

The Swing Voter's Curse in Proportional Representation Systems (Evidence from Multiple Elections)

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Abstract

This paper proposes a theoretical framework to assess the presence of the swing voter's curse in proportional representation (PR) systems. Using individual survey data that contains detailed information on coalition expectations and preferences, this framework is then used to estimate its presence in five recent large elections. Swing voters are defined as those who believe that two or more coalitions are equally likely to be formed. A consistent asymmetric pattern emerges: voters who perceive a very close race between two coalitions are more likely to abstain when they cannot express a strict preference for any of the most likely coalitions. This result does not extend to voters who believe one coalition is much more likely to be formed than all other ones. Finally, this paper addresses the role of ambiguity aversion: results show that individuals who have a harder time assessing the probabilities of the different coalitions are more likely to abstain.

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1 Introduction

Do individuals who are genuinely concerned about policy outcomes rationally abstain when they are pivotal? In their seminal piece, [Feddersen and Pesendorfer \(1996\)](#) argue that, under certain conditions, uninformed independent pivotal voters should abstain even at the complete absence of voter costs. This should be the case when, by being pivotal, an uninformed voter realized her vote could go against that of informed voters and thus decide the outcome in the wrong direction. This prediction, known as the swing voter's curse, has been tested using laboratory experiments ([Battaglini et al. \(2008\)](#), (2010), [Morton and Tyran \(2015\)](#)). Attempts to do so using observational data have been less frequent ([Lassen \(2005\)](#) and [Sobbrio and Navarra \(2010\)](#)). One reason for such scarcity may be that, as [Battaglini et al. \(2008\)](#) suggest, observational data does not provide researchers with enough controls to evaluate empirically the nuances of the pivotal voter approach. This paper suggests a strategy to check for the presence of the swing voter's curse in large elections using survey data. This strategy is then used to evaluate the predictions of the swing voter's curse in proportional representation systems (PR henceforth).

The recent literature on voting behavior in PR systems has extensively shown that a non-negligible set of voters try to strategically affect policy outcomes with their vote ([Bargsted and Kedar \(2009\)](#), [Duch et al. \(2010\)](#), [Blais et al. \(2006\)](#), [Bowler et al. \(2010\)](#), [Hobolt and Karp \(2010\)](#), [Kedar \(2009\)](#), [Meffert and Gschwend \(2010\)](#), [Riambau \(2015a\)](#)). The framework presented here assumes that two factors determine vote choice: an expressive component (the "sincere" utility one derives from voting for a given party) and a policy component (utility derived from government policies). If an agent does not vote, then she still gets some level of utility from government policies implemented. Now consider an instrumental agent who only cares about policy outcomes, and suppose that this agent believes there are only two possible coalitions, both equally likely to be formed. If this agent is uncertain about the quality of such coalitions, she may find it optimal to abstain and defer to potentially better informed agents, even when voting costs are 0.

Using survey data from five different elections between 2006 and 2013, this paper seeks to ascertain whether voters who cannot express a strict preference relation between two coalitions that are neck and neck are more likely to abstain. Strictly speaking, these voters are not necessarily uninformed or independent as in the [Feddersen and Pesendorfer \(1996\)](#) model. Nor need they necessarily infer any particulars about the state of the world given their perception of a very close race. However, in essence, they may be suffering from the same curse, in the sense that (i) they believe they could be decisive; (ii) they cannot express a strict preference for any of the options; and (iii) they may choose to defer if they believe others have more reliable information.¹ To be precise, this paper checks whether (iii) is an observed consequence of (i) and (ii) in large elections.

Being pivotal for a particular coalition in PR systems is a much looser concept than being pivotal for a given party in a 'first past the post' election. The literature has identified various ways by which a voter's choice can be critical in determining the chances of a given coalition: (a) by securing the seat that guarantees majority in parliament (and thus a minimal winning coalition can be formed); (b) by deciding the *formateur*;² or (c) by giving enough bargaining power to a particular party to engage in negotiations or shape the coalition government ([Baron and Diermeier \(2001\)](#), [Cho \(2014\)](#)). As mentioned above, voters have consistently been shown to respond to these incentives in multiple elections.

¹In the exact words of [Feddersen and Pesendorfer \(1996\)](#) "uninformed voters who are almost indifferent between voting for either of the two candidates suffer the swing voter's curse and are strictly better off by abstaining" (p.410).

²Party (or politician) appointed by the head of state to lead the formation of a (coalition) government. In some countries, the tradition is to appoint the party with most votes, whereas in some others this is not necessarily the case: hence, the choice of *formateur* for the latter can be modeled as probabilistic.

In order to characterize the set of pivotal voters, I follow the approach used by the literature on large Poisson games. Characterization of rational equilibria with instrumental voters is only possible when the pair of most likely candidates is identified (Myerson (2002)). As Castanheira (2003) puts it, the instrumental voter must only consider the states of the world where pivotability is most likely. The surveys used in this paper are unique in the sense that they include very detailed information on respondents' pre-electoral expectations and preferences regarding coalition formation. This makes it possible to pin down the set of voters for whom the perceived race between two coalitions is so close that they allocate equal chances to both. Following Myerson (2002) and Castanheira (2003), I contend that these are the only voters that could have perceived their vote as being decisive in terms of coalition formation. Even if the chances of being decisive between the two frontrunner coalitions are tiny, these are orders of magnitude larger than the probability of being decisive between any of the two frontrunners and another coalition (and even larger with respect to any other pair of coalitions). Given that for any voter we observe all perceived coalition probabilities, we can infer that, *if voters are to believe they are pivotal*, then they must believe they are pivotal between those coalitions which they deem as 'most likely'. Indeed, experimental data from three experiments carried out in Montréal, Paris and Brussels in 2009/10 confirms that the closer voters perceive the race to be, the more decisive they believe their vote is.³

Once the set of voters who are most likely to feel pivotal are identified (which I henceforth denote coalition-pivotal), next step is to assess whether those who do not have a strict preference for any of the two frontrunner coalitions are more likely to abstain. To do so, I construct a measure of 'Difference in support' for the two most likely coalitions, which takes value 0 if agents do not have enough information to rank them (or if they genuinely like them equally). Since there is no reason to expect a linear relationship, a semiparametric model is used. All variables that traditionally explain turnout are included in the analysis (age, political interest, political knowledge, party preferences, party identification, etc.). Results from individual country regressions support the idea that, for the subset of coalition-pivotal voters, the less able they are to rank the two most likely coalitions, the more likely they are to abstain: this is the case in three of the five elections. When the data for all countries is pooled as in Sobbrío and Navarra (2010), results are strong and unambiguous. Selective abstention is in line with the empirical findings of Degan and Merlo (2011), although in their model votes are never pivotal. Furthermore, contrary to Coate et al. (2008), results in this paper suggest that models based on perceived pivotal probabilities may still have some explanatory power.

Indifference between alternative options has been shown to increase turnout (Adams et al. (2006), Hortala-Vallve and Esteve-Volart (2011)). Hence, it could be argued that results described above are merely a story of intensity of preferences. The contribution of this paper is to refine the analysis by assessing the impact of indifference on voters by level of perceived pivotability. To do so, I repeat the exercise, now using only the set of voters for whom one coalition seems to be leading the race comfortably. That is, the set of voters who could see themselves *furthest* away from being pivotal. Results show that, for these voters, indifference between the two most likely coalitions has no effect on turnout. Therefore, inability to rank the most likely coalitions only has effects on turnout for those voters who believe the race is as close as it can be.

Despite the evidence, there is a small caveat: even though this paper is able to identify the circumstances under which seemingly a swing voter's curse takes place, the underlying reasons for abstention cannot be fully pinned down. A theoretical model can be used to show that the coalition-swing voter

³These experiments were carried out by Simon Labbé St-Vincent, and were the basis for Labbé St-Vincent (2013). See section 2.2 below for more details on this.

defers to other voters in the hope that they are better informed, yet, however, the available data does not contain enough information for this to be checked. Therefore, the existence of the swing voter’s curse as fully characterized in [Feddersen and Pesendorfer \(1996\)](#) remains as a conjecture. In particular, even if all regressions control for political interest, the argument that a tiny voting cost and not a deferral to better informed voters is the reason behind abstention cannot be rejected.

One possible interpretation is that inability to strictly rank the quality of the most likely coalitions is a consequence of not being fully informed. The surveys reveal that, when measuring political knowledge, the average voter in most cases does not even get right half of the questions. However, given the available data, one cannot reject that agents who are fully and perfectly informed about all ‘most likely’ coalitions may still be indifferent among them. One possible interpretation for abstention that can plausibly be rejected is risk aversion/regret avoidance: if risk averse coalition-pivotal agents are not sure how parties will use their votes in the bargaining process, then they should abstain the more they favor one coalition over the other one if they are unsure that their vote will be decisive in the *correct* direction. Results show that the exact opposite happens, which hints that voters are highly confident that their vote will be correctly interpreted by the party elites in the bargaining process.

[Sobbrio and Navarra \(2010\)](#) also look for the existence of the swing voter’s curse in large legislative elections. Their analysis however overlooks perceived pivotal probabilities. Their goal is to assess whether politically unsophisticated independent voters are less likely to turn out. They find no effects. In order to validate their analysis, I do the same exercise with an extension: I check whether politically unsophisticated independent voters who do not have a strict preference for the two most likely coalitions are more likely to abstain. I find only weak evidence that that is the case. Therefore, results here support [Sobbrio and Navarra \(2010\)](#) findings that non-partisanship and lack of information *per se* have no relevant effect on participation. One needs to focus on uncertainty about policy outcomes and the actual preference relation between such policy outcomes instead of on partisanship and information levels in order to find behavior as predicted by the swing voter’s curse.

Finally, this paper checks whether ambiguity leads to abstention. To the best of my knowledge, this is the first paper to empirically address this. Given that surveys record all ‘Don’t know’ answers, I use this to assess whether agents who have a harder time assessing the chances of some coalitions are less likely to vote. The same battery of relevant controls is used. Results are unambiguous: ambiguity reduces turnout, substantially, and everywhere. This is consistent with the findings in [Tillman \(2015\)](#), who shows that pre-electoral coalitions have a positive effect on turnout. Both papers suggest that, at the margin, ability to pin down the relevant set of coalitions and its probability distribution increases turnout.

1.1 Related literature

In a very recent paper, [Herrera et al. \(2015\)](#) show theoretically that the marginal voter (the one who decides the last seat in a PR system) may prefer to abstain, as a mistaken vote is likely to have a larger policy impact than a vote for the superior side. Importantly, experimental data presented in the paper supports their predictions. This paper is also closely related to several strands of the literature that seek to understand turnout. First, rational choice theory. [Blais \(2000\)](#) provides an excellent review of the literature on turnout as it relates to rational choice models. He finds that closeness of elections influences turnout, which suggests that voters participate because they hope to influence the ultimate outcome of the election. Nonetheless, most recent experimental studies find that majority supporters vote with greater propensities than minority ones ([Duffy and Tavits \(2008\)](#), [Agranov et al. \(2015\)](#), [Kartal \(2015\)](#)) contrasting the predictions of the pivotal voter model. This paper builds on to this literature

by analyzing how assessment of likely policy outcomes affects turnout when elections are expected to be close.

Second, several papers have considered how polarization affects turnout (Degan (2006), Rogowski (2014)). This paper does not address polarization *per se*, but, interestingly, it shows that the more distinct the evaluation of the leading coalitions, the more likely voters are to turn out, which is suggestive that perceived polarization could increase turnout.

Finally, scholars have been long interested in establishing the relationship between electoral rules and turnout (see for instance Herrera et al. (2014), Cox (2015) or Tillman (2015) and the literature cited therein). Results presented here suggest that the electoral system is not neutral: since turnout and voting decisions are endogenous to the expected coalition bargaining process, the electoral system has an indirect effect on participation.

2 Data and variables of interest

This section describes the data and discusses the construction of the main variables of interest. I use publicly available pre-electoral survey data from five legislative elections: Austria (2006 and 2013), Germany (2009 and 2013) and Israel (2006). The reason why I restrict the analysis to these five surveys is because to my knowledge they are the only ones that contain explicit information on both coalition preferences and expectations, which is key to this study. Descriptive statistics for all variables I use are found in Table 1.

[Table 1 around here]

2.1 Turnout

The dependent variable of interest in this study is turnout probability. I normalize them all so that the range is between 0 (not likely at all/very unlikely) and 1 (very likely/for sure). One potential limitation of using survey data is that the average turnout probability in the sample may differ from the actual turnout rate in the elections. Table 2 summarizes such differences for all five elections. The main potential problem arising from having a non-representative sample is the possibility of obtaining biased regression coefficients. However, as Sobbrío and Navarra (2010) point out, vote validation studies also suggest that the presence of such a discrepancy has no significant effect on the empirical results. See Matsusaka and Palda (1999) for a discussion of this issue.

[Table 2 around here]

2.2 Coalition pivotal probabilities and preferences

Perceived coalition pivotal probabilities are not directly observed in any of the surveys. However, all surveys collect information on the perceived likelihood of each coalition, which, as I explain below, suffices for the purposes of this paper. Data on coalition expectations comes from a question that generally reads ‘What is the likelihood that a coalition between j, k and h is to be formed after the elections?’ Values range from 1 (very unlikely to be formed) to 4 (very likely to be formed) for both surveys in Austria and Germany 2009, from 0 (very unlikely) to 10 (very likely) in Germany 2013, and from 0 to 100 (no labels) for Israel 2006. The approach I use here follows that of the voting literature on large Poisson games for ‘first past the post’ and runoff elections, which relies on the relative magnitude of the pivotal probabilities of different events, and not the pivotal probabilities *per se* (Myerson (2000), Myerson (2002), Bouton

and Castanheira (2012), Castanheira (2003)). Myerson (2002) argues that “to characterize rational equilibria with instrumental voters, we need a formal procedure to identify which pairs of candidates are more likely to be in a close race where one vote could determine the winner (...). So if we can show that a close race between one pair of distinguishable candidates has a magnitude that is strictly greater than the magnitude of a close race between another pair of candidates, then the latter race is not serious” (p.228). Castanheira (2003) synthesizes the argument: if the voter wants her vote to be instrumental, “she must only consider the states of the world where pivotability is most likely” (p.826).⁴

This is the approach followed here. Hence, for the purposes of this paper, it suffices to be able to infer the relative magnitude of different pivotal events from observable information on coalition expectations. What is relevant is not the cardinality of the chances, but the fact that coalitions can be ranked in terms of their perceived likelihood. Given that for any voter we observe all perceived coalition probabilities, we can infer that, *if voters are to believe they are pivotal*, then they are most likely to believe they are pivotal between all coalitions which they deem as ‘most likely’.

Consider the following example: if a given individual i states that coalitions a and b are both ‘very likely’, and coalitions c and d are ‘fairly unlikely’, then, were she to be pivotal, she would almost surely be pivotal between coalitions a and b . Hence, I construct a measure of ‘Chances of the most likely coalition - Chances of the second most likely coalition’. I define as ‘most likely to be coalition-pivotal’ those agents for whom this measure takes value zero, since these are the agents for whom (paraphrasing Myerson (2002)) a close race between one pair of distinguishable coalitions has a magnitude that is strictly greater than the magnitude of a close race between another pair of coalitions.⁵ Figure 1, using data from three identical experiments carried out in Montréal, Paris and Brussels between 2009 and 2010, shows that the predictions of large Poisson games are confirmed empirically: the closer the race between two candidates, the more pivotal voters believe they are.⁶ Furthermore, it should be noted that, when it comes to accuracy of coalition expectations, it has been shown that voters in PR systems are quite knowledgeable about these probabilities (Riambau (2015b); see Armstrong and Duch (2010) for a detailed analysis of why).

The main independent variable of interest in this study is ability to rank ‘most likely’ coalitions in terms of policy preferences. The number of coalitions included in the surveys ranges from four to seven. Information on coalition support takes values from 0 (none) to 10 (maximum) for all elections (except for Israel, where the range is $[1, 10]$). I use these questions to construct the following variable: ‘Support for most likely coalition - Support for second most likely coalition’. For subjects for whom the two most likely coalitions are equally likely, I construct the variable so that it always takes a nonnegative value. If three or more coalitions are expected to tie on top, I use the two most preferred ones.

In order to control for intensity of preferences, all regressions include ‘Support for most preferred coalition’ $\in [0, 10]$ ($\in [1, 10]$ in Israel). By construction, all results in this study exclude respondents who can assess *at most* the chances of one coalition or assess own support for *at most* one coalition. Panel B in Table 7 is the only exception.

⁴Similarly, Bouton (2013), analyzes behavior of instrumental voters based on the likelihood ratio between different events, where likelihood ratio is defined as the ratio of the pivotal probabilities for each event. Suppose the pivotal probability between candidates a and b is orders of magnitude larger than the pivotal probability between candidates b and c . Then, if pivotal, the voter will assume that it almost surely is the case that she is pivotal between a and b , and bases her strategy on that fact, no matter how small pivotal probabilities actually are. See also Goertz and Maniquet (2011) and Núñez (2010).

⁵The set of voters for whom all coalitions are equally likely is negligible in all surveys.

⁶These experiments were designed and carried out by Simon Labbé St-Vincent, and were the basis for Labbé St-Vincent (2013). The figure and analysis presented here are original. The advantage of the data collected by Labbé St-Vincent is that before each round of voting, subjects were asked *both* about chances of each of the candidates, and their own chances of casting a decisive vote, which makes this data set unique in that respect. Labbé St-Vincent generously shared the data with me, so I can hereby test whether closeness of the race and own perceived pivotal probabilities are positively correlated.

2.3 Party preferences and expectations

In PR systems the probability of being pivotal for the last seat between any two parties j, k is orthogonal to the number of votes that these parties effectively get (conditional on both entering parliament). Figure 2 shows the case for Israel 2006. The x -axis represents number of votes won in the elections, whereas the y -axis represents number of votes that each party would have needed to win one extra seat in those elections. One can clearly see that there is no pattern. The story is different, though, for parties which do not make the cut: even if one only considers parties that come reasonably close to making the electoral threshold, these are on average much further away from getting ‘one more seat’ than the average party that indeed enters parliament.⁷ Therefore, for any instrumental agent i , her perceived pivotal probability for the last seat between two parties she expects to make the cut is on average larger than the perceived pivotal probability for the last seat between two parties, one of which is not surely expected to make the cut.

[Figure 2 around here]

Hence, supporters of smaller parties may be more prone to feel their vote could be ‘wasted’ and therefore not turn out. For this reason, even if the goal of this paper is not to assess how ‘perceived probabilities of entering parliament’ affect turnout, it is important to include them as a control. In particular, ‘chances of favorite party entering government’ are included. If two or more parties are the most preferred, chances of the most likely are taken into account. The values range from 1 (surely not/very unlikely) to 4 (surely/very likely).⁸ In order to control for intensity of party preferences, I construct ‘Sympathy of most preferred party’ $\in [0, 10]$ ($\in [1, 10]$ in Israel). Similarly, in order to control for evaluation of the political actors overall, I also include ‘Average sympathy of all parties’.

Obviously, relying on such self-reported political preferences implies implicitly assuming that individuals in all samples have the same mapping between political preferences and numbers on the eleven-point sympathy scores. However, results of this study do not rely on the cardinality of sympathy scores, but on whether individuals can strictly rank different options. This should substantially mitigate such a potential source of measurement errors. Furthermore, inclusion of individual mean sympathy and maximum sympathy scores should further undermine the problem.

2.4 Sociodemographic characteristics and political attitudes

Finally, I also include in the analysis other variables that are traditionally explanatory of turnout. These are age, gender, education level, political knowledge, political interest, party identification and strength of party identification. Depending on the data availability for each election, other controls used are number of people in the household, employment status, religion, place of birth, language spoken at home, marital status, size of town of residence or opinion on democracy. Appendix 1 gives full details on the controls used in each election.

3 Theoretical Framework

The literature on coalitional voting has grown substantially in the past few years. Many studies have shown that coalition considerations are a key part of the equation for a non-negligible subset of voters

⁷See Appendix ?? for more detailed data.

⁸1 to 5 for Germany 2013. The survey for Israel 2006 asks about ‘expected seats to be won’ for small parties only if the respondent states that (s)he will vote for such party. Hence, this variable cannot be used for that case. Similarly, the survey for Austria 2013 does not include any information on that respect.

in PR systems (Bargsted and Kedar (2009), Duch et al. (2010), Blais et al. (2006), Bowler et al. (2010), Hobolt and Karp (2010), Kedar (2009), Meffert and Gschwend (2010), Riambau (2015a)). These voters have indistinctly been denoted as *policy* or *coalition* voters. Once the policy motivation of their vote has been established, it seems natural to check whether coalition-oriented voters who cannot express a strict preference relation among the coalitions that they regard as most probable are less likely to turnout altogether.

3.1 Coalition pivotal probabilities

There are reasons to believe that coalition pivotal probabilities are non-existent or unclear at best. I have discussed above why in large elections instrumental voters need not focus on the size of pivotal probabilities but on the relative magnitudes of the pivotal probabilities of different events. An early prediction on coalition formation first proposed by von Neumann and Morgenstern (1953) (and later applied and re-visited by Gamson (1961), Riker (1962), Baron and Ferejohn (1989)) is that minimal winning coalitions should form - that is, coalitions should incorporate the minimum number of parties such that a majority of seats in the chamber is attained. In such a case, a vote would be pivotal if it were to secure the seat that guaranteed majority in parliament for a particular set of parties. In which case the voter would only be certain about the pivotality of her vote if the relevant set of parties had reached and made public a pre-electoral agreement to form a coalition. Generally, though, coalition agreements prior to the elections are the exception: more than half of the elections do not have any pre-electoral coalition, whereas only a quarter of coalition governments are a result of a pre-electoral coalition (Golder (2006)). Furthermore, evidence is not overwhelmingly supportive of minimal winning coalitions (Martin and Stevenson (2001), Volden and Carrubba (2004)).⁹

However, voters may be coalition pivotal even when their vote is not necessary to secure a minimal winning coalition. That is the case when a *formateur* is selected according to a known rule which explicitly depends on election results (as in the literature started by Baron and Ferejohn (1989)). Many have modeled such rule as stochastic, where the probability distribution is derived from vote shares (Baron and Diermeier (2001), Cho (2014)). Such procedure is empirically well supported (Diermeier and Merlo (2004)). Furthermore, vote shares matter in the choice of coalition partners and posterior distribution of cabinets (Austen-Smith and Banks (1988), Ansolabehere et al. (2005), Baron and Diermeier (2001)). All these theories predict that even if party elites have a large say in the post-election coalition bargaining process, voters can indeed shape coalition formation with their vote in the elections: in Baron and Diermeier (2001)'s words, to the eyes of the voter, "each distribution of seat shares corresponds to a probability distribution over government policies" (p.936). And therefore, each vote is *quasi*-pivotal in the sense that it modifies this probability distribution.¹⁰

To summarize, the literature has broadly distinguished two main events by which individuals can affect coalition formation, which I denote here *within-coalition* and *between-coalition* pivotal probabilities. Within-coalition pivotability refers to the situation in which an agent is sure that a particular coalition will be formed, but is unsure about the particular power relationship that will take place within that coalition. Hence, in order to increase the bargaining power of her preferred party within that coalition,

⁹Martin and Stevenson (2001) observe that "minimal-winning coalitions are more likely to form than the other two types of coalitions [minority or surplus majority]" (p.41), whereas Volden and Carrubba (2004) state that "while the logic of minimal winning coalitions has remained robust, the empirical record has not supported its point prediction" (p.522).

¹⁰In Israel 2006, the last seat was only 106 votes away from being switched, which translates into an ex-ante surely non-negligible pivotal probability. The discussion on pivotality for the last seat in section 2.3 becomes relevant here: for any degree of uncertainty (no matter how small) about preference distribution or turnout rates, then the probability of a vote being pivotal for the last seat is the same for all parties for any probability distribution, as long as all parties are expected to enter parliament.

the instrumental voter may cast a vote for that party.¹¹ Between-coalition pivotal events are those in which the voter aims to directly affect the likelihood of a particular *formateur* or coalition. This paper focuses only on turnout propensity of between-coalition pivotal voters.¹²

3.2 The voter's utility

Let us assume that agents put different weights on sincere and policy considerations (ω_{sin} and ω_{pol} respectively). Without loss of generality, we can assume away the utility voters derive from purely legislative action, and also assume that both benefits from voting (civic duty) and costs of voting are non-existent. The interesting case is that of policy-focused voters (those for whom $\omega_{pol} \rightarrow 1$).

$u_i(v_j)$ denotes the utility for i of voting for party j . \mathcal{J} is the set of parties $\mathcal{J} = \{j, k, h, \dots, \mathbb{J}\}$, whereas \mathcal{C} is the set of all possible coalitions, $\mathcal{C} = \{a, b, c, \dots, \mathbb{C}\}$. p_a^c refers to the probability that coalition a is formed, whereas \tilde{p}_{ab}^c refers to the perceived pivotal probability that a vote breaks the tie between coalitions a and b . Voters are defined as coalition-pivotal if (i) $\frac{\tilde{p}_{abd}^c}{\tilde{p}_{iab}^c} \rightarrow 0$, $\frac{\tilde{p}_{iad}^c}{\tilde{p}_{iab}^c} \rightarrow 0$ and $\frac{\tilde{p}_{icd}^c}{\tilde{p}_{iab}^c} \rightarrow 0$ for some $c, d \in \mathcal{C} \setminus a, b$ for at least a pair $\{ab\}$; and (ii) $p_{ia}^c = p_{ib}^c \geq p_{ic}^c$ for some a, b and $\forall c \in \mathcal{C}$ (intuitively, if a and b have equal chances and the probability to break a tie between a and b is orders of magnitude larger than between any other pair). Assume for now that pivotal voters know the state of the world, in the sense that they know exactly how their vote will determine coalition formation. Below it will become clear why I impose this assumption.

Let U_{ij} be some intrinsic utility i derives from voting for j - what the literature denotes as the utility that "sincere" voters derive. $E[U_i^c(a|j \in a)]$ denotes the expected utility derived from coalition a 's policies. Suppose there is a party k that is part of at least one coalition that will not include j . Denote such coalition with b , and with a the one including j . Then, i will vote for j instead of k if¹³

$$E[\Delta u_i(v_{jk})] \equiv u_i(v_j) - u_i(v_k) = \omega_{sin} \Delta U_{ijk} + \omega_{pol} \tilde{p}_{ab}^c E[\Delta U_{iab}^c] > \max\{0, E(u_i(abs))\} \quad (1)$$

where Δ denotes difference, for instance $\Delta U_{ijk} \equiv U_{ij} - U_{ik}$, and $E(u_i(abs))$ the expected utility of abstaining - i.e. the policy benefits given that i does not vote. To simplify, assume $a \succeq b$, so that $E[\Delta U_{iab}^c] \geq 0$ in all cases. Agent i will turn out to vote if and only if the expected utility of voting for a party is larger than the expected utility of abstaining. That is, if and only if

$$\max_{jk} E[\Delta u_i(v_{jk})] = \omega_{sin} \Delta U_{ijk} + \omega_{pol} \tilde{p}_{ab}^c E[\Delta U_{iab}^c] \geq E(u_i(abs)) \quad \forall j, k \in \mathcal{J} \text{ and } \forall a, b \in \mathcal{C} : j \in a, k \notin a, k \in b \quad (2)$$

If there is equality, she randomizes between abstention and voting. One critical implication of (2) is that a coalition-pivotal agent who only cares about policy outcomes may prefer to abstain even at the complete absence of voting costs. There are three situations in which this may happen. First, when expression (2) holds with equality: the expected utility of voting is equal to the expected utility of abstaining. For a policy-focused voter, this happens as $E[\Delta U_{iab}^c] \rightarrow 0$. The voter is absolutely indifferent. Hence, half the times she will abstain. Second, when $E[\Delta U_{iab}^c] \rightarrow 0$ and the voter believes that other

¹¹Game theoretical approaches have suggested that smaller parties should get a disproportionate share of the pie, but as most of the empirical literature has pointed out, Gamson's Law prevails i.e. the distribution of portfolios most resembles the distribution of seat shares within the coalition. See [Ansolabehere et al. \(2005\)](#) for further discussion.

¹²Strictly speaking, on those voters who, given their expectations, could be regarded as between-coalition pivotal. Unfortunately, the available data does not allow inference of beliefs with respect to within-coalition pivotality.

¹³For simplicity of exposition, I reduce the set of coalitions that do not jointly contain j and k to two. It is straightforward to generalize the argument by converting the scalar $\tilde{p}_{ab}^c E[\Delta U_{iab}^c]$ into a vector, i.e. $\vec{\tilde{p}}_{ab}^c \times \vec{E}[\Delta U_{iab}^c] = \sum_{\{ab\} \in \mathcal{C}} \tilde{p}_{ab}^c E[\Delta U_{iab}^c] : j \in a, k \notin a, k \in b$. Similarly, one needs not assume that there is at least a coalition b that does not include k .

agents are better informed than her: in that case, the optimal strategy will be to defer to other voters since the expected utility of abstention will be strictly larger.¹⁴ Third, when voters believe that their decisive vote could be used the *wrong* way. Then, for a certain degree of risk aversion, as $E[\Delta U_{iab}^c]$ grows large she will prefer to abstain. Consider, for example, a risk averse centrist coalition-pivotal voter who expects the Left (L) and Right (R) parties to win the exact same share of seats, and to depend upon Center party C to form a majority government. That is, this voter believes her vote could ensure a minimal winning coalition, either CR or CL . Suppose that this voter much prefers a CR coalition but fears that, once C becomes the key for government formation, its leaders could opt for a CL coalition. Then this voter may prefer to abstain to increase the chances of a R minority government (which is much preferred to a CL majority government) as long as she gets some sincere disutility $U_{iR} < 0$ from voting for R (disutility that may derive from “principles”, a family tradition, the candidates, etc.).¹⁵

The first is a pure indifference argument. The second is more in line with Feddersen and Pesendorfer (1996) spirit, in which abstention has an informational component. Both are observationally equivalent using the available data sets: it can indeed be tested whether coalition-pivotal voters for whom $E[\Delta U_{iab}^c] \rightarrow 0$ tend to abstain more. However the underlying motive (indifference or lack of precise information) cannot be fully disentangled. Note that as footnote 1 highlights, Feddersen and Pesendorfer (1996) also refer to ‘almost indifference’ as a factor leading to the presence of the the curse. Ironically, those who care the most about policy outcomes are the most likely to suffer from it: the larger ω_{pol} , the more likely the voter will be to abstain as $E[\Delta U_{iab}^c] \rightarrow 0$. It is important to emphasize that it is not necessary that i is indifferent between all coalitions for the curse to be present: it suffices that she is indifferent between the most likely coalitions.

Regarding the third motive identified above, if there is selective abstention among coalition-pivotal voters due to uncertainty about potential coalition agreements and risk aversion, then we should find a completely opposite pattern: abstention to increase as $E[\Delta U_{iab}^c]$ grows large, since potential disutility from the *wrong* coalition being formed could be higher the larger the difference in evaluation of the two leading coalitions. Next section checks which predictions are consistent with the data.

4 Empirical strategy and results

The goal in this section is to assess whether voters who believe two or more coalitions have maximum chances of being formed are less likely to turn out the less able they are to rank such coalitions. To this avail, this paper focuses on the subset of voters for whom there are at least two ‘most likely’ coalitions i.e. coalition-pivotal as defined above in section 3.2.

Table 3 shows the correlation of turnout and coalition preferences for swing voters. The sample only includes voters who believe two or more coalitions are the most likely. We can clearly see that a strict policy preference indeed matters: propensity to turn out is highly correlated to the difference in support between top likely coalitions. The remaining of this section analyzes whether this is robust to the inclusion of different controls and alternative specifications. To that avail, the following specification

¹⁴Note that I am equating here what Feddersen and Pesendorfer (1996) denote as *uninformed* voters to voters who do not have enough information to strictly rank the top two likely coalitions. I however prefer not to use the term *uninformed* since, as the data shows, many highly politically sophisticated agents are indifferent between the two most likely coalitions. Also, note that the model presented here differs from Feddersen and Pesendorfer (1996) in the sense that agents who cannot rank the two most likely coalitions are not necessarily independent. The essence of the *curse* is however maintained: pivotal agents with high stakes in the election may be better off by abstaining. Note also that the pivotal voter in the case presented here is aware that she could be deferring to partisans or informed voters. I extend the empirical analysis to strictly uninformed and independent voters in section 4.2.1.

¹⁵There are many other ways to think about how risk aversion may increase abstention. The key ingredients are disutility from voting for parties that one would not mind in government, and some fear that party leaders may use one’s vote in the *wrong* direction.

is used:

$$Pr.(vote_i) = \alpha + X_i\beta + POL_i\gamma + g(E[\Delta U_{iab}^c]) + \varepsilon_i \quad | \quad p_{ia}^c = p_{ib}^c \geq p_{ic}^c \text{ for some } a, b \text{ and } \forall c \in \mathcal{C} \quad (3)$$

where X_i is a vector of sociodemographic controls and POL_i a vector of political attitudes and preferences. If three or more coalitions are deemed to be most likely, $E[\Delta U_{iab}^c]$ represents the difference in support between the two most preferred.

$g(\cdot)$ is the main function of interest. The reason why a semiparametric functional form is chosen over a purely linear specification is that a priori there is no reason to suspect a linear impact of $E[\Delta U_{iab}^c]$ on turnout. The swing voter's curse suggests that there should be a kink or a discontinuity when there is no information (i.e., for the case in point here, in the neighbourhood of $E[\Delta U_{iab}^c] \rightarrow 0$). However it is silent with respect to what happens to turnout as $E[\Delta U_{iab}^c]$ grows large for potentially pivotal voters. Hence a more flexible model is used. In particular, I use Robinson (1988) double residual semiparametric regression estimator to estimate $g(\cdot)$.

The sociodemographic controls used are age, gender, education level, political knowledge, political interest,¹⁶ party identification and strength of party identification. Depending on the data availability for each election, other controls used are number of people in the household, employment status, religion, place of birth, language spoken at home, marital status, size of town of residence or opinion on democracy. Appendix 1 gives full details on the controls used in each case.

The controls on political preferences include evaluation of the two most preferred parties, chances of entering parliament of the most preferred party,¹⁷ mean evaluation of all parties and evaluation of the most preferred coalition. Both groups of controls aim at capturing all possible incentives that voters may have to turn out over and above pivotal coalition considerations.

Before showing the shape of $g(\cdot)$ for the different countries, Table 4 shows the effects of socioeconomic characteristics and political preferences on turnout. Intensity of party preferences increases turnout, whereas increased mean evaluation of all parties seems to have no effect. Age, political knowledge, political interest and strength of party identification are other key factors in determining turnout. These effects are consistent with most -if not all- studies on turnout. Germany 2009 is shown as a case in point. Effects are very similar for all other elections. Table 8 in section 4.1 below shows the effect of these variables on turnout using a pooled sample of all elections.

[Table 4 around here]

The effect of preference intensity for coalition-pivotal voters is shown in Figure 3. In three of the five elections, there is a clear effect of ability to rank coalitions on turnout: the more clearly agents can distinguish their support for the most likely coalitions, the larger the chances of voting. There seems to be no effect for both Austria 2006 and Israel 2006. This is hardly surprising given the fact that in both cases self-reported turnout in the survey averages above 90%, which leaves little room for identification. Figure 1 in the Online Appendix shows the same results for a narrower bandwidth. The pattern is robust to such a different specification.

[Figure 3 around here]

Figure 4 expands the sample to those who gave highest chances to one and only one coalition, but perceived the second most likely as very close in terms of probabilities of being formed. The exact

¹⁶There is no data for Israel 2006 on political interest. This can be proxied with past vote in the previous 2001 prime ministerial and 2003 legislative elections.

¹⁷Chances of entering parliament are not available for Israel 2006 or Austria 2013.

specification of ‘very close’ depends on the election, as each survey had a different scale and number of coalitions mentioned. The precise numbers for each case are given in the Figure. As a rule of thumb, each regression expands the initial sample to include those 10%-20% of respondents for whom the coalition race was not neck and neck but very close to being so. Hence, Figure 4 comprises the voters who were *least confident* in terms of making a prediction regarding coalition formation. Results do not change in any case, but one: in Germany 2013, the effect for the swing voter disappears: at the neighborhood of ‘no difference in support’ for the two most likely coalitions the kink disappears: $g(\cdot)$ is flat in that domain. This suggests that, at least for that election, perceiving a particular coalition to be strictly more likely than all others disincentivized vote, as long as the difference in support for the two most likely coalitions was relatively small.

[Figure 4 around here]

Finally, it could be argued that what really matters is a strict policy preference relation *per se*, regardless of coalition pivotal probabilities. To check this, for each country I use the subsample of voters for whom one coalition was clearly more likely than all others. That is, if coalition probabilities in the survey are from 1 (very unlikely) to 4 (very likely), I restrict analysis to voters for whom the difference between the top two most likely is at least 2 points in that scale (or if the scale is from 0 (very unlikely) to 100 (very likely), at least 40).¹⁸ If this is a story of only preference intensity, we should find that $g(\cdot)$ has the same shape as in Figure 3. If, on the other hand, the effect is conditional on perceived pivotal probabilities, then we should find that $g(\cdot)$ has a flat shape. Figure 5 shows the results.

[Figure 5 around here]

One can clearly see that overall there is little effect of strict policy preferences on turnout for voters who perceive themselves as being far away from pivotal positions. The slope is positive in Germany 2009, which suggests that indeed there is an effect - however, this is substantially smaller than the effect for pivotal voters as one can see in Figure 3c, where the slope is twice as steep. Also, interestingly, Israel 2006 seems to be an outlier, since strict policy preferences do seem to have an effect only for voters who are *not* pivotal - see Figure 5e. This result has to be taken with care, though, as the sample size for this particular regression specification is of only 73 observations. In sum, results suggest that a strict preference relation seems to matter only for coalition pivotal voters.

4.1 Pooled sample

This section uses the approach in [Sobbrio and Navarra \(2010\)](#), which is to pool all samples. Doing so has the obvious shortcoming that different elections have different contexts and that citizens in different countries use different yardsticks regarding party and coalition evaluations. With this in mind, there are ways to (at least, partially) address these problems. One is to normalize all common control variables so that the values are directly comparable. Hence, political knowledge, education or political interest are all re-scaled to take values between 0 and 1. Similarly strength of party identification $\in [0, 5]$, chances of entering parliament $\in [0, 100]$, sympathy party/coalition $\in [0, 10]$ are also re-scaled.

Figures 3f and 4f above (and 2f in the Online Appendix) show the results. All strongly support the thesis that lacking a strict preference relation regarding coalitions decreases turnout for between-coalition pivotal voters. Furthermore, Figure 5f seems to confirm that such effect takes place only among pivotal voters. All these results taken together indicate that risk aversion seems to play no role in selective

¹⁸Using this metric there are only 39 observations for Austria 2006. Hence, for that case, the sample of voters includes all voters for whom distance was at least one point in a scale of 1 to 4, which increases the sample to 452.

abstention. The fact that voters who perceive a very close race are more likely to vote the more they support one coalition over the other one is suggestive that voters are confident that parties will interpret use their vote *correctly* during the bargaining process.

4.2 Alternative specifications

This paper has so far argued that, conditional on perceiving two or more coalitions as the two most likely, having no strict preference relation between them decreases turnout. One possible interpretation is that agents do not have enough information to distinguish between both coalitions, and therefore defer to other voters. Another interpretation is that such agents may indeed be perfectly informed about them, but simply be genuinely indifferent between both. The latter would be consistent with a story of intensity of policy preferences: for the pivotal voter, the more she prefers one coalition with respect to the other one, the more likely she is to show up to the polls.

In order to check whether the interpretation of lack of information has enough support, I carry out two robustness checks. First, I restrict the focus to those agents who are non-partisan and relatively uninformed. Second, I take advantage of the fact that most surveys include ‘Don’t Know’ as a potential answer, and incorporate ‘Don’t know position of/support for a particular coalition’ and ‘Don’t know chances of a particular coalition’ in the analysis.

4.2.1 Non-partisan uninformed voters

This section is still based on those voters for whom two coalitions are the most likely, yet restricts the analysis to those voters who do not express any party identification and are politically uninformed relative to the majority of the population. Formally, the following specification is used:

$$Pr.(vote_i) = \alpha + X_i\beta + POL_i\gamma + \delta D_i + \varepsilon_i \quad | \quad p_{ia}^c = p_{ib}^c \geq p_{ic}^c \text{ for some } a, b \text{ and } \forall c \in \mathcal{C} \quad (4)$$

where D_i is a dummy that takes value one if the respondent (i) expresses no party ID; (ii) is able to answer correctly fewer questions regarding political knowledge than the median voter; (iii) believes at least two coalitions have most chances of being formed after the elections; and (iv) has no strict preference between such two coalitions.¹⁹ X_i and POL_i capture the same variables as in expression (3). In particular, political knowledge, strength of party ID and coalition preferences are included in the regression (when they are not, results are always significant, strong and in the expected direction). Only the sample of voters for whom two coalitions are the ‘most likely’ is used. Panel A in Table 6 shows the results.

[Table 6 around here]

Results are ambivalent: certainly, non-partisan uninformed voters seem to be less predisposed to turn out and vote in all elections but one. However, this result is only significant for Germany 2009 (and also for the unweighted pooled sample). Furthermore, uninformed independent voters are *more* prone to casting a vote in Austria 2006. To further check this, I slightly relax the construction of D_i , by first modifying (iv), so that voters who express a strict preference for one coalition of *at most* one point in the scale 0 to 10 are included in the sample, and second, by further changing (ii), so that the lower 66 percentiles in terms of political knowledge are included (instead of only the lower 50 percentiles as above). Panels B and C in Table 6 show the results. Half the coefficients are significant in Panel B,

¹⁹Or, if more than two are perceived to have maximum chances, i is indifferent between the top two most preferred.

and the unexpected result of Austria 2006 disappears. Nonetheless, Panel C reveals that expanding the definition to include slightly more politically sophisticated agents completely dilutes the effect. Overall, evidence does not strongly support that non-partisan uninformed coalition pivotal voters turn out less.

4.2.2 The effect of *explicit* ‘Don’t know’s on turnout

Four of the five surveys used in this paper provide detailed data regarding ‘Don’t know’ and ‘Refused to answer’ for most of the questions. Here I take advantage of this fact to check whether explicit admission of ignorance with respect to coalition preferences or coalition socioeconomic positions has any negative effect on turnout. For each voter, I construct a variable that measures for how many of the most likely coalitions the respondent answers ‘Don’t know’ when asked about support for that coalition (in the case of Germany 2013, when asked about the socioeconomic position of that coalition). I do not count ‘Refused to answer’ as ‘Don’t know’ for this analysis.

Certainly, answering ‘Don’t know’ may capture states beyond that of actual ignorance. Respondents may answer so out of utter boredom, tiredness, distaste for the coalition they are being asked about or actual inability to answer the question. Since by construction all samples used in this paper include voters who can assess the chances of at least two coalitions, the effect of boredom or tiredness is partially corrected (disinterested respondents are most likely to answer ‘Don’t know’ for *all* coalitions, regardless). The following specification is used:

$$Pr.(vote_i) = \alpha + X_i\beta + POL_i\gamma + \delta DK_i + \varepsilon_i \quad (5)$$

where DK_i is a variable that captures the number of most likely coalitions for which the respondent does not know her own support. Panel A in Table 7 shows the results for each individual election, whereas columns (1), (2), (5) and (6) in Table 8 show the results for the pooled sample.

[Table 7 around here]

Election-specific regressions show ambivalent effects: whereas in Germany 2009 the effect is significant and goes in expected direction, in Austria 2013, ignorance about own support increases turnout. I carry out a robustness check, using $\%DK_i$ instead, where $\%DK_i$ represents the proportion of most likely coalitions that the respondent cannot evaluate. Results do not change using this alternative specification for DK_i .

However, when pooling all surveys together, lack of knowledge of most likely coalitions seems to overall have a negative effect on turnout. This can be seen in columns (1) and (5) in Table 8. Turnout probability decreases by around 5% for every added coalition for which the respondent cannot assess own support. I use again $\%DK_i$ as a robustness check and results become stronger (columns (2) and (6)). Table 1 in the Online Appendix shows the results for the pooled sample excluding weights. The patterns are all the same. Overall, these results suggest that indeed lack of knowledge about the quality of most likely coalitions decreases turnout. However, the case of Austria 2013 should make us be cautious about fully generalizing the result.

[Table 8 around here]

4.3 On ambiguity aversion

This paper has so far analyzed the effects on turnout of (i) lacking strict policy preferences and (ii) uncertainty regarding the quality of most likely coalitions. What if turnout is also affected by an inability

to assess the joint probability distribution of the different coalitions? This section addresses this question. I construct a measure of ‘number of coalitions for which the respondent cannot assess its chances’. In this case, I do not take out of the sample individuals who cannot assess the chances for any coalition. However, in order to get rid of the potential noise caused by individuals who genuinely do not care/have no idea about coalitions, I keep in the sample only individuals who can assess their own support for *at least* one coalition.

The regression specification is exactly the same as in expression (5) above. The only change is the construction of the variable DK_i , which now measures the number of coalitions for which the respondent cannot state its likelihood of being formed (again, I restrict the analysis to those who answer ‘Don’t know’ and exclude those who ‘Refuse to answer’). Panel B in Table 7 shows the results for each individual election, whereas columns (3), (4), (7) and (8) in Table 8 show them for the pooled sample.

Results are unambiguous: ambiguity reduces turnout, substantially, and everywhere. In three of the four elections, turnout probabilities decrease on average 5% for every coalition the chances of which one cannot estimate. As a robustness check, I create a dummy that takes value 1 if the individual cannot assess the chances of at least one coalition. Results do not change, even though it has to be pointed out that the coefficient $\hat{\delta}$ for Austria 2013 becomes marginally non-significant.

This result is not driven by respondents who systematically respond ‘Don’t know’ when inquired about chances or support. The pooled sample excludes them, and the coefficient is significant in all cases, in the expected direction: ambiguity leads to abstention. Every new coalition one cannot assess increases the estimated probability of abstaining by around 3%. The number of coalitions may be misleading in this case: the Austria 2013 survey mentions four coalitions, whereas for instance in Israel 2006 seven are mentioned. To correct for the potential measurement error caused by this, I construct a new measure $\%DK_i$, which captures the proportion of coalitions for which agents cannot estimate probabilities. Columns (4) and (8) in Table 8 show that results are robust to this alternative specification: a 10% increase in the proportion of coalitions its chances one cannot assess results to an estimated increase of around 2% in the probability of abstaining. Columns (3), (4), (7) and (8) in Table 1 of the Online Appendix show the results for the pooled sample excluding weights. None changes.

5 Discussion

This paper has shown that there are two consistent patterns across elections in PR systems: first, coalition-pivotal voters turn out less when they cannot express a clear preference for one of the leading coalitions. Second, voters who are less able to compute coalition probabilities are less likely to turn out. On the other hand, evidence that uninformed non-partisan coalition-pivotal voters tend to vote less when they cannot express a clear preference relation is weak at best. All them taken together suggest the presence of a coalition-swing voter’s curse, which is not unique to uninformed or politically unsophisticated voters. However, existing data does not let us ascertain the true underlying motive behind abstention: we cannot reject that abstainers genuinely delegate to other voters, nor that they simply respond to unobserved voting costs.

This paper speaks to recent developments in the theoretical literature. In [Oliveros \(2013\)](#), the swing voter’s curse happens for two reasons. In one case, an ambivalent voter decides to remain uninformed and, in the other case, a voter with mild ideological bias receives a signal against her bias.²⁰ Furthermore,

²⁰Strictly speaking, in his model voters are denoted ‘centrist’ and not ‘ambivalent’. I use the latter term for clarity of

Oliveros (2013) predicts that voters who have strong preferences are less likely to abstain. These predictions are all consistent with the evidence presented here (at least, when it comes to coalition preferences).

This paper also contributes to the debate on whether political sophistication increases turnout. Sobrio and Navarra (2010) look at the effects of information and partisanship on turnout. They find that both factors independently increase turnout. However, they also find that there is no joint effect: non-partisan uninformed voters are not significantly less likely to vote. By focusing on uninformed coalition-indifferent non-partisans who are more likely to be pivotal and finding only very weak evidence in favor of lower turnout, this paper supports their findings.

Furthermore, this paper provides a framework that allows us to distinguish between expressive and instrumental abstention. Previous studies have looked at the effects of indifference towards candidates on turnout propensity in ‘first past the post’ systems (Hortala-Vallve and Esteve-Volart (2011), Adams et al. (2006)). Here I address the same question but focus the analysis on those voters who believe they are most likely to have a say in policy outcomes. Results show that indifference has a negative effect on turnout only for those voters who believe two coalitions are neck and neck. Hence, this paper suggests that, at least when we consider policy outcomes, abstention due to indifference is an instrumental rather than an expressive choice.

An interesting avenue of research would be to identify exactly the process by which individual perceptions of coalition pivotal probabilities are constructed. Blais (2000), Labbé St-Vincent (2013) and Duffy and Tavits (2008) have shown that voters tend to overestimate their chances of being pivotal. Their work focuses on situations in which pivotal events are ‘objective’ or ‘mechanical’ (i.e. breaking a tie between two parties for the only/last seat, securing a minimal winning coalition or a *formateur*, etc). Evidence presented here suggests that voters believe their vote can be critical beyond the pure mechanical effects, and for instance have an impact on the coalition bargaining process. Increased participation of pivotal voters with strong and unambiguous preferences for one of the frontrunner coalitions suggests voters may be overconfident about how parties will interpret their choices. Survey design and experimental work should help us understand how these beliefs are generated and incorporated in the voters’ strategies.

Another interesting question that lies ahead is to check whether the patterns found here hold for distinct levels of polarization in elections. Existing evidence has pointed both towards mobilization and demobilization effects of polarization (see Kamm and Schram (2013) or Rogowski (2014) for a discussion). Results presented above suggest that one way to disentangle the mechanism by which polarization affects turnout could be to condition the analysis on aggregate perceptions of closeness of the elections.

Finally, results on ambiguity aversion fit nicely with recent findings on the effect of pre-electoral coalitions on turnout. Tillman (2015) finds that the presence of a pre-electoral coalition increases turnout on average by more than 1.5 percentage points. Results in both papers together suggest that reduction in ambiguity with respect to which coalitions may be formed (and hence with respect to the joint probability distribution of them being formed after the elections) has a positive effect on turnout for the average voter.

6 Concluding Remarks

This paper has proposed a theoretical framework and empirical strategy to assess the presence of the swing voter’s curse in PR systems. Two consistent patterns across elections in PR systems have been

exposition.

highlighted: first, coalition-pivotal voters turn out less when they cannot strictly rank the coalitions they perceive as most likely. Second, voters who are less able to assess coalition probabilities are less likely to turn out. Furthermore, there seems to be no effect of political sophistication or partisanship on voters who perceive a close race and do not express a clear preference for any of the coalitions. These results suggest that a swing voter's curse as in Feddersen and Pesendorfer (1996) takes place. However, the data is not fine enough to let us disentangle whether selective abstention of indifferent pivotal voters is due to a willingness to defer, or small unobserved voting costs. What results in this paper seem to unambiguously discard is that risk aversion decreases turnout for coalition-pivotal voters. This suggests that, not only voters do respond to strategic incentives in PR systems, but that they are very confident that parties will use their marginal vote in the *correct* direction.

Exploring the origins and effects of risk aversion and overconfidence are avenues that should help us better understand the relation between turnout and voting strategies in modern democracies when the race is perceived to be close. Labbé St-Vincent (2013) is a nice first effort in that direction.

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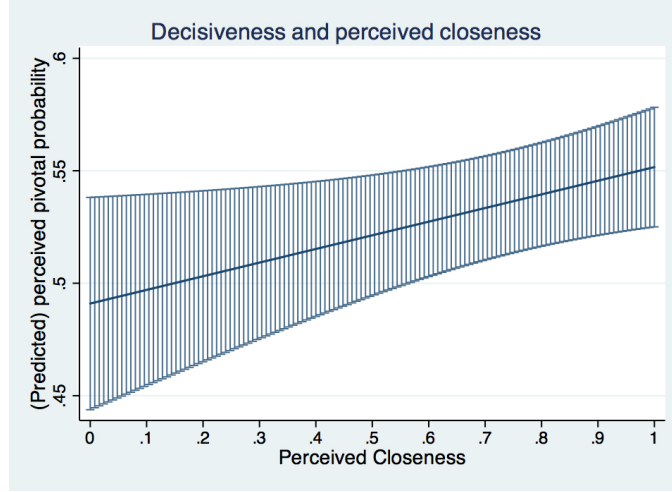
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7 Figures

Figure 1: Perceived pivotal probability as a function of perceived closeness of the election.



Data: Experimental data collected by Simon Labbé St-Vincent. See [Labbé St-Vincent \(2013\)](#) for details, in particular p. 797. 16 experimental sessions with 21 subjects each, choosing among 4 parties for 20 consecutive rounds under different electoral rules. Before each round t , all subjects i were asked both about their own chances of being decisive, and the chances of each of the four parties winning the election. For ‘first past the post’ elections, ‘Perceived Closeness’=1-(Chances expected winner - Chances expected runner-up). That is, if the two perceived front-runner parties had equal chances, ‘Perceived Closeness’=1. If two parties were elected (PR treatments), ‘Perceived Closeness’=1-(Chances expected 2nd - Chances expected 3rd). ‘Predicted perceived pivotal probabilities’ in the vertical axis are the predicted probabilities from the model $Own_decisiveness_{it} = \alpha + \gamma Perceived_closeness_{it} + X_i\beta + \varepsilon_{it}$, where i is subject, t is the round and X includes gender, major (science or not), political interest and experimental session fixed effects. Standard errors are clustered at the individual level. $\hat{\gamma}$ is significant at the 5% level. Results for $\hat{\gamma}$ are robust to many different specifications and available upon request. Data from the treatment in which the number of parties elected is uncertain is excluded (i.e. 4 out of the total of 16 experiments). Hence, 5,040 observations for a total of 252 subjects are used. All experiments were conducted in French. The wording of the key question on $Own_decisiveness_{it}$ was: “Indicate your perception of the chances that your vote will decide who will win (scale of 0-10)” [Indiquer votre perception des chances que votre vote décide qui va gagner (échelle de 0-10)]. Data is re-scaled here to fit actual probabilities.

Figure 2: Israel 2006: Distance to the last seat (won by Likud), for all parties that won representation in the Knesset (threshold: 2%).

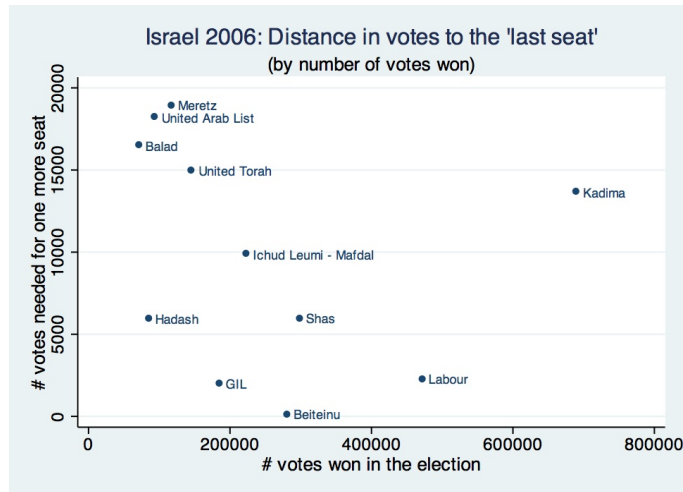
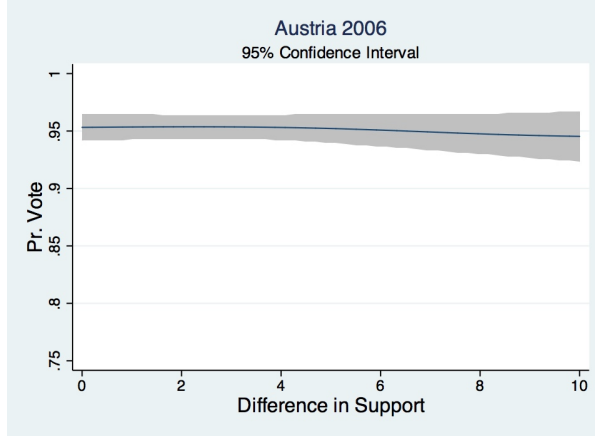
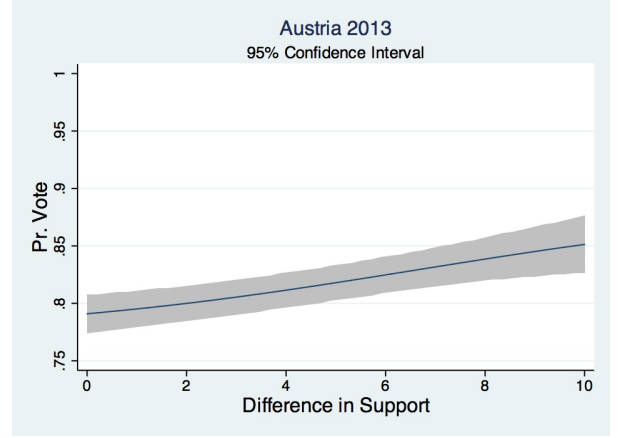


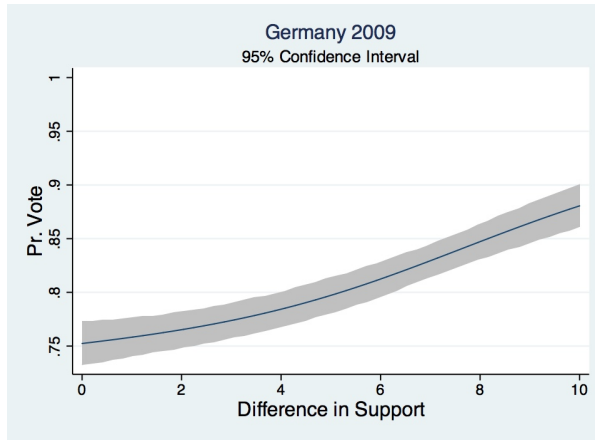
Figure 3: Turnout probability for individuals who believe at least two coalitions have maximum (equal) chances of being formed after the elections (i.e. ‘Chances most likely = Chances 2nd most likely’).



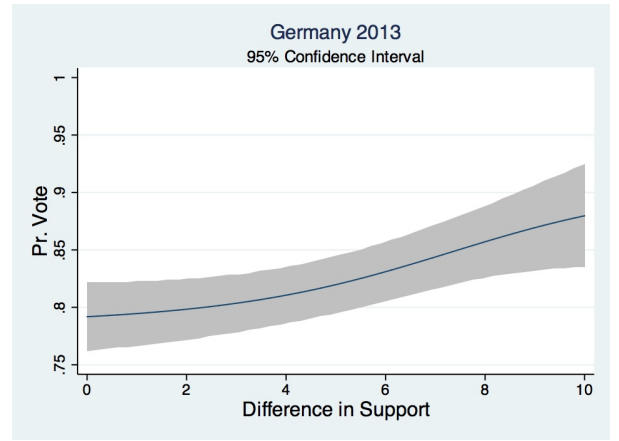
(a) N=1,195 (65.5% of the sample).



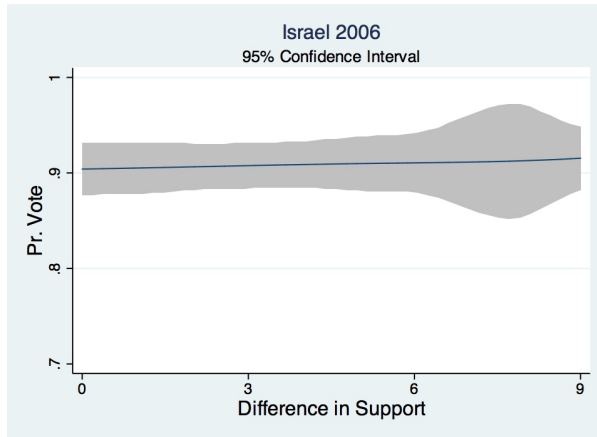
(b) N=1,259 (43.7% of the sample).



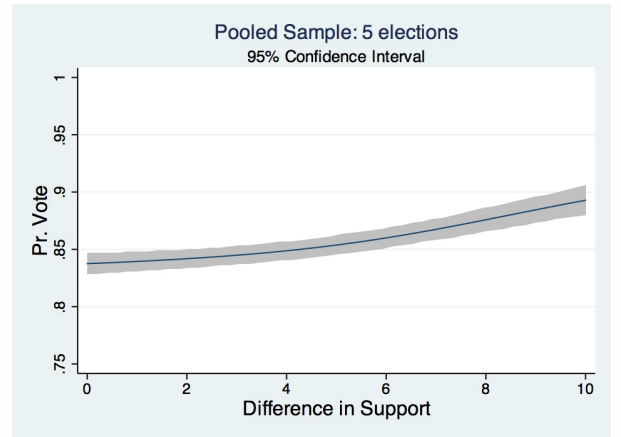
(c) N=949 (50.2% of the sample).



(d) N=380 (20.9% of the sample).



(e) N= 401 (38.4% of the sample).

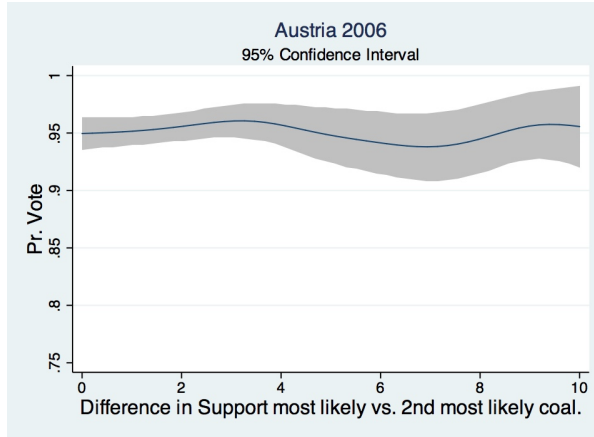


(f) N=3,922 (41.3% of the sample).

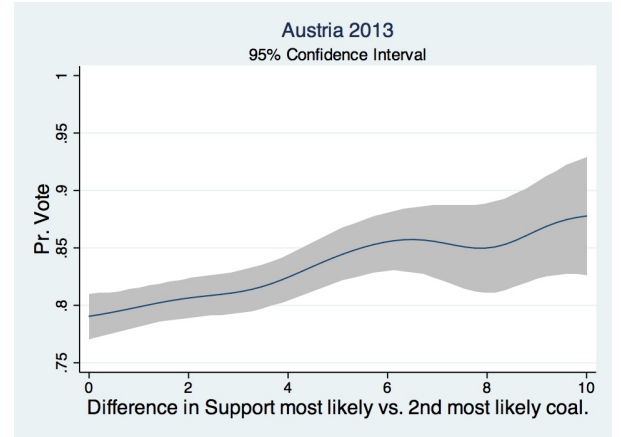
‘Difference in Support’: ‘Support for most preferred among the most likely coalitions’ - ‘Support for second most preferred among the most likely coalitions’.

Estimation: partially linear estimation using Robinson’s (1988) double residual semiparametric regression estimator (half-bandwidth=3). The shaded areas represent 95% confidence intervals. See expression (3) for the exact regression specification, and Appendix 1 for details regarding the controls.

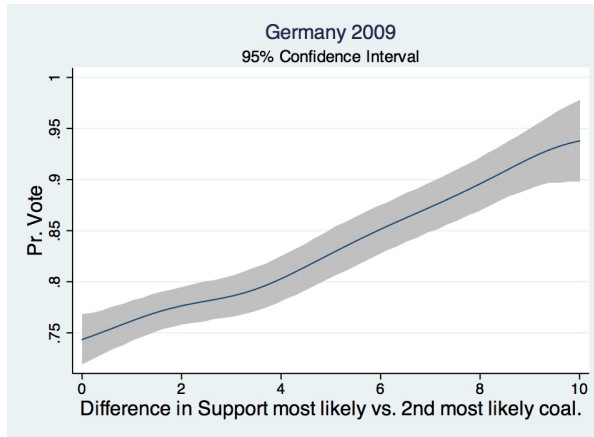
Figure 4: Turnout probability for individuals who believe that the difference in chances for the two most likely coalitions is *at most* $x\%$.



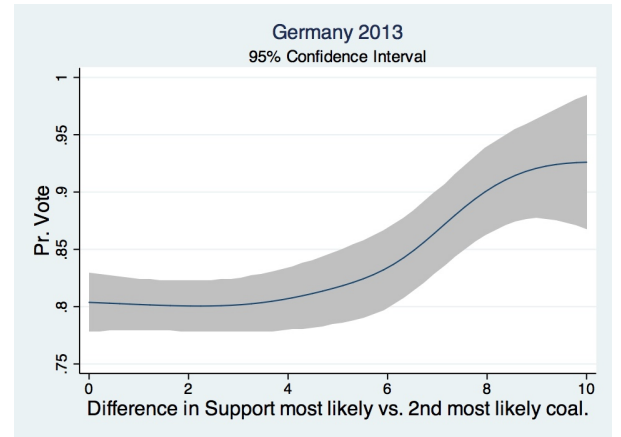
(a) ‘Chances most likely - Chances 2nd most likely’ at most 10%. N=1,387 (76% of the sample).



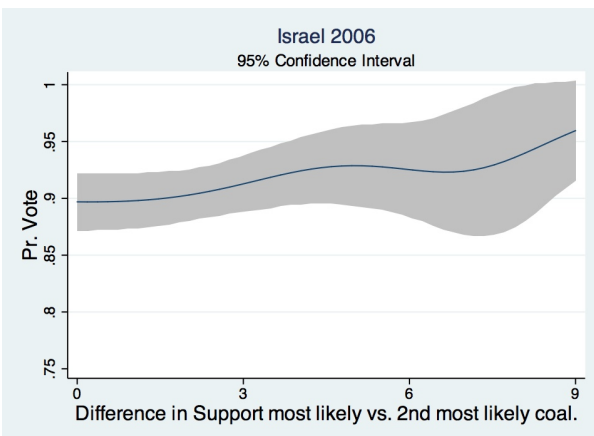
(b) ‘Chances most likely - Chances 2nd most likely’ at most 15%. N=1,689 (58.6% of the sample).



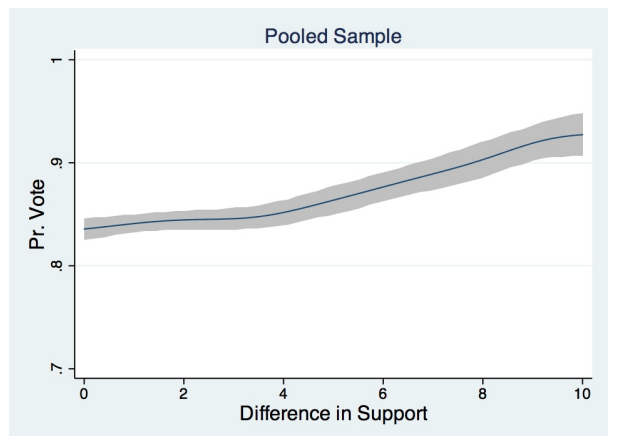
(c) ‘Chances most likely - Chances 2nd most likely’ at most 7%. N=1,347 (69.6% of the sample).



(d) ‘Chances most likely - Chances 2nd most likely’ at most 4%. N=655 (36% of the sample).



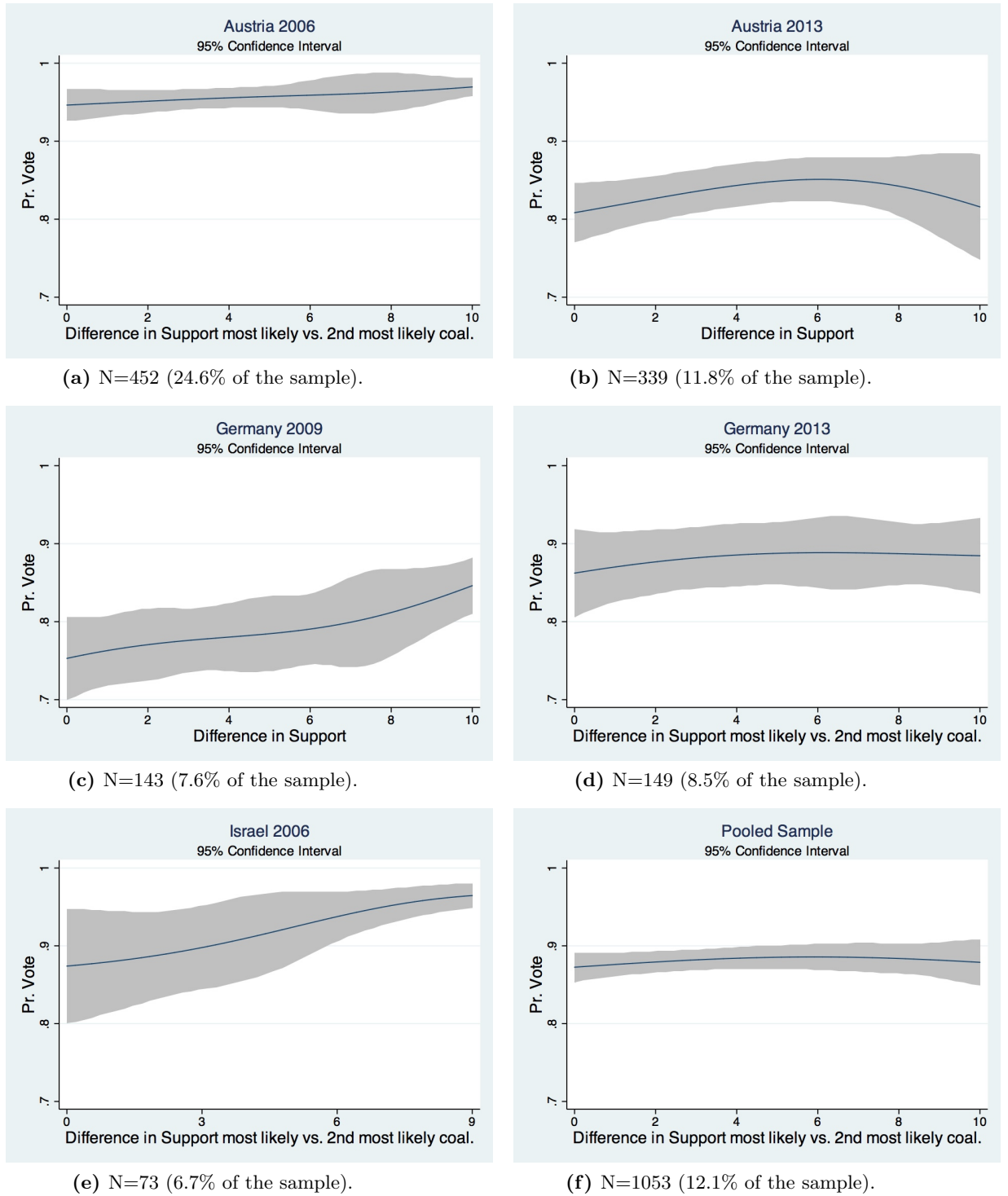
(e) ‘Chances most likely - Chances 2nd most likely’ at most 3%. N=608 (58.3% of the sample).



(f) ‘Chances most likely - Chances 2nd most likely’ as in (a)-(e). N=5,172 (55% of the sample).

‘Difference in Support’: $|\text{‘Support for most likely coalition’} - \text{‘Support for second most likely coalition’}|$ (i.e. absolute value). In case 2 or more are considered to be in the set of ‘second most likely coalitions’, this value is the difference between the most likely and the most preferred among the second most likely coalitions. Estimation: partially linear estimation using Robinson’s (1988) double residual semiparametric regression estimator (half-bandwidth=1). The shaded areas represent 95% confidence intervals. See expression (3) for the exact regression specification, and Appendix 1 for details regarding the controls.

Figure 5: Turnout probability for individuals who believe they are not likely to be pivotal with respect to coalition formation. (i.e. ‘Chances most likely >> Chances 2nd most likely’).



‘Difference in Support’: Difference in support between the two most likely coalitions. In case more than two are considered to be 2nd most likely coalitions, the most preferred in the set is considered.

Estimation: partially linear estimation using Robinson’s (1988) double residual semiparametric regression estimator (half-bandwidth=3). The shaded areas represent 95% confidence intervals. See section 4 for details on the regression specification and sample used, and, in particular, footnote 18 for the subsample used for Austria 2006. For details regarding the controls, see Appendix 1.

8 Tables

Table 1: Descriptive Statistics, by country-election

Variable	Mean	St. Dev.	Min.	Max.	N
Austria 2006					
Likelihood Vote	4.77	0.77	1	5	1,939
ΔChances 2 most likely coal.	0.06	0.16	0	1	1,937
ΔSupport 2 most likely coal.	1.67	3.55	-10	10	1,836
Max. sympathy for a party	8.49	1.72	0	10	1,922
Mean sympathy all parties	4.25	1.35	0	10	1,922
# DK 'Support Top Likely Coalition'	0.03	0.27	0	6	1,951
# Coalitions DK Chances	0.35	1.32	0	7	1,951
Age	47.59	17.65	18	97	1,951
Female	0.52	0.50	0	1	1,951
Strength of party ID	2.61	2	0	5	1,707
Political interest	3.47	1.12	1	5	1,949
Political knowledge	1.14	0.91	0	3	1,951
Austria 2013					
Likelihood Vote	7.91	2.96	0	10	3,113
ΔChances 2 most likely coal.	0.14	0.20	0	1	3,228
ΔSupport 2 most likely coal.	1.72	3.58	-10	10	2,912
Max. sympathy for a party	7.37	1.99	0	10	3,166
Mean sympathy all parties	3.78	1.31	0	10	3,166
# DK 'Support Top Likely Coalition'	0.02	0.19	0	4	3,216
# Coalitions DK Chances	0.36	1.03	0	4	3,216
Age	45.67	19.44	16	96	3,266
Female	0.51	0.50	0	1	3,266
Strength of party ID	0.93	1.03	0	3	2,812
Political interest	2.38	0.93	1	4	3,257
Political knowledge	4.24	1.85	0	7	3,266
Germany 2009					
Likelihood Vote	4.03	1.31	1	5	2,092
ΔChances 2 most likely coal.	0.05	0.06	0	0.5	1,997
ΔSupport 2 most likely coal.	1.86	3.79	-10	10	1,962
Max. sympathy for a party	7.41	2.01	0	10	4,235
Mean sympathy all parties	4.45	1.51	0	10	4,235
# DK 'Support Top Likely Coalition'	0.05	0.34	0	6	2,032
# Coalitions DK Chances	0.63	1.65	0	6	2,173
Age	50.34	18.27	16	94	4,288
Female	0.52	0.50	0	1	4,288
Strength of party ID	2.59	1.80	0	5	1,847
Political interest	2.78	1.04	1	5	4,274
Political knowledge	0.67	0.47	0	1	4,288
Germany 2013					
Likelihood Vote	4.25	1.21	1	5	1,948
ΔChances 2 most likely coal.	0.10	0.14	0	1	1,873
ΔSupport 2 most likely coal.	0.97	4.03	-10	10	1,836
Max. sympathy for a party	7.81	1.91	0	10	3,854
Mean sympathy all parties	4.80	1.54	0	10	3,854
# DK 'Support Top Likely Coalition'	0.03	0.31	0	6	1,892
# Coalitions DK Chances	0.46	1.41	0	6	2,003
Age	56.08	18.55	16	99	3,911
Female	0.50	0.50	0	1	3,911
Strength of party ID	2.80	1.74	0	5	1,750
Political interest	2.86	1	1	5	3,906
Political knowledge	1.07	1.27	0	3	3,911
Israel 2006					
Likelihood Vote	1.76	0.54	0	2	1,856
ΔChances 2 most likely coal.	0.04	0.12	0	1	1,919
ΔSupport 2 most likely coal.	1.06	3.11	-9	9	1,108
Max. sympathy for a party	7.85	2.20	1	10	1,879
Mean sympathy all parties	4.09	1.36	1	8.5	1,879
DK 'Support Top Likely Coalition'	.	.	.	.	.
Coalitions DK Chances	.	.	.	.	.
Age	44.67	17.61	18	90	1,906
Female	0.52	0.50	0	1	1,919
Strength of party ID	0.48	0.75	0	4	1,108
Political interest ¹	1.62	0.68	0	2	1,054
Political knowledge	1.23	1.01	0	3	1,871

ΔChances 2 most likely coal.: 'Chances most likely coalition' - 'Chances 2nd most likely coalition'. ΔSupport 2 most likely coal.: 'Support for most likely coalition' - 'Support for 2nd most likely coalition'. # DK 'Support Top Likely Coalition': Number of most likely coalitions for which the respondent cannot assess own support (answers 'Don't know' in the survey). # Coalitions DK Chances: Number of coalitions for which the respondent cannot assess its chances of being formed after the elections (answers 'Don't know' in the survey). For all surveys, Strength of party ID=0 means no party identification. (1) No 'Political Interest' question in Israel 2006: hence, proxied by past vote in the 2001 prime ministerial and 2003 legislative elections.

Table 2: Comparison of the average probability of turnout with the actual turnout rates.

	Austria		Germany		Israel
	2006	2013	2009	2013	2006
Average Pr. (vote)	0.95	0.81	0.78	0.83	0.90
Real Turnout	78.49%	74.91%	70.8%	71.5%	63.55%

Table 3: Unconditional turnout probability by intensity of support for individuals for whom ‘Chances most likely coalition’=‘Chances 2nd most likely coalition’

	Austria		Germany		Israel
	2006	2013	2009	2013	2006
$\Delta\text{Support} = 0$	0.96	0.74	0.68	0.78	0.89
Observations	261	272	195	89	179
$\Delta\text{Support} > 7$	0.94	0.86	0.92	0.89	0.92
Observations	99	71	107	43	19

$\Delta\text{Support}$: Difference in support between the most liked coalition (among the most likely ones) and the second most liked (among the most likely ones). Support $\in [0, 10]$ ($\in [1, 10]$ for Israel).

Table 4: Germany 2009. Turnout probability. Subsample of voters who believe at least two coalitions have maximum chances of being formed.

Variable	
Max. Sympathy	0.032*** (0.008)
Mean Sympathy	0.001 (0.010)
Max. Support Coal.	-0.004 (0.005)
Female	0.010 (0.016)
Age	0.001* (0.000)
Education	0.001 (0.008)
Political Knowledge	0.064*** (0.018)
Political Interest	0.116*** (0.009)
Strength Party ID	0.024*** (0.005)
Born in former RDA	-0.005 (0.017)
R^2	0.34
Observations	949
Standard errors are in parentheses.	
*** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$	

Dependent variable: Pr. (vote).

Max. Sympathy $\in [0, 10]$: Evaluation of most preferred party. Mean sympathy $\in [0, 10]$: mean evaluation of all parties. Max. Support Coal. $\in [0, 10]$: support for most preferred coalition. Political knowledge = knows electoral threshold (Yes/No). Political interest $\in [1, 5]$. Strength of party ID $\in [0, 5]$ (0=no party ID). Other controls: Difference in sympathy for the two most preferred parties (squared also), difference in chances of entering parliament for the two most preferred parties, size of town of residence, born in Germany. See expression (3) for the exact regression specification.

Table 5: Unconditional probability of turnout for individuals who (i) have no party ID; (ii) have no or little political knowledge; and (iii) do not have a strict preference for any of the most likely coalitions (when at least two are deemed to be the most likely).

	Austria		Germany		Israel
	2006	2013	2009	2013	2006
Little Pol. knowledge \times No Party ID \times No strict preference	0.90	0.54	0.46	0.39	0.80
Observations	63	61	33	7	76
Remaining of the sample	0.95	0.81	0.79	0.81	0.92
Observations	1,049	1,113	958	348	322
Total observations sample	1,112	1,174	991	355	398

Sample (total observations): voters who believe the top two most likely coalitions have the exact same chances of being formed.

‘Little Pol. knowledge \times No Party ID \times No strict preference’: all the following characteristics abide; (a) Party ID = None; (b) At most able to answer 50% of the questions regarding political knowledge; (c) Equal support for the two most likely coalitions.

Table 6: Effect on turnout of simultaneously (i) having no party ID; (ii) having no or little political knowledge; and (iii) not having a strict preference for any of the most likely coalitions (sample: individuals for whom ‘Chances most likely coalition’=‘Chances 2nd most likely coalition’).

	Austria		Germany		Israel	Pooled Sample	
	2006	2013	2009	2013	2006	no weights	weights
Panel A: strict definition							
Little Pol. knowledge \times No Party ID	0.51**	-0.033	-0.118**	-0.059	-0.104	-0.033*	-0.007
\times No strict preference (a)	(0.253)	(0.064)	(0.057)	(0.100)	(0.078)	(0.018)	(0.028)
Controls	Y	Y	Y	Y	Y	Y	Y
R^2	0.07	0.18	0.39	0.44	0.15	0.24	0.22
Observations	1079	1143	949	343	369	3896	3896
Panel B: slightly looser definition							
Little Pol. knowledge \times No Party ID	0.038	-0.026	-0.099**	-0.128	-0.175**	-0.027*	-0.026
\times No strict preference (b)	(0.241)	(0.047)	(0.048)	(0.079)	(0.077)	(0.015)	(0.023)
Controls	Y	Y	Y	Y	Y	Y	Y
R^2	0.07	0.18	0.39	0.44	0.15	0.24	0.22
Observations	1079	1143	949	343	369	3896	3896
Panel C: slightly looser definition (alternative)							
Little Pol. knowledge \times No Party ID	0.028	-0.052	-0.057	-0.055	-0.042	0.05	0.001
\times No strict preference (c)	(0.26)	(0.037)	(0.045)	(0.063)	(0.082)	(0.013)	(0.019)
Controls	Y	Y	Y	Y	Y	Y	Y
R^2	0.07	0.19	0.38	0.44	0.15	0.24	0.22
Observations	1079	1143	949	343	369	3896	3896

Standard errors are in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Dependent variable: Pr. (vote)

Sample: subset of voters who believe at least two coalitions are the most likely ones.

Little Pol. knowledge \times No Party ID \times No strict preference:

(Panel A) (i) Party ID = None; (ii) At most able to answer 50% of the questions regarding political knowledge; (iii) Equal support for two most likely coalitions.

(Panel B) (i) Party ID = None; (ii) At most able to answer 50% of the questions regarding political knowledge; (iii) Difference in support for two most likely coalitions *at most* 1 (support $\in [0, 10]$).

(Panel C) (i) Party ID = None; (ii) At most able to answer 66.6% of the questions regarding political knowledge; (iii) Difference in support for two most likely coalitions *at most* 2 (Support $\in [0, 10]$).

Weights: in-sample weights and country weights combined (so country sample size is corrected for).

All regressions include as controls strength of party ID, political knowledge and difference in support between top two most likely coalitions. Other controls: age, gender, political interest, level of education, born in country, maximum support for a party, average support for all parties, difference in support for two most preferred parties, chances of entering parliament for the most supported party (the last one, not for Israel, Austria 2013 or the pooled sample). Support $\in [1, 10]$ for Israel. See expression (4) for the exact regression specification and Appendix 1 for more details on the controls.

Table 7: Effect on turnout of not being able to (A) assess own support for coalition deemed as most likely; (B) assess the chances of the different coalitions.

	Austria		Germany		Israel
	2006	2013	2009	2013	2006
Panel A:					
# DK ‘Support Top Likely Coalition’	-0.006 (0.014)	0.144* (0.083)	-0.093** (0.046)	0.008 (0.018)	(.) ⁽¹⁾
Controls	Y	Y	Y	Y	
R^2	0.08	0.13	0.36	0.37	
Observations	1660	2763	1822	1649	
<hr/>					
% DK ‘Support Top Likely Coalition’	-0.022 (0.052)	0.352*** (0.120)	-0.140*** (0.052)	0.012 (0.027)	(.)
Controls	Y	Y	Y	Y	
R^2	0.08	0.13	0.36	0.37	
Observations	1660	2763	1822	1649	
<hr/>					
Panel B: ambiguity aversion					
# ‘Coalitions DK Chances’	-0.024** (0.012)	-0.017** (0.008)	-0.006 (0.006)	-0.028*** (0.008)	(.)
Controls	Y	Y	Y	Y	
R^2	0.09	0.15	0.36	0.40	
Observations	1687	2865	1904	1698	
<hr/>					
Dummy ‘Coalitions DK Chances’	-0.084* (0.046)	-0.037 (0.023)	-0.020 (0.022)	-0.086*** (0.027)	(.)
Controls	Y	Y	Y	Y	
R^2	0.10	0.15	0.36	0.40	
Observations	1687	2865	1904	1698	

Standard errors are in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Dependent variable: Pr. (vote)

DK ‘Support Top Likely Coalition’: number of most likely coalitions for which respondent answers ‘Don’t know’ when asked about support for that coalition (for Germany 2013, ‘Don’t know’ refers to the socioeconomic position of the coalition). ‘No Answer’ / ‘Refuses to answer’ are excluded.

Dummy DK ‘Support Top Likely Coalition’: dummy that takes value 1 if the respondent does not know own support for at least one of the coalitions (s)he considers to be most likely. ‘No Answer’ / ‘Refuses to answer’ are excluded.

‘Coalitions DK Chances’: Number of coalitions for which the respondent answers ‘Don’t know’ when asked about its chances after the elections. ‘No Answer’ / ‘Refuses to answer’ are excluded.

Dummy ‘Coalitions DK Chances’: dummy that takes value 1 if the respondent does not know the chances of at least one coalition. ‘No answer’ / ‘Refuses to answer’ are excluded.

Panel B only excludes respondents who missed to respond about own support for *all* coalitions, be them most likely or not.

Controls: age, gender, political interest, political knowledge, level of education, born in country, strength of party ID, maximum support for a party, average support for all parties, difference in support for two most preferred parties. See expression (5) for the exact regression specification and Appendix 1 for more details on the controls.

(1) The 2006 INES survey for Israel does not contain information on ‘Don’t know’ or ‘No answer’ for the relevant variables.

Table 8: Pooled Sample. Effect on turnout of not being able to (A) assess own support for coalition deemed as most likely; (B) assess the chances of the different coalitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# DK 'Support Top Likely Coalition'	-0.046* (0.026)				-0.064 (0.039)			
% DK 'Support Top Likely Coalition'		-0.131** (0.062)				-0.191** (0.089)		
# Coalitions DK Chances			-0.028*** (0.009)				-0.019* (0.010)	
% Coalitions DK Chances				-0.179*** (0.053)				-0.118** (0.058)
Age	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Pol. Interest	0.379*** (0.021)	0.379*** (0.021)	0.379*** (0.021)	0.379*** (0.021)	0.339*** (0.024)	0.339*** (0.024)	0.337*** (0.024)	0.337*** (0.024)
Pol. Knowledge	0.057*** (0.011)	0.057*** (0.011)	0.055*** (0.011)	0.055*** (0.011)	0.049*** (0.011)	0.049*** (0.011)	0.049*** (0.011)	0.049*** (0.011)
Max. Sympathy for a party	0.022*** (0.005)	0.022*** (0.005)	0.021*** (0.005)	0.021*** (0.005)	0.021*** (0.005)	0.021*** (0.005)	0.021*** (0.005)	0.021*** (0.005)
Pol. Extremism					-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Strength Party ID					0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)
Weights	Y	Y	Y	Y	Y	Y	Y	Y
Other Controls	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
R ²	0.22	0.22	0.23	0.23	0.22	0.22	0.23	0.23
Observations	8160	8160	8154	8154	7297	7297	7292	7292

Standard errors are in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Dependent variable: Pr. (vote).

Individuals who responded about perceived chances or own support for at most one coalition are excluded from the sample.

DK 'Support Top Likely Coalition': number of most likely coalitions for which respondent answers 'Don't know' when asked about support for that coalition (for Germany 2013, 'Don't know' refers to the socioeconomic position of the coalition). 'No Answer' / 'Refuses to answer' are excluded.

Dummy DK 'Support Top Likely Coalition': dummy that takes value 1 if the respondent does not know own support for at least one of the coalitions (s)he considers to be most likely. 'No Answer' / 'Refuses to answer' are excluded.

'Coalitions DK Chances': Number of coalitions for which the respondent answers 'Don't know' when asked about its chances after the elections. 'No Answer' / 'Refuses to answer' are excluded.

Dummy 'Coalitions DK Chances': dummy that takes value 1 if the respondent does not know the chances of at least one coalition. 'No answer' / 'Refuses to answer' are excluded.

Weights: in-sample weights and country weights combined (so country sample size is corrected for).

All controls are normalized: Political Interest $\in [0, 1]$, Political Knowledge $\in [0, 1]$, Max. Sympathy for a party $\in [0, 10]$, Strength Party ID $\in [0, 5]$, Pol. Extremism = $(5 - \text{Own Left-Right})^2$.

Other controls: Gender, education level, own Left-Right position, difference in support for two most preferred parties, chances of favorite party entering parliament, mean sympathy for all parties. See expression (5) for the exact regression specification and Appendix 1 for more details on the controls.

(Israel 2006 is excluded as the 2006 INES survey does not contain information on 'Don't know' or 'No answer' for the relevant independent variables).

9 Appendix

1. Main variables of interest and controls

This appendix describes the variables used in the regressions across this paper for each particular election.

(a) Variables common to all:²¹

Difference in support for two most likely coalitions: 'Support for most likely coalition' - 'Support 2nd most likely'. Values between 0 and 10

Difference in sympathy for two most preferred parties: 'Sympathy for preferred' - 'Sympathy for 2nd most preferred'. Values between 0 and 10 .

Other controls: Max. sympathy for a party ($\in [0, 10]$), mean sympathy for all parties ($\in [0, 10]$), maximum support for a given coalition ($\in [0, 10]$), age, gender.

(b) Austria 2006:

Likelihood of voting: 1=certain not to vote 5=certain to vote. Normalized to takes values between 0 (surely not) and 1 (for sure).

Chances of party j entering parliament: 0=no chances 3=for sure. Normalized to take values between 0 and

²¹All support and sympathy variables take values between 1 and 10 for Israel.

100. Used to construct ‘Difference in chances to enter parliament between preferred party and most likely party to enter parliament’ which takes values from -100 to 0.

Other controls: education (1=primary, 7=university or higher), interest in politics (1=not at all, 5=very strong), political knowledge ($\in [0, 3]$), employed (0=no, 1=partially, 2=fully), # people in the household, Carinthia (Y/N), strength of party identification (0=none, 1=very weak, 5=very strong).

(c) **Austria 2013:**

Likelihood of voting: 0=certain not to vote 10=certain to vote. Normalized to takes values between 0 and 1.

Other controls: education (1=did not finish any, 13=PhD), interest in politics (1=not at all, 4=very interested), political knowledge ($\in [0, 7]$), unemployed (Y/N), single (Y/N), # kids in the household, language spoken at home not German (Y/N), born in Austria (Y/N), protestant (Y/N), strength of party identification (0=not close to any party, 1=not very close, 3=very close).

(d) **Germany 2009:**

Likelihood of voting 1=certain not to vote 5=certain to vote (includes “I have already sent off my postal vote”). Normalized to takes values between 0 and 1.

Chances of party j entering parliament: 0=very unlikely 3=very likely. Normalized to take values between 0 and 100. Used to construct ‘Difference in chances to enter parliament between preferred party and most likely party to enter parliament’ which takes values from -100 to 0.

Other controls: education (1=no certificate, 5=higher qualification), interest in politics (1=not at all, 5=very interested), political knowledge (1=knows threshold for entering Bundestag, 0=does not), born in Germany (Y/N), born in former RDA (Y/N), size of town of residence (1=under 20,000 inhabitants, 8=over 500,000 inhabitants), strength of party identification (0=none, 1=very weak, 5=very strong).

(e) **Germany 2013:**

Likelihood of voting 1=certain not to vote 5=certain to vote (includes “I have already sent off my postal vote”). Normalized to takes values between 0 and 1.

Chances of party j entering parliament: 0=very unlikely 4=very likely. Normalized to take values between 0 and 100. Used to construct ‘Difference in chances to enter parliament between preferred party and most likely party to enter parliament’ which takes values from -100 to 0.

Other controls: education (1=no certificate, 5=higher qualification), interest in politics (1=not at all, 5=very interested), political knowledge ($\in [0, 3]$), born in Germany (Y/N), lives in former RDA (Y/N), # people in the household, strength of party identification (0=none, 1=very weak, 5=very strong).

(f) **Israel 2006:**

Likelihood of voting 0=certain not to vote, 1=undecided, 2=certain. Normalized to takes values between 0 and 1.

Other controls: education (in years of schooling), political knowledge ($\in [0, 3]$), born in Israel (Y/N), religious observance (1=not at all, 4=all of it), democracy is the best system (1=definitely disagree, 4=definitely agree), strength of party identification (0=not a supporter or activist, 1=supporter but not a member, 2=member, 3=active member, 4=member and holds a position).

10 Online Appendix

1. Robustness checks

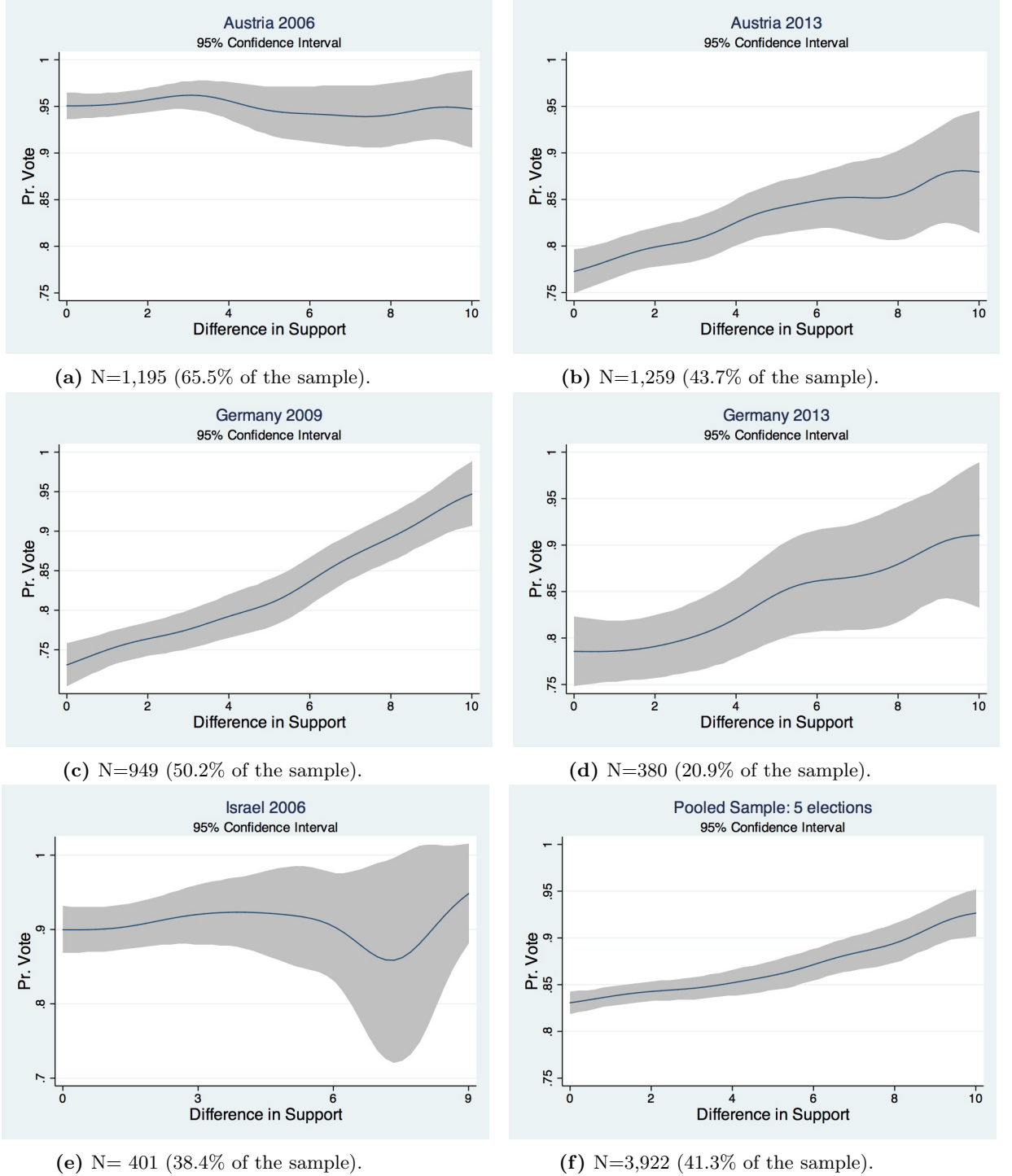


Figure 1: Figure 3 with narrower bandwidth: Turnout probability for individuals who believe at least two coalitions have maximum (equal) chances of being formed after the elections (i.e. ‘Chances most likely = Chances 2nd most likely’). ‘Difference in Support’: ‘Support for most preferred among the most likely coalitions’ - ‘Support for second most preferred among the most likely coalitions’.

Estimation: partially linear estimation using Robinson’s (1988) double residual semiparametric regression estimator (half-bandwidth=1). The shaded areas represent 95% confidence intervals. See expression (3) for the exact regression specification, and Appendix 1 for details regarding the controls.

Table 1: Table 8 in main text without weights. Pooled Sample. Effect on turnout of not being able to (A) assess own support for coalition deemed as most likely; (B) assess the chances of the different coalitions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# DK 'Support Top Likely Coalition'	-0.019 (0.022)				-0.057* (0.030)			
% DK 'Support Top Likely Coalition'		-0.047 (0.048)				-0.095 (0.058)		
# Coalitions DK Chances			-0.016*** (0.005)				-0.009* (0.005)	
% Coalitions DK Chances				-0.111*** (0.030)				-0.064* (0.034)
Age	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Pol. Interest	0.358*** (0.013)	0.358*** (0.013)	0.356*** (0.013)	0.358*** (0.013)	0.31*** (0.014)	0.31*** (0.014)	0.31*** (0.014)	0.31*** (0.014)
Pol. Knowledge	0.067*** (0.008)	0.067*** (0.008)	0.065*** (0.008)	0.065*** (0.008)	0.057*** (0.009)	0.057*** (0.009)	0.057*** (0.009)	0.057*** (0.009)
Max. Sympathy for a party	0.027*** (0.002)	0.027*** (0.002)	0.026*** (0.003)	0.026*** (0.003)	0.023*** (0.002)	0.023*** (0.002)	0.023*** (0.002)	0.023*** (0.002)
Pol. Extremism					-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Strength Party ID					0.016*** (0.002)	0.016*** (0.002)	0.016*** (0.002)	0.016*** (0.002)
Weights	N	N	N	N	N	N	N	N
Other Controls	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
R ²	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Observations	8160	8160	8154	8154	7297	7297	7292	7292

Standard errors are in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Dependent variable: Pr. (vote).

Individuals who responded about perceived chances or own support for at most one coalition are excluded from the sample.

DK 'Support Top Likely Coalition': number of most likely coalitions for which respondent answers 'Don't know' when asked about support for that coalition (for Germany 2013, 'Don't know' refers to the socioeconomic position of the coalition). 'No Answer' / 'Refuses to answer' are excluded.

Dummy DK 'Support Top Likely Coalition': dummy that takes value 1 if the respondent does not know own support for at least one of the coalitions (s)he considers to be most likely. 'No Answer' / 'Refuses to answer' are excluded.

'Coalitions DK Chances': Number of coalitions for which the respondent answers 'Don't know' when asked about its chances after the elections. 'No Answer' / 'Refuses to answer' are excluded.

Dummy 'Coalitions DK Chances': dummy that takes value 1 if the respondent does not know the chances of at least one coalition. 'No answer' / 'Refuses to answer' are excluded.

All controls are normalized: Political Interest $\in [0, 1]$, Political Knowledge $\in [0, 1]$, Max. Sympathy for a party $\in [0, 10]$, Strength Party ID $\in [0, 5]$, Pol. Extremism = $(5 - \text{Own Left-Right})^2$.

Other controls: Gender, education level, own Left-Right position, difference in support for two most preferred parties, chances of favorite party entering parliament, mean sympathy for all parties. See expression (5) for the exact regression specification and Appendix 1 for more details on the controls.

(Israel 2006 is excluded as the 2006 INES survey does not contain information on 'Don't know' or 'No answer' for the relevant independent variables).