | (0.035) | (0.036) | (0.035) |
| Age | | 0.000 | 0.000 | | -0.002* | -0.002* |
| | | (0.001) | (0.001) | | (0.001) | (0.001) |
| Female | | 0.042 | 0.042* | | 0.020 | 0.019 |
| | | (0.022) | (0.021) | | (0.023) | (0.022) |
| Education F.E. | No | Yes | Yes | No | Yes | Yes |
| Income F.E. | No | Yes | Yes | No | Yes | Yes |
| Observations | 454 | 454 | 480 | 448 | 448 | 474 |
| $R^2$ | 0.005 | 0.066 | 0.067 | 0.003 | 0.073 | 0.069 |

*Notes:* Columns 2-3 and 5-6 report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. Columns 3 and 6 include respondents that did not report their car's fuel and/or emission category. *p<0.05; **p<0.01.

Table (SI-3) Environment-friendly behavior and attitudes

| *Dep. var:* | (1) Recycled | (2) Showers | (3) Eco Mode | (4) Bottles | (5) Policy | (6) Impact |
|---|---|---|---|---|---|---|
| Diesel X Euro 4 | 0.011 | 0.160 | -0.242 | -0.027 | -0.009 | 0.035 |
| | (0.124) | (0.138) | (0.135) | (0.172) | (0.047) | (0.051) |
| Diesel | 0.089 | -0.072 | 0.142 | -0.041 | -0.042 | -0.087* |
| | (0.091) | (0.101) | (0.099) | (0.126) | (0.035) | (0.037) |
| Euro 4 | 0.121 | 0.002 | 0.080 | 0.202 | 0.007 | -0.002 |
| | (0.090) | (0.100) | (0.098) | (0.124) | (0.034) | (0.037) |
| Age | -0.008** | 0.004 | -0.002 | -0.031** | -0.001 | -0.002 |
| | (0.003) | (0.003) | (0.003) | (0.004) | (0.001) | (0.001) |
| Female | -0.013 | 0.005 | -0.070 | -0.007 | -0.021 | -0.049 |
| | (0.062) | (0.069) | (0.068) | (0.086) | (0.024) | (0.025) |
| Education F.E. | Yes | Yes | Yes | Yes | Yes | Yes |
| Income F.E. | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 705 | 705 | 705 | 705 | 705 | 705 |
| $R^2$ | 0.146 | 0.097 | 0.081 | 0.157 | 0.040 | 0.082 |

*Notes:* The dependent variables in the first four columns reflect, respectively, respondents' report of how frequently—on a five-point scale ranging from 'never' to 'always'—they carry out each of the following: (1) buy products made using recycled materials and/or packaged without plastic; (2) take short showers to preserve water; (3) use home appliances in Eco mode; and (4) use reusable bottles for water. In column 5, the dependent variable is an indicator equal to 1 if the respondent partially or fully agrees with the statement that government and local institutions should adopt emission-reducing initiatives aimed at achieving climate neutrality in Italy by 2050. In column 6, we consider agreement with the statement that adoption of green policies against pollution and climate change will have a "very positive" impact on citizens. All columns report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. *p<0.05; **p<0.01.

Table (SI-4) Global Level (ZeroCO2)

| | (1) Website | (2) Video | (3) Social | (4) Podcast | (5) Tree |
|---|---|---|---|---|---|
| Diesel X Euro 4 | -0.040 | -0.045 | 0.141 | 0.220** | 0.373** |
| | (0.047) | (0.073) | (0.075) | (0.076) | (0.070) |
| Diesel | 0.056 | -0.036 | 0.019 | -0.021 | -0.065 |
| | (0.034) | (0.054) | (0.055) | (0.056) | (0.052) |
| Euro 4 | 0.013 | -0.072 | 0.039 | -0.017 | -0.070 |
| | (0.034) | (0.053) | (0.054) | (0.055) | (0.051) |
| Age | -0.001 | 0.001 | -0.012** | -0.007** | -0.006** |
| | (0.001) | (0.002) | (0.002) | (0.002) | (0.001) |
| Female | -0.009 | 0.104** | -0.107** | -0.120** | -0.026 |
| | (0.023) | (0.037) | (0.037) | (0.038) | (0.035) |
| Education F.E. | Yes | Yes | Yes | Yes | Yes |
| Income F.E. | Yes | Yes | Yes | Yes | Yes |
| Observations | 705 | 705 | 705 | 705 | 705 |
| $R^2$ | 0.047 | 0.157 | 0.184 | 0.187 | 0.297 |

*Notes:* The dependent variables are indicators equal to one in case the respondent: (1) clicks on ZeroCO2 website; (2) watches a short video about the company; (3) expresses interest in following the company's page on social media; (4) expresses interest in listening to the company's podcast on environmental sustainability; and (5) expresses interest in planting a tree. All columns report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. *p<0.05; **p<0.01.

Table (SI-5) Local Level (Genitori Antismog)

| | (1) Website | (2) Newsletter | (3) Donation |
|---|---|---|---|
| Diesel X Euro 4 | 0.016 | 0.281** | 0.434** |
| | (0.024) | (0.072) | (0.063) |
| Diesel | -0.029 | -0.066 | -0.027 |
| | (0.017) | (0.053) | (0.046) |
| Euro 4 | -0.034* | 0.001 | -0.055 |
| | (0.017) | (0.052) | (0.045) |
| Age | -0.001 | -0.004** | -0.004** |
| | (0.000) | (0.002) | (0.001) |
| Female | -0.011 | -0.022 | -0.050 |
| | (0.012) | (0.036) | (0.031) |
| Education F.E. | Yes | Yes | Yes |
| Income F.E. | Yes | Yes | Yes |
| Observations | 705 | 705 | 705 |
| $R^2$ | 0.067 | 0.246 | 0.453 |

*Notes:* The dependent variables are indicators equal to one in case the respondent: (1) clicks on Genitori Antismog website; (2) expresses interest in subscribing to the association's newsletter; and (3) expresses interest in donating money to the association. All columns report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. *p<0.05; **p<0.01.

Table (SI-6) Responsibility, Taxes and Prices

| | (1) Responsibility | (2) Higher Taxes | (3) Higher Prices |
|---|---|---|---|
| Diesel X Euro 4 | 0.362** | 0.112 | 0.132 |
| | (0.073) | (0.073) | (0.072) |
| Diesel | -0.158** | 0.035 | -0.052 |
| | (0.053) | (0.054) | (0.053) |
| Euro 4 | -0.056 | 0.079 | -0.042 |
| | (0.053) | (0.053) | (0.052) |
| Age | 0.003 | -0.001 | -0.000 |
| | (0.002) | (0.002) | (0.002) |
| Female | -0.013 | -0.106** | 0.003 |
| | (0.036) | (0.037) | (0.036) |
| Education F.E. | Yes | Yes | Yes |
| Income F.E. | Yes | Yes | Yes |
| Observations | 705 | 705 | 705 |
| $R^2$ | 0.110 | 0.249 | 0.166 |

*Notes:* The dependent variable in column 1 is an indicator equal to one in case the respondent partially or fully agrees with the statement that preserving the environment is the "responsibility of governments and big firms more than of citizens". In column 2, the dependent variable is an indicator equal to one if the respondent is "fairly" or "very" willing to pay higher taxes in order to finance public initiatives aimed at preserving the environment. In column 3, the dependent variable is an indicator equal to one if the respondent is "fairly" or "very" willing to pay higher prices for environment-friendly goods and services. All columns report estimates from regression models that include controls for age and gender, as well as fixed effects for education levels and income brackets. *p<0.05; **p<0.01.