Italian Political Science, VOLUME 18 ISSUE 3

The Warming Ballot:
Demand and Supply in the Green Electoral Market

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Abstract

As global warming intensifies, ballot boxes become more heated, with various parties potentially targeting the green electoral market. In this article, we analyse how, in Italy, the political supply side aligns with the electorate's environmental demand. To this end, we introduce the Propensity for Green Voting (PGV) measure, representing an individual's likelihood of voting for a party with environmental protection at the core of its agenda. Using survey data, we detect the area of potential green voting in the Italian electoral market, exploring its overlaps with the potential electorate of the major political parties. Our analysis revolves around three hypotheses concerning the nature of green issue representation in Italian politics: monopolistic, fragmented, or absent. Our findings reveal no single-party monopoly over environmental issues in Italy. Instead, a spectrum of parties within the divided centre-left opposition shows varying degrees of success in appealing to pro-environmental voters, indicating a fragmented green demand as well as a potential unifying theme in the environment for the centre-left camp. Additionally, a segment of the green-oriented electorate remains politically unrepresented in the existing party system, potentially increasing non-voter ranks. A final investigation projects the impact on the current electoral space of a hypothetical new Green party.

1. Introduction

As global warming intensifies, environmental issues can be expected to increasingly influence electoral politics (Hoffmann et al., 2022). Ballot boxes become more 'heated', with various parties targeting the pro-environmental electorate. Themes related to environmental protection and sustainability represent a battleground for parties competing in the elections, even beyond traditional cleavages. Such competition can also be comparatively pronounced in the Italian electoral context, where green issues have historically struggled to gain salience in policy and media attention (Biancalana & Ladini, 2022; De Blasio & Sorice, 2013) and where we can note the absence of a Green party identified as such and competing as a ballot choice.

When asked about the primary concern for the government to address, Italians predominantly cite economic issues (Bentivegna et al., 2023). Conversely, Italian public opinion widely acknowledges the changing climate and its danger to humanity (Vlasceanu et al., 2024), its anthropogenic nature, and its visible effects being experienced today

Italian Political Science. ISSN 2420-8434.

Volume 18, Issue 3, 371–394.
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(Bertolotti & Catellani, 2023), while environmental concerns seem to be gaining more traction in public discourse. As the salience of green issues is expected to rise in the coming years, covering these themes becomes an opportunity or necessity for political parties. For these reasons and this conflicting landscape, Italy is a puzzling case study for investigating the relationship between the green electoral demand and its political representation.

Our study contributes to pro-environmental political behaviour, party competition, and voter orientations literature, especially but not limited to the Italian political landscape. Additionally, as the existing literature is predominately centred on green electoral behaviour focusing on Green parties nominally identified as such (Abou-Chadi & Kamphorst, 2023; Clegg & Galindo-Gutierrez, 2023; Gourley & Khamis, 2023; Hoffmann et al., 2022; Lichtin et al., 2023), we attempt to go beyond these boundaries, analysing the electoral space from the point of view of pro-environmental demand and supply in a context, i.e., the Italian one, without electorally significant Green parties. To this end, we provide a methodological contribution introducing the Propensity for Green Voting scale (PGV). This scale assesses individuals' likelihood of voting for parties prioritizing environmental protection and sustainability. While we acknowledge that PGV may not directly translate into actual voting behaviour, following the existing literature on the Propensities to Vote (Maggini & Vezzoni, 2022; van der Eijk et al., 2006), we propose it as a valuable tool for the analysis of the electoral space of party competition.

How does voters' demand for green policies reflect in the electoral space? We first hypothesize that a single party captures entirely the green electoral demand in the electorate, gaining a significantly higher propensity to vote in the pro-environmental electorate. In Italy, the party holding a monopoly over green issues could be identified as either the joint electoral list AVS (Alleanza Verdi e Sinistra – Green and Left Alliance) or the M5S (Movimento 5 Stelle – 5-Star Movement). Alternatively, instead of single-party representation, we hypothesize a fragmented representation of green demand. Given this outcome, we can expect that, in Italy, the heterogeneous centre-left opposition attracts the most significant portion of the green electorate. Finally, we also consider that, due to the current configuration of the electoral supply and the progressive lowering of electoral turnout, the green electorate may still seek representation, resulting in electoral abstention.

To test these hypotheses, we utilize the survey 'Italians and the State' (*Gli Italiani e lo Stato*), conducted in December 2023 by LaPolis – University of Urbino Carlo Bo. Through an empirical analysis using this original data, we aim to enhance the current understanding of what we term the *green electoral market* by investigating the match between demand and supply. In the following section (2), we focus on our hypotheses, framed by a discussion of the extant literature. We delineate the research design intended to test such hypotheses in section 3, and we discuss the results of the empirical analysis in section 4. Finally, in section 5, we present the conclusions of our study.

2. Theoretical background and hypotheses

An ongoing debate in political science and related disciplines regards the relationship between people's environmental concerns and political parties' representation. The latter could be receptive to growing environmental concerns if the threat of losing consensus

over environmental issues arises (Matsumoto & Laver, 2015). A premise to this is that environmentalism can be an independent dimension of political preferences (Kenny & Langsæther, 2022), not entirely subsumed under other established political cleavages. In addition, contrary to the perception of climate change as solely a valence issue, where political parties contend the green electorate through perceived competence, Farstad and Aasen (2023) argue that it also functions as a positional issue. This perspective challenges the notion of a competitive consensus, revealing potential disagreements between parties, especially during electoral campaigns, even amidst a general agreement on the supply side on climate goals (Farstad & Aasen, 2023) and policies (Ghinoi & Steiner, 2020). Moreover, environmental issues and climate change can be included among the science-related themes that fuel contemporary political polarisation (McCright & Dunlap, 2016).

In Italy, the political debate has historically overshadowed environmental issues (Biancalana & Ladini, 2022; De Blasio & Sorice, 2013). Despite the growing visibility of global warming's impact on daily life, which suggests a possible traction gained by environmentalism in the oncoming years, climate change was not a primary concern for voters in the 2022 general election. Economic issues took precedence, with only 6% of the electorate prioritizing climate change for the incoming government, compared to, for example, the 29% who focused on inflation (Bentivegna et al., 2023). However, when not being asked about specific issues, and directly questioned on a trade-off between environmental protection and economic growth, most Italians prioritize the former over the latter (Improta et al., 2022). Further, most Italians acknowledge the reality of climate change and recognize its present-day consequences (Vlasceanu et al., 2024; Bertolotti & Catellani, 2023). For this, we expect the area of Propensity for Green Voting to be larger than the potential electorate of other parties.

To explore the political representation of environmental concerns in voting behaviour, we consider three competitive hypotheses. While the latter are tailored to the Italian electoral context, they are articulated in a manner that allows for application to other multi-party parliamentary democracies.

Following the literature on parties' issue ownership and its stability over time (Seeberg, 2017), the question arises as to which party might be expected to play this role in the Italian electoral landscape. On examining the intersection of populism and greenhouse gas emissions (GHG), Jahn (2021) finds a significant correlation between escalating GHG levels and the ascent of populist parties in European governments. However, this pattern inverts for left-wing populist parties in Southern Europe, suggesting a regional alignment of left-wing populism with climate change mitigation efforts, in contrast to its counterparts in North-Western and Eastern Europe. While the analysis ends at 2018, applying this perspective to today's Italy suggests that the M5S can capture a substantial portion of the green electoral demand.

Since its emergence on Italy's political landscape, the M5S has kept environmental issues as one of its central tenets (Bordignon & Ceccarini, 2013; Mosca, 2014). Such a commitment is symbolically represented in its party logo, in which one of the five stars is dedicated to the environment. This focus was accompanied by a critical stance towards large industrial groups, leading to M5S's active participation in the 2011 referendums which opposed the privatization of water services and the revival of nuclear energy in

Italy. Reflecting these principles, in its early legislative period (2013-2014), the M5S, as an opposition party, proposed more environment-centric legislation than the rest of parliament (Bordignon & Ceccarini, 2015). This environmental alignment is corroborated by data from the Chapel Hill Expert Survey (Jolly et al., 2022) and the Manifesto Project (Lehmann et al., 2023), identifying M5S as a leading force in environmental sustainability. Notably, in the 2019 CHES dataset, the M5S scored highest among Italian parties for its commitment to environmental sustainability; similarly, in MARPOR, it achieved top scores for policies aimed at environmental protection, combating climate change, and other related green initiatives, significantly outperforming other parties (see Tables A1 and A2 in the Appendix).

Among the reasons for which the M5S might be able to occupy the political space on green issues, it must be noted that the Italian electoral context is lacking an electorally significant Green party termed as such. The party that directly referred to green issues in its name was the FdV party (Federazione dei Verdi – Greens' Federation), established as a national list in 1986, but which failed to achieve significant electoral success at the national level even when actively participating in national governments (e.g., Prodi I & II; D'Alema; Amato) (Biorcio, 2002). Additionally, other Italian parties have historically shown reluctance to address environmental issues. This was accompanied by a certain degree of consensus on climate change-related strategies between 2013 and 2018 (Ghinoi & Steiner, 2020). In a shift towards a more pronounced EU-oriented stance, FdV rebranded itself as Europa Verde (EV – Green Europe) in 2021. During the national elections in September 2023, EV joined forces with Sinistra Italiana (SI – Italian Left)[1], serving as a minority partner to form the Alleanza Verdi e Sinistra (AVS – Green and Left Alliance). The AVS list secured 3.6% of the vote[2], translating into fourteen out of six hundred parliamentary seats. Despite these modest results, it could be reasonable to assume that the green vote predominantly gravitates towards the party that most explicitly champions environmental issues. This assumption gains further traction in an analysis of the communication strategies of political leaders during the last national election campaign. As reported by ITANES (Bentivegna et al., 2023), the theme of 'climate change emergency' featured in 5.5% of Giuseppe Conte's Facebook posts, the second highest among main party leaders. Nicola Fratoianni, the leader of AVS, topped this list, with 10.4% of his posts dedicated to this issue.

Because of these reasons, our initial hypothesis focuses on a possible single-party representation in the green electoral market:

> H1: The green electoral demand is mostly captured by a single party, identified as holding the monopoly over green issues and policies.

[1] It is important to underline that Sinistra Italiana (SI), established in 2017, is the political successor to Sinistra Ecologia Libertà (SEL – Left Ecology Freedom). Along with the Federazione dei Verdi (FdV), SEL has been one of the few parties in Italy explicitly incorporating environmental issues into its name. Data from the Chapel Hill Expert Survey (CHES) and the Manifesto Project (MARPOR) confirm that SEL's commitment to green issues extends beyond its name, indicating an alignment with environmental priorities (see: Tables A1 and A2 in the Appendix).

[2] In the Lower Chamber (Camera dei Deputati), excluding the Valle d'Aosta region and the vote abroad (source: Ministry of Interior).

Moving beyond such considerations of the monopolistic nature of environmental issues in the electoral space, we note how the effect of issue salience on party preferences has been found to be very limited; on the contrary, issue salience plays an indirect role through ideology (van der Brug, 2004). Therefore, we consider the possibility of fragmented issue ownership, grouped by common ideological stances. Scholarly research frequently integrates environmentalism into existing political dichotomies – such as the traditional left vs. right, materialist vs. post-materialist, and the more recent green, alternative, libertarian (GAL) vs. traditional, authoritarian, nationalist (TAN). In particular, the emergence of environmentalism, together with other new values, was the basis for developing new left parties (Damiani & Viviani, 2015; Poguntke, 1987; Kitschelt, 1988, 1994). Without necessarily subsuming environmentalism under these cleavages (Kenny & Langsæther, 2022), it is plausible to expect that leftist, liberal, and cosmopolitan parties might predominantly address the demand for green policies or that voters recognize those parties to be better equipped to address such a demand.

This tendency could stem from an ideological alignment, where the collective interest (e.g., environmental protection) is prioritized over individual or national interests, which are more often associated with the right of the political spectrum, typically characterized by a nationalist orientation. In this vein, Kulin et al. (2021) note that nationalist ideology significantly predicts climate change scepticism. Nationalism, broadly defined as the antithesis of cosmopolitanism – i.e., the perception of humanity as a single community – contrasts with a global perspective, the most common viewpoint through which climate change related issues are addressed. In terms of policies or voters' perception, right-wing parties may lean towards prioritizing national interests over global issues such as climate change, with right-leaning individuals often exhibiting more scepticism and less consistent beliefs about climate change compared to their left-leaning counterparts (Bertolotti & Catellani, 2023; Jenkins-Smith et al., 2020; Levi, 2021). With the gradual decline of class-based voting, left-leaning parties appear to have shifted their focus towards post-materialist issues (Abou-Chadi & Kayser, 2017; Fisher et al., 2022; Taniguchi & Marshall, 2018), among which environmentalism is often included. Extensive research highlights how a liberal orientation or left-wing partisanship positively influences green attitudes and behaviours, both electorally and non-electorally (Bornstein & Thalmann, 2008; Conroy & Emerson, 2014; Franklin & Rüdig, 1992; Franzen & Vogl, 2013; Kenny & Langsæther, 2022; Soni & Mistur, 2022; Taniguchi & Marshall, 2018).

Based on the presented theoretical background, in a scenario characterised by the absence of single-party green representation we hypothesize the following:

> H2: The green electoral demand finds fragmented representation, and is captured by the parties positioning on the centre-left of the political spectrum.

Adapting this hypothesis to the Italian political landscape, we observe that the opposition to Meloni's government (2022-), despite its high degree of heterogeneity and division, could be categorized within a centre-left domain. This classification is based on various factors: historical roots, together with the current political positioning, also at the European level, for parties like AVS and PD; the personal political trajectory of party leaders, for Az (Azione – Action) and IV (Italia Viva – Italy Alive), and a distinct emphasis on traditional left-wing themes such as redistribution, particularly evident in the 2018 and

2022 electoral campaigns of the M5S, which, however, started from an alleged post-ideological 'neither left nor right' position (Bordignon & Ceccarini, 2013).

The Italian scenario also presents a relatively high degree of polarisation on environmental concerns[3], where such concerns are significantly greater among individuals reporting a left-wing political orientation, compared to their right-wing counterparts (Bertolotti & Catellani, 2023). Coherently, the study by Bentivegna et al. (2023) on the prioritization of climate change by Italian voters, based on their electoral preferences, reveals a significant underestimation of this issue among the electorate of FdI. Only 1% of this electorate identifies climate change as the top issue for the incoming government to address. This percentage slightly increases to 2% among League voters. Moving away from the radical right of the political spectrum, 4% of Forza Italia (FI) and Azione-Italia Viva (Az-IV) voters prioritize climate change, with this figure rising to 6% for M5S and 9% for PD voters, illustrating a discernible divide between the electorates of the current parliamentary majority and the opposition.

In addition to the first two hypotheses, another possibility is that environmental concerns find no significant representation in the political supply. While some argue that non-voters are less concerned about climate change (Fisher et al., 2022; Torgler & García-Valiñas, 2007), in a context lacking a strong Green party that resonates with the electorate, it is plausible that many potential 'green votes' are lost to abstention. This might also intertwine with a lack of confidence in democratic institutions, as the latter might be considered unresponsive or ineffective in addressing environmental concerns, leading to individual pro-environmental inaction (Kulin & Johansson Sevä, 2021). These considerations could be particularly relevant in Italy, where the September 2022 national elections witnessed the highest share of non-voters in the history of the Italian Republic (approximately 36%). This group encompasses a significant portion of the electorate who perceive themselves to be unrepresented by the current political supply (Bordignon & Salvarani, 2023). As, in current scholarship, the dimension of environmentalism is often dropped or subsumed into a different or broader dimension of party competition, representation gaps related to environmental issues could be lost along those lines (Kenny & Langsæther, 2022). Thus, there is a need to test the relationship between electoral abstention and environmentalism as a separate dimension. These observations lead to our third hypothesis:

> H3: The green electoral demand finds no political representation, raising the probability of abstention.

In the following section, we outline our research design, structured to evaluate the relationship between green demand and its representation within the Italian political landscape, particularly focusing on the hypotheses regarding the monopolistic, fragmented, or absent political representation of green issues.

[3] According to the analysis by Bertolotti & Catellani (2023), the degree of polarisation of environmentalism is lower than that of issues such as immigration and same-sex marriage, while it is higher than that of issues such as sending military aid to Ukraine, women's representation in politics, and the State's intervention in the economy.

3. Data and method

To address the research questions and test the related hypotheses presented in the previous section, this article uses original survey data from the 'Italians and the State' project, conducted by LaPolis – University of Urbino Carlo Bo (XXVI Annual edition). A mixed-mode (CATI-CAMI-CAWI) survey was carried out in December 2023 (field: 4-7 December) on a sample of the Italian voting age population (over 18 years old) of 1,298 cases. The cases were selected to reproduce the quotas for the main socio-demographic variables: gender, age group, geographical area, and city size.

The primary measure we introduce to study the potential area of voting driven by environmental motivations is the Propensity for Green Voting (PGV). This measure is based upon the theoretical assumption and analytical strategy of the Propensity to Vote (PTV) for political parties, which political scientists use to study voter preferences (Van der Eijk and Franklin, 1996; Van der Eijk et al., 2006). PTVs have been employed by Maggini and Vezzoni (2022) to study the configuration of political space in Italy and its evolution during the pandemic phase.

PTVs are regularly measured in the European Election Study (EES) by asking respondents how likely they are to 'ever vote' for some parties in the future.[4] Going beyond the 'ipsative' nature of the traditional question on voting intentions, which implies a 'forced choice', PTVs have proven to be a powerful tool for studying the structure of electoral competition (Maggini & Vezzoni, 2023). PGV uses the same logic, assessing the respondents' willingness to vote for a party prioritising environmental protection and sustainability issues. The question wording is the following:

> Suppose there is a party in the future that places sustainability and environmental protection at the core of its agenda. How probable is it that you would vote for it?[5]

It is important to stress that, in the questionnaire, the PGV question immediately followed the PTV battery, suggesting the same response mechanism and the same semantic space to respondents.[6] Like PTV, PGV is measured on an 11-point scale ranging from 0 (not at all likely) to 10 (very likely). Moreover, PGV was designed to evoke two different scenarios in the respondent's mind: a potential *new* party prioritising environmental issues, and the attempt by an *existing* party to emphasise environmental issues in its platform.

It is important to acknowledge that this approach risks introducing social desirability bias, potentially overestimating the green vote.[7] However, employing the same

[4] The standard formulation of the question is: 'We have a number of parties in [country], each of which would like to get your vote. How probable is it that you will ever vote for the following parties? Please answer on a scale where 0 means not at all probable and 10 means very probable' (Schmitt et al., 2022).

[5] In the questionnaire, the original wording in Italian and full sentence recites as follows: 'Immagini che in futuro ci sia un partito che metta al centro del proprio programma i temi della sostenibilità e della difesa dell'ambiente. Quanto è probabile che lei possa votarlo? Utilizzi sempre una scala che va da 0 a 10, dove 0 significa *per niente probabile* e 10 significa *molto probabile*.'

[6] This tool was first introduced and tested, with a slightly different question wording, in a survey conducted by the University of Urbino Carlo Bo's Department of Economics, Society, Politics, as part of the 'Sustainability and Food (In)security' project (2021).

[7] However, it should be stressed that this bias can be limited by choosing a higher cut point – another advantage of having an 11-point scale.

conceptual framework and methodological approach as PTVs, PGV enables the study of the utility of the green vote option: its weight and role in the electoral choice process. Following this strategy, the green electoral demand is placed in the *existing* space of party competition. It is possible to examine whether parties are able to intercept it, to what extent it does not match the existing political supply, suggesting a problem of political representation, and to what extent a potential redefinition of the environmental political supply may alter the configuration of the electoral market.

The analysis we developed is structured in three stages.

First, following the analytical strategy used by Maggini and Vezzoni (2023), a Venn diagram is used to illustrate the structure of the Italian political space at the end of 2023 and identify the 'place' of a potential green vote within it.[8] In this representation, the PTV for each party is plotted on a two-dimensional space. The circles represent the potential electorate of each party; their overlaps represent the areas of competition between the main political forces. The configuration of the political space was estimated by jointly considering the PTVs and the PGV, using 6 as cut point. The seven parties estimated to be above 3% by Politico's Poll of Polls in early December 2023 were included in the analysis.[9]

Second, in order to test the hypotheses put forward in this article, the central part of the analysis provides a series of nested multivariate multiple regression models, in which PGV serves as a predictor for PTVs. In the equations of each model, PTVs are used as dependent variables.[10] Since the conceptual framework of this article includes abstention, an eighth equation uses the Propensity to Abstain (PTA) as the dependent variable. The latter is based on a question asking about the respondent's likelihood of abstaining in the future. This question also comes after PTVs in the questionnaire and uses the same scale. Three different models will be presented:

Model 1. The relationship between PGV and PTVs-PTA is controlled for three socio-demographic variables.

- *Gender*. This is a dichotomous variable with 'men' as the reference category.
- *Age*. This is a categorical variable with five groups: 18-29 years (reference category), 30-44, 45-54, 55-64, 65 and over.
- *Education*. This is a categorical (ordinal) variable on three levels: low (reference category: up to lower secondary education); medium (up to upper secondary education); high (tertiary education).

Model 2. Together with Model 1, we also test our hypotheses through a less parsimonious model, through which we check whether the (possible) effect of PGV maintains its

[8] This diagram was generated using the algorithm developed by Ben Frederickson in Javascript (https://github.com/benfred/venn.js) applying Constrained Multidimensional Scaling (MDS). See Maggini and Vezzoni (2023) for a discussion on this technique, its methodological implications and possible limitations.

[9] https://www.politico.eu/europe-poll-of-polls/italy/ Given that Carlo Calenda's Az (Azione – Action) and Matteo Renzi's IV (Italia Viva – Italy Alive) formed a joint list in 2022, only the first party (estimated at 4%) was used in the analysis to achieve a configuration comparable to that of the last General Election.

[10] In this technique, the coefficients and standard errors are the same as those estimated by single OLS regression models (one for each party), but it enables the coefficient to be tested across equations. STATA's mvreg command was used to fit the models.

significance when other determinants of the vote choice and the choice (not) to vote are controlled for. Studies on the General election of 2022 showed that the results of voting as well as turnout were influenced by social, cultural, and political malaises connected to different factors: the lingering effects of the economic crisis, fears related to international migration, and widespread dissatisfaction regarding the functioning of state institutions and the role of political elites (Azzollini et al., 2023; Bellucci, 2023; Bordignon & Salvarani, 2023; Cavazza & Roccato, 2023). To test the adjusted effect of PGV, net of these 'malaises' that are reasonably expected to be confounding factors in our relationship of interest, three indicators were considered:

- *Egotropic economic satisfaction*. The question asked respondents to indicate their satisfaction with their household's economic circumstances on a scale of 1 to 10.
- *Xenophobic attitude*. The question asked respondents how much they agree with the sentence 'Immigrants pose a threat to public order and people's safety' using a 4-level scale (not at all = 1; a little = 2; quite a lot = 3; very much = 4).
- *Institutional trust*. This is an additive index constructed using four items measuring individual trust in four institutions: the EU, the state, parliament, political parties. These four items were originally measured on a 4-level scale.[11]

Model 3. Since pro-environmental attitudes have been seen as originating from post-materialist values, which can also confound the studied effect on the propensity (not) to vote, Model 3 includes an alternative indicator for post-materialist orientations as a final control. A survey question asked respondents about their agreement on the possible implementation of a law enabling 'same-sex adoption', measured on a 10-point scale ranging from 1 ('totally disagree') to 10 ('totally agree'). The predictive margins exhibited (Figures 2-4) are built from this model.

Model 4. This final model aims to test whether the studied relationship still stands, even controlling for individual self-placement on a left/right axis, which we add as a control variable to the structure of Model 2. If this is the case, we will have empirical evidence of PGV not being subsumed by the left vs right cleavage. The variable we use for individual self-placement on a left/right axis is divided into seven categories: left; centre-left; centre; centre-right; right; external; no answer.

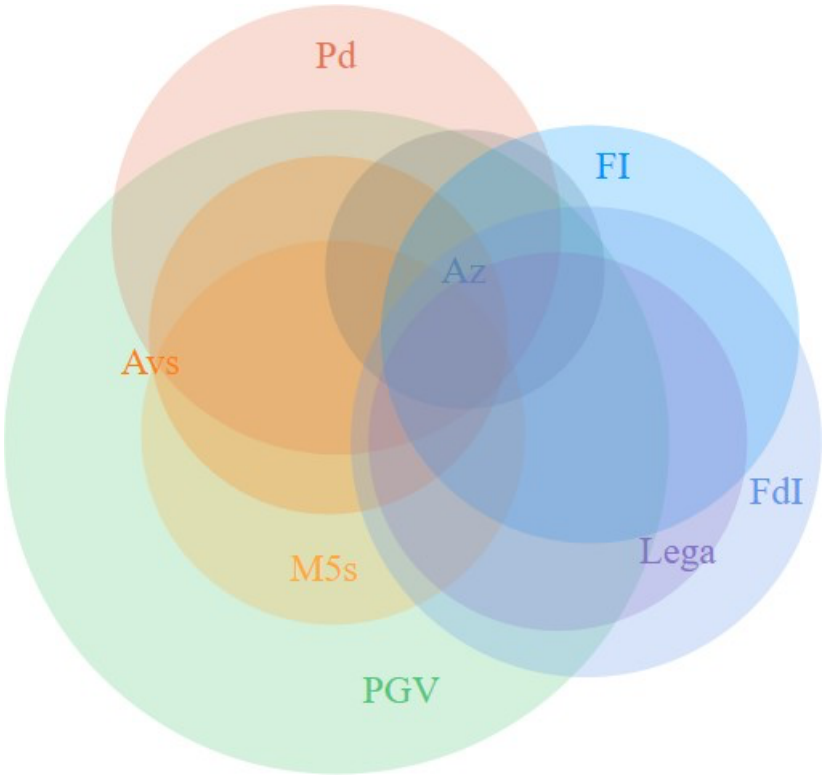
Logit models are presented in the Appendix (Table A3) as a robustness check to test the internal validity of the results, utilising a different distributional assumption, with PGV, PTVs, and PTA dichotomised (having 6 as a cut point of the 0-10 scale).

Earlier in this section, we suggested that the PGV may (also) be conceived by the respondent as the propensity to vote for a new Green party. In the third and final part of the analysis, we push this counterfactual logic further. What if a new environmental party enters the electoral market? A two-step strategy was designed to attempt to provide an answer to this question. First, PTVs and PTA were used to generate a segmentation of the Italian electoral market, which identifies the exclusive potential electorates of each party, the different areas of inter-party competition and the group(s) of potential abstainers.

[11] The resulting additive scale appear to be satisfactory with a Cronbach's alpha of 0.784.

The resulting typology was then intersected with PGV to estimate the (potential) outflows from each area towards the hypothetical new Green party.

Figure 1. Venn diagram – PTV (6-10) and PGV (6-10).



Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023).

4. Results and discussion

4.1. The environmental political space

The Venn Diagram in Figure 1 displays the configuration of the political space estimated using Ben Frederickson's algorithm with the PGV and the PTVs for the seven main Italian parties. Examining the graphical configuration, two preliminary considerations are straightforward. First, the size of the PGV area is much larger than the circles representing the parties' potential electorate. Using 6 as the cut point of the 0-10 PGV scale, 63% of the sample falls into this area. Second, even if PGV is introduced in the analysis, the overall configuration of the political space does not significantly differ from the pattern observed by Maggini and Vezzoni (2023) for the 2022 General election. The centre-right parties have largely overlapping potential electorates, revealing a high degree of competition within the area (but also relevant coalition potential). In contrast, the opposition parties overlap less, retaining significant portions of exclusive electorates. This is true in particular for the largest two among the potential allies, the M5S and the PD, while AVS bridges the two and Azione predictably bridges the centre-left and the centre-right.

The most important aspect to be analysed, however, concerns the location of the PGV area in this space. The large green circle intersects the potential electorate of all

parties, but it extends more to the left, towards the opposition forces. For them, this highlights the potential bridging effect of environmental issues regarding each electorate's exclusive areas. Further, the PGV area covers a large part of the propensity to vote for the PD, while, in this representation, it entirely includes the circles representing the potential electorate of both the M5S and AVS.

This does not necessarily mean that there is a complete overlap between these two components of the sample: the size of PGV and the relatively high number of parties included in the analysis generate a high number of constraints that the algorithm must respect, in its attempt to optimize the graphical solution. In our case, this leads to the partial violation of some of these constraints. Nevertheless, this result seems to suggest a strong correspondence between an environmentalist electoral orientation and the voting propensity for these parties, which needs to be further explored in the analyses that will be presented in the next section. At the same time, the graph indicates that at least part of the potential green demand is not matched by the political supply of the main Italian parties. This might suggest that part of it remains unrepresented, enlarging the area of potential abstention.

Table 1. PGV means analyzed by PTVs (Propensity to vote for parties, scores ≥ 6, ≥ 7, ≥ 8).

Propensity to vote	PGV (PTV ≥ 6)	PGV (PTV ≥ 7)	PGV (PTV ≥ 8)
Alleanza Verdi e Sinistra	7.55	7.70	8.02
Partito Democratico	7.22	7.52	7.69
Movimento 5 Stelle	7.34	7.41	7.31
Azione	7.33	7.42	7.47
Forza Italia	6.47	6.51	6.51
Lega	6.24	6.24	6.17
Fratelli d'Italia	6.05	6.16	5.78
Propensity to abstain (PTA ≥ 6, ≥ 7, ≥ 8)	6.38	6.46	6.42

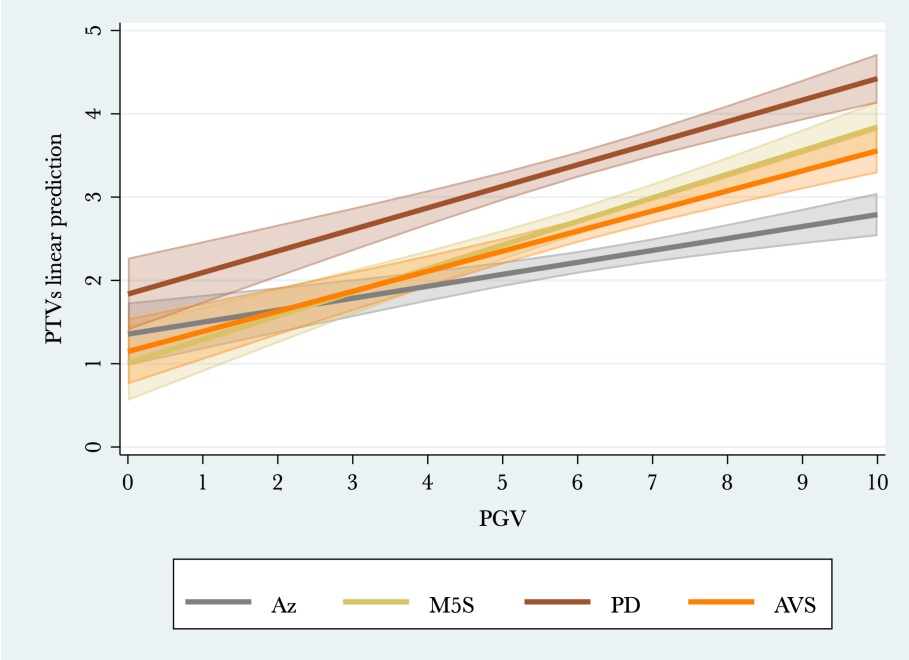
Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023). Mean PGV all=6.21.

4.2. Matching demand and supply

The bivariate relationship between PTVs and PGV (Table 1) confirms the insights suggested by the Venn diagram. The highest average value of PGV is observed in the potential electorate (defined using 6 as the cut point) of AVS (7.6), followed by M5S (7.3), Az (7.3), and PD (7.2). Significantly lower values are observed for FI (6.5), the League (6.2), and FdI (6.1). Raising the cut point to 7 or 8 does not substantially change the overall configuration. However, these relationships need to be investigated in the context of a multivariate model to test the hypotheses formulated in this article.

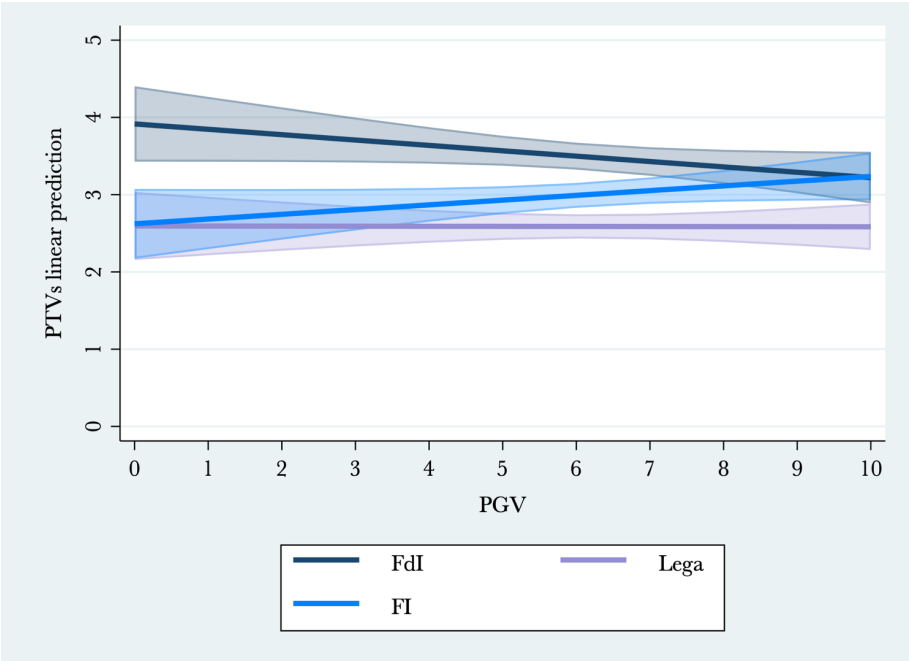
Table 2 reports the parameters of PGV and their significance for the different equations of the multivariate multiple regression models presented in section 3. Figures 2, 3, and 4 provide the estimated values of PTVs and PTA at different levels of PGV (using Model 3). Both the parameters and the graphs suggest that there is not a single-party capture of the green electoral demand and that all parties belonging to the (enlarged) centre-left area seem to attract some of it.

Figure 2. Linear PTVs predictions at different PGV levels with 95% CIs, Multivariate multiple regression. Model 3 (opposition parties).



Source: LaPolis - University of Urbino Carlo Bo *Italians and the State* (N=1,298; Dec. 2023).

Figure 3. Linear PTVs predictions at different PGV levels with 95% CIs, Multivariate multiple regression. Model 3 (right-wing coalition parties).

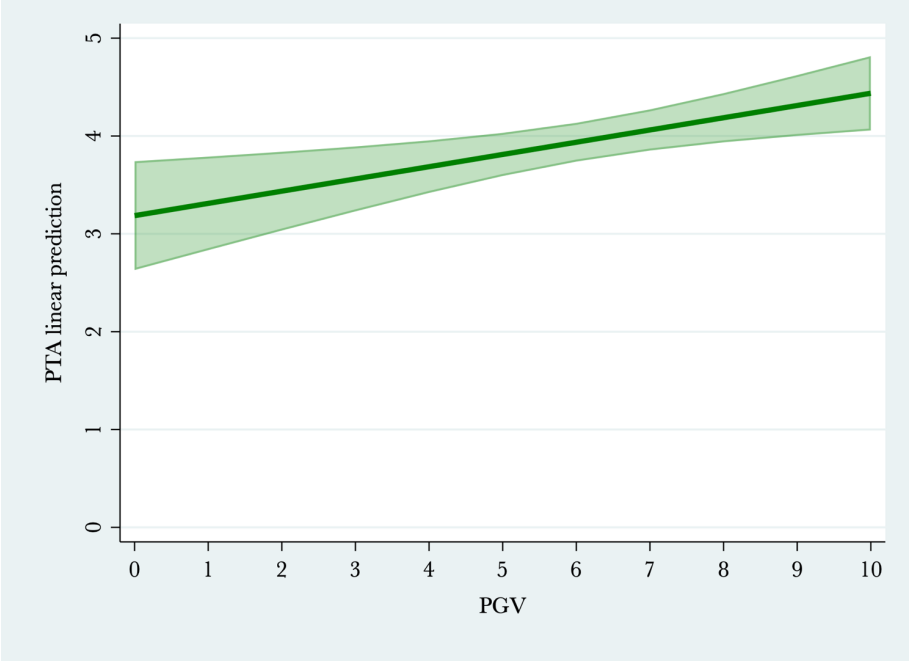


Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023).

Interestingly, the internal ranking seems to change from Model 1 to Models 2-3. When only the socio-demographic variables are controlled for, the PD and AVS have the highest values. Nevertheless, the M5S takes the 'lead' of the environmental vote once other predictors of the vote choice are taken into account. This suggests that the effect of pro-environment attitudes tends to be partially absorbed by other factors in the case of more traditionally centre-left parties, while it more distinctly impacts the vote choice for the M5S. Consequently, the relative weight of environmentalism, among the factors of the propensity to vote, is higher for the M5S, compared to the other centre-left parties.

In the less parsimonious models, the equation parameter for PTA also becomes positive and significant. This last finding portrays a picture of a green electoral market in which the green demand is partially unmet by the current supply, if the match between demand and supply is cleaned by the effects of confounding factors.

Figure 4. Linear PTA predictions at different PGV levels with 95% CIs, Multivariate multiple regression. Model 3 (abstention).



Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023).

Limiting the analysis to a comparison of the parameters' absolute values is insufficient to conclude that the effect on one dependent variable is significantly greater than on another. Multivariate multiple regression enables coefficients to be tested across equations. In particular, Stata's post-estimation command *test* was used to test that the difference between the values for the parameter of PGV in different equations was significantly different from zero. Table 3 provides the F statistic and its significance for such differences across pairwise comparisons between the parameters of PGV. Analysing the overall pattern, we cannot conclude that the effect of PGV on PTV for a specific party is significantly higher than the effect on PTV for any other party (or on PTA).

For these reasons, the results reject H1 and support H2, as the effect of the PGV on the PTV for each centre-left party is significantly higher than the effect on PTV for each

centre-right party. It is also worth noting that while the PTV parameter for Az is significantly higher than the corresponding parameter for the right-wing parties, it is always significantly lower than the corresponding parameter for the other centre-left parties. This signals the specific role of the centrist Az with respect to the potential centre-left coalition.

At the same time, our findings weakly support H3, as the parameter for PTA is positive and significant in Model 2, 3 and 4. In Table 3, the parameter of PGV for PTA is significantly higher than the corresponding value for right-wing parties (Lega and FdI) but significantly lower than the corresponding parameter for left-wing parties (AVS, PD and M5S), while the difference between the parameters is not significant for FI and Az. As environmental concerns predominantly find representation in centre-left parties, these findings about PTA push the interpretation forward, suggesting that: either environmentalism is insufficiently addressed by current political parties, or that the latter hold other undesirable characteristics unrelated to environmental issues that prevail in at least some voters' eyes.[12]

Given these insights, in the subsequent paragraph we will deepen the investigation of the political space and the electoral market, addressing the potential consequences of introducing a new Green party into the political landscape. While it is anticipated that such a party would attract votes from the current pool of non-voters, it is also expected to 'steal' green votes from existing parties. The extent and implications of this vote redistribution will be analysed and discussed.

Table 2. PGV coefficients of multivariate multiple regression models.

Propensity to vote[a]	**Model 1**[c]	**Model 2**[d]	**Model 3**[e]	**Model 4**[f]
Alleanza Verdi e Sinistra	0.354***	0.258***	0.241***	0.214***
Partito Democratico	0.397***	0.280***	0.258***	0.205***
Movimento 5 Stelle	0.343***	0.305***	0.283***	0.268***
Azione	0.210***	0.139***	0.143***	0.138***
Forza Italia	0.059	0.033	0.061	0.112***
Lega	-0.017	-0.030	-0.001	0.054
Fratelli d'Italia	-0.086*	-0.110**	-0.069	0.005
Propensity to abstain[b]	0.078	0.138**	0.125**	0.155***

Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023). Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. [a] Dependent variable: Propensity to vote for each party on a 0-10 scale; [b] Dependent variable: Propensity to abstain on a 0-10 scale. [c] Controls: gender, age, education. [d] Controls: gender, age, education, egotropic economic satisfaction, migrants seen as a security issue, institutional trust index. [e] Controls: gender, age, education, egotropic economic satisfaction, migrants seen as a security issue, institutional trust index, position on same-sex adoption (post-materialist orientation). [f] Controls: gender, age, education, egotropic economic satisfaction, migrants seen as a security issue, institutional trust index, self-placement on the left-right axis.

[12] For PTVs and PTA, similar results are presented in the Appendix, in Table 3A, after a series of logit models, which mostly confirm the previous analysis. The only notable difference is the effect of PGV on the propensity to vote for Forza Italia, once the relationship is cleaned by self-placement on the left/right axis.

Table 3. F Statistic and significance across pairwise comparisons between the parameters of PGV.

–	AVS	PD	M5S	Az	FI	Lega	FdI	PTA
AVS		0.29	1.33	8.69	15.94	30.40	41.47	5.12
PD	0.29		0.37	9.80	16.31	26.61	36.52	6.06
M5S	1.33	0.37		12.56	20.75	35.44	45.00	8.39
Az	8.69	9.80	12.56		4.68	14.20	25.76	0.13
FI	15.94	16.31	20.75	4.68		4.56	17.02	1.36
Lega	34.40	26.61	35.44	14.20	4.56		5.46	5.51
FdI	41.47	36.52	45.00	25.76	17.02	5.46		12.12
PTA	5.12	6.06	8.39	0.13	1.36	5.51	12.12	

Legend: sign and significance

(+) $p < 0.001$	(+) $p < 0.01$	(+) $p < 0.05$	Not significant	(-) $p < 0.05$	(-) $p < 0.01$	(-) $p < 0.001$

Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023).

4.3. Propensity to Vote for a new Green party

In this final part of the analysis, we further stretch the counterfactual meaning of the PGV, conceiving it as the propensity to vote for a newly established party prioritising environmental protection. What if a new competitor enters the green electoral market?

Before attempting to respond to this question, the inherently abstract nature of PGV must be further emphasised. Intentionally, no information about the ideological characterisation of this hypothetical party was provided in the question. This implies that each respondent should conceive of it independently of ideological alignment. However – also in light of the results presented earlier in this section – it is worth noting that the respondent may still attach a specific ideological connotation to his or her 'idea' of a Green party.

To perform this analysis, we first generated a segmentation of the electoral market by combining PTVs and PTA. Using three different cut points (no cut point; 5; 6), the resulting typology identifies:

1. The *exclusive components* of likely voters for each of the seven major parties. These are the respondents who give the party the highest score of the PTVs;
2. The uncertain voters between two or more parties, assigning the highest value of the PTVs to all of them. Different types of uncertain voters have been detected. Using a more restrictive definition of the possible areas based on the left-right political spectrum, some of them have been labelled uncertain between left-wing parties (PD, AVS, M5S – *Uncertain left*) or right-wing parties (FdI, Lega, FI – *Uncertain*

Right). In view of the specific position of Az in the configuration of the political space (Figure 1 and Table 2), we decided to distinguish uncertain voters between this party and other left-wing parties (*Uncertain centre-left*) or right-wing parties (*Uncertain centre-right*). Then, we identified the *Totally Uncertain voters*, who include among their (best) options both left-wing and right-wing parties.

3. Finally, the typology isolates the groups of *Likely Abstainers* and *Very Likely Abstainers*. For the former, the value of the PTA equals the maximum value of PTVs; for the latter, PTA is higher than all PTVs.

Different possible distributions of this typology are reported in Table A3 in the Appendix. The final solution, including PTA and using 6 as cut point, is quite reliable if taken as an estimate of the vote choice and related to the traditional direct question on the respondent's voting intentions, focusing on the percentage of correct predictions.[13]

A second typology was generated by combining PGV, PTVs and PTA. Considering the possible combinations, three areas of the green election market have been identified:

1. The area of *No Green Competition*, when the value of PGV is lower than the highest value of PTVs and PTA.
2. The area of *Green Competition*, when the value of PGV equals the highest value of PTVs and PTA.
3. The area of *Potential Green Vote*, when the value of PGV is higher than the highest value of PTVs and PTA.

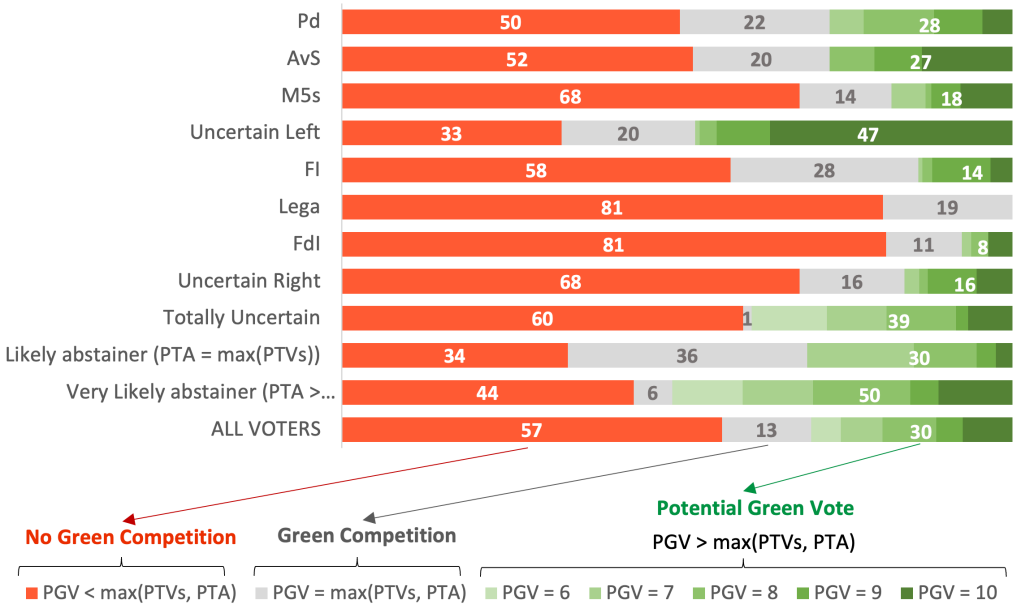
Figure 5 illustrates the cross tabulation between the two typologies. The size of the area of *Potential Green Vote* within each segment of the electoral market can be taken as an estimate of the potential outflows towards a new Green party. The initial observation is that it is a sizable component, perhaps too large to be considered truly reliable. Approximately 30% of the whole sample would be willing to leave their segment to vote for this new party. It arguably reflects the hypothetical nature of PGV and the acknowledged issue of social desirability.

Nevertheless, it is interesting to examine which segments of the electorate would be most affected by these hypothetical outflows. The shades of green in the graph, based on different levels of PGV, provide additional information about the strength of this green 'attraction' – also enabling the effects of using more demanding cut points to be evaluated.

Again, the potential green vote is higher in the exclusive electorates of left-wing parties. The strongest attraction involves the PD (28%) and AVS (27%) much more than the M5S (18%). But this is consistent with the results of *Model 1* analysed earlier in this section, before other potential factors of the vote choice entered the analysis. The attraction is even stronger in the area of uncertainty among left-wing parties (47%) and in the area of totally uncertain voters (39%). Finally, the attraction is very high among likely abstainers (30%) and particularly among very likely abstainers (50%). Even taking into account the effect of social desirability, these values confirm that a credible green electoral supply might bring a significant proportion of non-voters back into the electoral arena.

[13] Table A4 in the Appendix provides different indices of reliability based on the voting intentions for the seven major parties.

Figure 5. Appeal of a Green party in different components of the electorate defined by PTV voteestimates.



Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023). Note: Only data for groups with more than 40 available cases are shown in the graph.

5. Conclusions

Expecting a progressively higher salience of environmental issues, paralleled by the increasingly visible effects of climate change, we aimed to analyse what we termed the *green electoral market* in Italy. To this end, we introduced a methodological innovation: the Propensity for Green Voting (PGV). This tool, inspired by the theoretical background of PTVs, measures the individual likelihood of voting for a hypothetical party focusing on environmental protection and sustainability. In different sections of this article, we have acknowledged this measure's possible limitations, abstractness, and social desirability bias. The latter notwithstanding, the PGV emerged as a valuable tool for examining the electorate's environmental demand in party politics, allowing us to explore the electoral space through the lens of this dimension, independently of other political cleavages and across individual voting orientations for existing parties.

Using a Venn diagram, we graphically projected the PGV area on the space of the Italian electoral competition at the end of 2023. The Venn diagram exhibits the potential green electorate overlapping with all the main parties in the Italian electoral market. However, such overlap is stronger for the opposition parties than for the governing coalition, with the PGV area entirely including the potential M5S and AVS electorate.

Investigating the green electoral market, we tested three hypotheses: a monopolistic (H1), fragmented (H2), or absent (H3) political representation of green issues. Multivariate multiple regression models, with PGV as an independent variable across models, having PTVs for the seven main parties and PTA as dependent variables, led to the rejection of H1 and support of H2. While assuming environmentalism as an independent dimension in the political space, the analysis indicates that, in the context studied, the

green electoral demand finds fragmented representation. Further, in this fragmented context, the green demand of Italian voters mostly leans towards parties that, albeit heterogeneous, gravitate toward the centre-left of the political spectrum. AVS, PD, and M5S seem particularly able to capture green votes, with the latter gaining more traction once other predicting factors clean the studied relationship. This last consideration could be taken as a further clue to the premise that other cleavages cannot entirely subsume the dimension of environmentalism. As shown in the Venn diagram, the centre-left opposition, although divided and highly heterogeneous, could find a unifying theme in the environment, bridging electorates that appear much more exclusive than those forming the right-wing coalition.

The analyses weakly support H3. Once cleaned of confounding factors (such as economic satisfaction and institutional trust), the results suggest that a portion of the green electoral demand still needs to be addressed. In the Italian political landscape, then, environmental concerns only find partial representation. Further, we extended our analysis to the hypothetical impact of a new Green party capable of encompassing the entire spectrum of existing environmental demand. This projection permits us to study how such a political party could reshape electoral dynamics, potentially redefining the political space. The results attest that the left area of the current political configuration, and its uncertain components in particular, would be most affected by this change. This exploratory analysis also confirms the potential for re-engaging a portion of non-voters should a Green party emerge on the political scene.

Future research might apply this article's theoretical and methodological framework – and the novelty of the PGV in particular – to other contexts, overcoming the inherent limitations of a single-country study. Our hypotheses were specifically tailored to allow their replication beyond the Italian context. As they might be applied both to countries with and without distinct (nominal) green parties, we do not necessarily expect similar results from analyses focusing on other electoral contexts. Moreover, future studies adopting a different representation of the electoral space might address the acknowledged limitations of a bi-dimensional graphical representation of PTVs, PTA, and PGV. Hopefully, in this vein, our study could serve as a reference point for understanding how always-evolving environmental concerns shape party competition over 'warming' ballot boxes.

Acknowledgements

This research was supported by the University of Urbino Carlo Bo, through funds from the Department of Economics, Society and Politics and from LaPolis – Laboratory of Political and Social Studies, for the project 'Italians and the State' (*Gli Italiani e lo Stato*), approved and co-financed with DESP Resolution No. 170/2022. The authors thank the two anonymous reviewers, whose comments have significantly improved the article, as well as the guest editors of this Special Issue and the editors of Italian Political Science. The usual disclaimers apply.

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6. Appendix

Table A1. CHES scores on Italian parties for salience of environmental sustainability (2010, 2019) and prioritization of the environment versus economics (2010, 2014, 2019).

Party	2010 Salience[a]	2010 Env./eco. [b]	2014 Env./eco.	2019 Salience	2019 Env./eco.
Rifondazione Comunista	7.00	8.38	7.00	-	-
Sinistra Italiana	-	-	-	7.27	7.88
SEL (2014), Sinistra e Libertà (2010)	8.20	8.83	8.40	-	-
Partito Democratico	5.87	6.00	6.00	6.53	5.88
Radicali Italiani	-	-	-	4.31	5.33
Italia dei Valori	5.00	7.00	-	-	-
Movimento 5 Stelle	-	-	8.20	7.47	7.56
Südtiroler Volkspartei	6.80	6.20	6.00	4.50	5.43
Scelta Civica	-	-	4.00	-	-
Unione di Centro	3.00	4.00	3.50	-	-
Forza Italia	-	-	2.00	2.37	2.44
Il Popolo della Libertà	2.12	1.13	-	-	-
Fratelli d'Italia	-	-	2.80	2.06	2.40
Alleanza Nazionale	4.57	3.14	-	-	-
Lega (2019), Lega Nord (2014, 2010)	3.00	2.00	4.20	1.88	2.35

Source: Jolly et al., 2022. a Importance/salience of environmental sustainability. Scale: 0-10. 0=Not important at all; [...] 10=Extremely important. b Position towards environmental sustainability. Scale: 0-10, recoded: 0=Strongly supports economic growth even at the cost of environmental protection; [...] 10=Strongly supports environmental protection even at the cost of economic growth.

Table A2. Manifesto Project: Environmental protection, positive (2018).

	2013	2018
Rivoluzione Civile	7.00	–
Liberi e Uguali	–	11.19
Sinistra Ecologia Libertà	13.90	–
Partito Democratico	0	3.20
+ Europa	–	5.3
Movimento 5 Stelle	25.81	22.84
Südtiroler Volkspartei	4.92	0
Scelta Civica	4.17	–
Unione di Centro	1.67	–
Forza Italia	–	3.12
Fratelli d'Italia	7.59	6.59
Lega	6.19	10.61

Source: Lehmann et al., 2024. Index: General policies in favour of protecting the environment, fighting climate change, and other "green" policies. For instance: General preservation of natural resources; Preservation of countryside, forests, etc.; Protection of national parks; Animal rights. May include a great variance of policies that have the unified goal of environmental protection. The higher the score the more positive the party's position on environmental protection.

Table A3. 6.1. Table A3: PGV (dichotomous, cut-off=6) coefficients, logit regression models.

	Model 1[c]	Model 2[d]	Model 3[e]	Model 4[f]
Propensity to vote[a]				
Alleanza Verdi e Sinistra	0.326***	0.281***	0.267***	0.260***
Partito Democratico	0.253***	0.206***	0.199***	0.181***
Movimento 5 Stelle	0.321***	0.306***	0.293***	0.300***
Azione	0.231***	0.192***	0.176***	0.201***
Forza Italia	0.062*	0.040	0.056	0.122***
Lega	0.024	0.012	0.022	0.095*
Fratelli d'Italia	-0.025	-0.046	-0.031	0.041
Propensity to abstain[b]	0.040	0.065*	0.061*	0.072**

Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* (N=1,298; Dec. 2023). Note: * p < 0.05; ** p < 0.01; *** p < 0.001. [a] Dependent variable: Propensity to vote for each party in the next national elections (dichotomous, cut-off=6). [b] Dependent variable: Propensity to abstain in the next national elections on a 0-10 scale. [c] Controls: gender, age, education. [d] Controls: gender, age, education, egotropic economic satisfaction, migrants seen as a security issue, institutional trust index. [e] Controls: gender, age, education, egotropic economic satisfaction, migrants seen as a security issue, institutional trust index, position on same-sex adoption (post-materialist orientation). [f] Controls: gender, age, education, egotropic economic satisfaction, migrants seen as a security issue, institutional trust index, self-placement on the left-right axis.

Table A4. Segmentation of the electorate combining PTVs (7 main parties) and PTA (Probability to Abstain).

	Without PTA						**With PTA**					
	Without cut-point		Cut-point=5		Cut-point=6		Without cut-point		Cut-point=5		Cut-point=6	
PD	17.6	21.2	16.5	22.1	14.7	22.3	14.4	23.3	13.8	23.4	13.0	23.9
AVS	6.6	8.0	5.2	7.0	4.9	7.4	4.9	7.9	4.2	7.1	3.9	7.2
M5S	11.0	13.2	9.7	13.0	8.2	12.5	7.0	11.4	6.9	11.7	6.5	11.9
Uncertain Left	5.7	6.8	5.0	6.6	4.1	6.2	4.1	6.6	4.0	6.8	3.3	6.1
Az-IV	3.0	3.6	2.7	3.6	2.1	3.2	2.0	3.3	1.9	3.3	1.8	3.3
Uncertain Centre-Left	2.4	2.9	1.7	2.3	1.1	1.7	1.7	2.8	1.4	2.4	0.9	1.7
Uncertain Centre-Right	1.3	1.6	1.0	1.3	0.6	1.0	0.7	1.1	0.6	1.0	0.5	0.9
FI	6.0	7.2	5.8	7.7	5.4	8.1	4.8	7.8	4.7	8.0	4.3	7.9
Lega	4.6	5.5	4.3	5.8	3.9	5.9	3.6	5.8	3.4	5.9	3.2	5.9
FdI	16.8	20.3	15.7	20.9	14.8	22.4	13.1	21.2	12.7	21.5	12.4	22.7
Uncertain Right	8.0	9.6	7.3	9.8	6.2	9.4	5.4	8.7	5.3	9.0	4.7	8.6
% Correct predictions (7 main parties)												
Exact[a]	63.3	68.4	61.0	69.6	57.3	71.0	52.0	70.8	51.2	71.6	50.3	73.1
Exact + Unc Area[b]	77.4	84.5	74.5	85.1	69.1	85.5	63.1	86.1	62.0	86.4	60.4	86.9
Exact + Unc Area + Other Area[c]	84.7	91.5	81.7	92.1	76.0	92.8	68.9	92.4	67.8	92.7	65.9	93.2

Source: LaPolis - University of Urbino Carlo Bo, *Italians and the State* [a] Based on the voting intentions for the seven major parties, the percentage of correct predictions is calculated considering only the cases exactlyattributed to each party. [b] In this version, the cases attributed to the area of uncertainty between parties of the same political area are also considered correct. [c] In this version, the cases attributed to other parties of the same political area are also considered correct.