

Inequality, Redistribution and the Rise of Outsider Candidates*

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Abstract

This paper theoretically studies the growth in support for extremist candidates by introducing a mechanism through which economic and ideological drivers of voting behavior interact. We provide a model of electoral competition between an *establishment* and an *outsider* candidate in which each candidate has a fixed ideological position and promises a policy of redistribution from skilled to unskilled voters. The voters perceive the establishment candidate to be more beholden to special interests and therefore more likely to renege on his policy promise in favor of the status-quo after the election. The equilibrium in our model features policy divergence and greater pandering to the politically more important group of voters by the outsider candidate. Furthermore, while higher income inequality and ideological extremism lead to polarization of support for the two candidates, they always benefit the outsider candidate at the expense of the establishment candidate's vote share. These results provide a theoretical underpinning for the recent empirical evidence that links voters' economic distress due to trade exposure or skill-biased technological change to support for outsider candidates.

Keywords : Extremism; Anti-establishment support; Differentiated candidates; Income shocks.

JEL Classification : D72, D78, H50.

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1 Introduction

The aftermath of the 2008 financial crisis has witnessed an unprecedented erosion in voters' trust in traditional political institutions and actors. According to a recent Gallup survey, the percentage of Americans who trust in "the men and women in political life in this country who either hold or are running for political office" has gone down by 20 percentage points since the early 2000s to 42 percent. Similarly, the percentage of citizens who responded to the question "How much of the time do you think you can trust government in Washington to do what is right?" as "Only some of the time/Never" has increased from 39 percent in the early 2000s to 81 percent in the beginning of this decade.^{1,2} Such voter disillusion has coincided with the rise of outsider candidates and parties running for office in local and national elections, with the election of President Trump in the U.S., the historic vote share of Marine LePen's National Front in France or the rise to prominence of new anti-establishment parties such as Syriza of Greece and Podemos of Spain among the notable examples.³ In this paper, we study the growth in voters' support for outsider candidates with a focus on understanding the potential roles of increasing income inequality and ideological extremism.

Recent empirical studies, along with extensive media-based analysis, have focused on the rising extremism and anti-establishment fervor in politics. For instance, Autor, Dorn, Hanson and Majlesi (2016) provide evidence that moderate incumbents were more likely to be replaced by extremist candidates in congressional races in the U.S. in districts that were adversely affected by import competition and the ensuing loss of manufacturing jobs. Colantone and Stanig (2016) obtain similar results on the political consequences of trade exposure for the U.K.'s vote to leave the European Union. Focusing on the 2016 U.S. presidential election, Freund and Sidhu (2017) show that issues such as race were more significant drivers of Trump's victory than purely economic ones.⁴ In light of such evidence pointing to economic as well as ideological motivations behind anti-

¹Jones, J.M. (2016, September 21). Americans' Trust in Political Leaders, Public at New Lows. Gallup.

²OECD reports similar figures, with only 43 percent of respondents among the OECD countries indicating trust in their national governments in 2015. For further analysis, see OECD (2017), *Trust and Public Policy: How Better Governance Can Help Rebuild Public Trust*, OECD Publishing, Paris.

³We take a broad view in defining outsider candidates and parties: even politicians or parties that have held office or have been in politics for long periods of time fall in our definition of outsiders if they are viewed by the voters as not belonging to the political establishment and as distant from the political mainstream. For instance, even though Senator Bernie Sanders has consistently held elected office in the U.S. since 1981, the voters perceive him as an outsider politician.

⁴These studies, along with other related ones, will be discussed in more detail in the subsequent section.

establishment voter support, the goal of this paper is to provide a theoretical framework for interpreting the above-mentioned empirical evidence and to offer one possible mechanism that can give rise to the observed increase in the vote shares of outsider candidates.

In order to simultaneously address the drivers and policy consequences of outsider candidates, we model an election between an establishment and an outsider candidate who compete for the support of voters consisting of skilled and unskilled workers. Each of the candidates is office-motivated and strategically chooses an income tax rate in order to maximize his vote share. In addition, each candidate is defined by a fixed characteristic, which we interpret as his ideology on a social issue such as, for instance, gun rights or abortion. These fixed characteristics cannot be changed before the election. The voters care both about the candidates' policy promises and their ideological positions.

We assume that a candidate's fixed characteristic as perceived by the voters conveys not only his ideological preference but also his status as an outsider to mainstream politics. Specifically, the voters perceive the ideologically more extreme candidate as an outsider and the more moderate candidate as part of the political establishment. The positive correlation we assume between ideological extremeness and outsider status is mainly a perception held by the voters - we do not argue that all ideologically-extreme candidates are in fact outsiders to mainstream politics, or vice-versa. Instead, our assumption is motivated by the recent candidacies of ideologically-extreme figures who made credible claims of running against the political establishment. For example, the campaigns of Bernie Sanders and Jean-Luc Melenchon, respectively for the Democratic Party nomination in 2016 and as the leader of the La France Insoumise movement during the 2017 French presidential election, simultaneously proclaimed far left-wing ideologies and statuses as outsiders. On the extreme-right of the ideological spectrum again as perceived by the voters, for instance, Nigel Farage, the ex-leader of the UKIP in Britain, and Donald Trump campaigned on anti-establishment platforms respectively for Brexit and the U.S. presidency.⁵

In our model, these perceptions imply for the voters that the outsider candidate is more likely to deliver a given policy promise compared to his opponent and the establishment candidate is more likely to perpetuate the status-quo. Consequently, our model differs from other voting models that assume full commitment to policy promises by positing that the status-quo prevails with some probability after the election if the candidate cannot implement his pre-election policy announcement. Specifically, we as-

⁵While assuming that ideological extremeness drives the voters' perception of a candidate as an outsider allows us to gain insights on how the candidates' equilibrium policy platforms are affected by their ideological positions, it is not required for obtaining any of our main results. We discuss our findings in the absence of this assumption in the equilibrium analysis section.

sume that there exists imperfect commitment to policy platforms, the degree of which is determined by the candidate’s outsider status and hence the extremeness of his ideology. We further assume that greater distance between his policy promise and the status-quo negatively affects a candidate’s chances of delivering. Thus, in line with the differentiated candidates framework developed by Krasa and Polborn (2010), our model introduces a channel through which a candidate’s fixed characteristic interacts with his policy promise so as to make the voters’ utility from a candidate non-separable between ideology and policy.⁶

As is standard in probabilistic voting models, candidates compete in equilibrium for the support of skilled and unskilled swing voters, i.e. those from each group of skilled and unskilled voters with ideologies that make them indifferent between the two candidates. However, the candidates’ differentiated abilities to deliver on their policy promises in our framework imply that marginal policy changes aimed at increasing their vote shares result in what we call non-monotone swing voter behavior. For example, it is possible in equilibrium for an ideologically left-wing voter who dislikes the status-quo policy to vote for the more right-wing candidate with the less appealing policy promise if this candidate demonstrates a sufficient willingness to dismantle the status-quo through his outsider status. Such behavior arises as voters weigh the direct effect of a given policy change on their utilities against its indirect effect on the probability that the status-quo prevails. Hence, our model can rationalize voting behavior such as some Obama or Sanders-supporters choosing the outsider right-wing candidate Trump over the more establishment candidate Clinton in the 2016 election.⁷

In equilibrium, there exists policy divergence between the candidates if and only if they are differentiated in terms of their outsider status. In addition, observing only the distribution of ideologies for each group of skilled and unskilled voters, both candidates pander to the same group of voters with the greater density of swing voters, which we refer to as the politically more important group. However, due to the candidates’ inherent advantages in delivering either their policy promise or the status-quo, the extent to which they pander to this group differs: the outsider candidate always promises the higher tax rate in an equilibrium that features tax hikes and the lower tax rate in an equilibrium with tax cuts. Our results are robust to any policy choice over which there

⁶This is our model’s main point of departure from the standard probabilistic voting models in which the voters care about a candidate’s ideology and policy promise in an additively-separable way. The consequences of abandoning separability are discussed in more detail in the Model section through specific examples. The differentiated candidates framework introduced by Krasa and Polborn (2010) and developed further in later studies will also be discussed subsequently.

⁷Cohn, N. (2017, March 18). A 2016 Review: Turnout Wasn’t the Driver of Clinton’s Defeat. *The New York Times*.

exists disagreement between the different groups of voters such as, for instance, protection from import competition or immigration restrictions. In other words, while the income tax rate operationalizes a policy for our model, the main driver of equilibrium behavior is the effective redistribution anticipated from each candidate. Divergence ensues in equilibrium as the candidates promise policies that accentuate their respective appeals with the different groups of voters.

An important consequence of this divergent equilibrium behavior is that greater ideological extremism and income inequality between skilled and unskilled voters always benefit the outsider candidate's vote share. As the outsider candidate becomes more ideologically extreme, he compensates for his loss of moderate voters by pandering to an even greater extent to the politically more important group, thereby winning more voters in that group than he loses in the other. In contrast, the greater stakes from redistribution that higher income inequality implies result in the elevation of the outsider candidate's inherent ability to dismantle the status-quo in the voters' evaluation of him. This effect increases the outsider candidate's vote share without changing the equilibrium tax rates. We also find that the candidates' vote shares depend on each group of voters' intensity of ideological preferences. For instance, if the unskilled voters start to care more about a candidate's ideology relative to his policy promise, then the outsider candidate benefits if the skilled swing voters are ideologically more concentrated and hence the politically more important group. To the best of our knowledge, these are the first results in the literature that directly link a candidate's outsider status to his equilibrium policy promise and vote share based on the voters' perception of his ability to dismantle the status-quo. We are also not aware of any other work that evaluates the change in support for outsider candidates during periods of rising income inequality.

Our theoretical findings carry empirical as well as policy implications that can inform the debates on the rise of outsider candidates and growing ideological extremism in politics. First, our finding that greater anti-establishment credentials and income inequality lead to a higher vote share for the outsider candidate suggests a plausible mechanism that can lend support to the empirical evidence on the relationship between globalization-induced economic hardship and extremism. Furthermore, increasing intensity of ideological preferences among skilled or unskilled voters can account for the empirical evidence that points to the importance of ideology over economic conditions in determining support for extremism. Second, our prediction that the candidates' policy promises diverge further as their statuses as outsiders grow apart offers an alternative explanation for the current state of polarization in politics. Finally, while we do not formally study how candidates are chosen, the higher vote share that we predict an

outsider would gain during periods of rising income inequality implies that the political parties have an incentive to nominate ideologically more extreme candidates that do not belong to the establishment.

The rest of the paper is organized as follows: The following section discusses the related literature. Section 3 introduces the model and Section 4 briefly discusses possible micro-foundations that can justify its main assumptions on candidate differentiation. We present the main equilibrium characterization and comparative statics results in Section 5, which we discuss in light of the existing empirical evidence in Section 6. Section 7 concludes.

2 Related Literature

This paper contributes to an extensive literature on electoral competition whose goal is to understand the observed ideological and policy polarization in politics. At the same time, we aim to provide a theoretical foundation for the empirical literature that investigates the factors behind the rise of extremist candidates.

There exists a large literature on why the observed policy divergence between candidates contradicts the Downsian prediction of policy convergence.⁸ In this paper, we offer a theory of policy divergence that builds on the probabilistic voting model of Lindbeck and Weibull (1987) and the differentiated candidates framework of Krasa and Polborn (2010, 2014). In standard probabilistic voting models, voters care about the office-motivated candidates' fixed characteristics and strategically-chosen policy promises in an additively-separable way, leading to policy convergence in equilibrium.⁹ By generalizing voter preferences, Krasa and Polborn (2010) generate policy divergence in a model of electoral competition between two candidates who have differentiated abilities to provide a public good. Krasa and Polborn (2014) introduce voters' cultural preferences into this framework in order to analyze their effects on equilibrium policy platforms.¹⁰

⁸For example, see Wittman (1983), Calvert (1985), Ansolabehere and Snyder (2000), Martinelli (2001), Aragonés and Palfrey (2002), Schofield (2007), Gul and Pesendorfer (2009), Hummel (2012), Aragonés and Xefteris (2012, 2016) and Polborn and Snyder (2017). There also exists a branch of this literature, which includes Roemer (1998), Lizzeri and Persico (2001, 2004) and Fernandez and Levy (2008), that studies how voters' different economic preferences lead to divergent outcomes related to redistribution policy or the size of the government. For a study of the relationship between political campaigns and polarization, see Herrera, Levine and Martinelli (2008) and Boleslavsky and Cotton (2015). Finally, Chakraborty and Ghosh (2016) study the role of media endorsements on polarization.

⁹See Persson and Tabellini (2001) and Banks and Duggan (2005) for an overview of the theory and literature.

¹⁰Krasa and Polborn (2012) introduce a class of voter preferences that satisfy the "Uniform Candidate Ranking" property, whose violation results in policy divergence in equilibrium. Previous studies with

While the primary focus of Krasa and Polborn (2014) is establishing the dependence of equilibrium policies on voters' cultural preferences, our goal is to study the implications of this dependence for the success of outsider candidates. Accordingly, in contrast to the main source of candidate differentiation in Krasa and Polborn (2010, 2014), we assume that the candidates differ in their abilities to commit to implementing their policy promises once elected. In particular, we are interested in the question of how income inequality between skilled and unskilled voters affects support for differentiated candidates, which cannot be addressed within the Krasa and Polborn (2014) framework.

Matakos and Xefteris (2017a) study redistribution in a generalized differentiated candidates framework and show that the candidates' equilibrium redistribution policies change in favor of the poor as the size of this group and its political importance relative to the rich increase. While the latter of these two results is in line with our findings, the authors' generalized model without a specific source of candidate differentiation does not address how redistribution is impacted by candidate qualities.¹¹

The recent empirical studies that establish a link between economic distress and support for extremist candidates or issues constitute our paper's main motivation. As discussed in the Introduction, Autor, Dorn, Hanson and Majlesi (2016) and Colantone and Stanig (2016) respectively study U.S. Congressional races and the Brexit vote to reach similar conclusions on the negative effect of import competition on support for moderate candidates and remaining in the European Union. Dippel, Gold and Heblich (2016) provide evidence that the loss of manufacturing jobs due to trade exposure contributed to higher vote shares for extreme right-wing parties in Germany.¹² In contrast, Freund and Sidhu (2017) emphasize the role of ideology and cultural factors behind President Trump's election.¹³

Finally, with its focus on candidate differentiation based on belonging to the political establishment, this paper contributes to the literature on the causes and policy effects of populism. For example, Acemoglu, Egorov and Sonin (2013) show that politi-

a divergent equilibrium in which the voters' preferences fail to satisfy this property include Dixit and Londregan (1996) and Adams and Merrill (2003).

¹¹Matakos and Xefteris (2017b) study a similar problem with multiple candidates in the absence of candidate differentiation (besides fixed characteristics). Their main conclusion, that it is the ideologically moderate parties instead of the extremists that propose redistribution policies favoring the poor, runs counter to our findings. This is due to the fact that being ideologically extreme implies a greater ability to dismantle the status-quo in our model, which affects the candidates' equilibrium policies.

¹²In addition, Che, Lu, Pierce, Schott and Tao (2016) show that these same forces led to higher vote shares for Democratic candidates for the U.S. Congress. Feigenbaum and Hall (2015) demonstrate the positive impact of trade exposure on the protectionist votes cast by legislators in the U.S. They also find that this effect is strongest in districts in which the incumbents faced primary challenges from opponents.

¹³We discuss the relevance of our results for existing and future empirical work in Section 6.

cians enact more populist policies to signal their anti-establishment credentials during periods of growing voter concern over corruption. Guiso, Herrera, Morelli and Sonno (2017) provide a theory in which populist parties emerge during periods of economic insecurity and voter disillusionment with establishment politics. Their empirical results based on European elections emphasize the role of voter turnout in determining the rise of populist policy platforms. Focusing on the role of globalization in the emergence of populism, Rodrik (2017) argues that left-wing populists exploit class cleavages emanating from the redistributive effects of trade, whereas right-wing populists exploit ethnic and racial cleavages based on, for instance, immigration. He also discusses the political difficulties associated with compensating the losers from globalization and the growing attractiveness of populist candidates as a result of the increasing ratio of such losses to the net gains to society.

3 The Model

We model an election with two office-motivated candidates and a continuum of voters consisting of skilled and unskilled workers. Each candidate is defined by a fixed characteristic and takes a policy position in order to maximize his vote share. Upon observing the candidates' fixed characteristics and policy positions, voters vote on their preferred candidate.

Candidate j 's fixed characteristic is denoted by $\sigma_j \in \mathbb{R}$ for $j \in \{L, R\}$ and represents his social ideology, which cannot be credibly changed before the election. For example, a candidate's ideology may express his position on gun control or abortion. Without loss of generality, we normalize the centrist ideology as 0 and assume that $\sigma_L < 0 < \sigma_R$. While a higher absolute value of σ_j corresponds to a more extremist candidate who is perceived by the voters to be an outsider to mainstream politics, a lower absolute value of σ_j corresponds to a more moderate and establishment-type candidate.

In contrast to their ideological inflexibility, each candidate j announces an income tax rate $t_j \in [0, 1]$ in order to finance a lump-sum transfer T_j to each voter. Letting $\alpha_h \in (0, 1)$ for $h = s, u$ respectively denote the mass of skilled voters with pre-tax income I_s and unskilled voters with pre-tax income I_u , where $\alpha_s + \alpha_u = 1$ and $I_s > I_u$, the amount of redistributive transfers that candidate j promises is given by $T_j = t_j(\alpha_s I_s + \alpha_u I_u)$ for $j \in \{L, R\}$. Consequently, an unskilled voter always prefers a higher and a skilled voter a lower tax rate.¹⁴

¹⁴See Meltzer and Richard (1981) for a more detailed analysis of such redistribution schemes.

A candidate can only partially commit to implementing his announced policy upon being elected. If the winning candidate is not able to implement his promised tax rate after the election, a status-quo tax rate t_q and the resulting redistributive transfers $T_q = t_q(\alpha_s I_s + \alpha_u I_u)$ prevail. Intuitively, implementing a redistribution policy that would create losers in the society would face hurdles from various special interests in politics, to whom the establishment candidate is more likely to be beholden. These forces would resist policies that diverge from the status-quo. To formalize this intuition, let $p_j : [0, 1] \times \mathbb{R} \rightarrow [0, 1]$ for $j \in \{L, R\}$ be a twice-differentiable function such that $p_j(t_j, \sigma_j)$ yields candidate j 's probability of implementing his policy announcement after the election, where $p_j(t_j, \sigma_j)$ is strictly decreasing at an increasing rate in the distance between t_j and t_q , and strictly increasing in the absolute value of σ_j . In other words, greater proximity of the promised policy to the status-quo and higher outsider status increase a candidate's probability of delivering on a campaign promise. Thus, in addition to having different fixed ideologies, the candidates also differ in their inherent abilities to deliver on their campaign promises. We provide micro-foundations for this set-up in the following section.¹⁵

Voters care both about a candidate's ideology and their post-tax consumption, which equals $(1 - t_j)I_h + T_j$ for a voter from group $h \in \{s, u\}$ if candidate $j \in \{L, R\}$ implements his promised policy upon election and $(1 - t_q)I_h + T_q$ if he fails to deliver. While voters within each group clearly have the same policy preferences, they differ in how much they value a candidate's ideology. The ideologies $\sigma_{ih} \in \mathbb{R}$ of voters i in group h are distributed according to a continuous cumulative distribution function F_h that admits the positive density f_h for $h = s, u$. The candidates can only observe the distributions F_s and F_u from which each group of voters' ideological preferences are drawn.

Voters are risk-neutral and vote based on their expected payoffs from each candidate. The expected utility that a voter i from group h receives from candidate j , conditional on candidate j being elected, can be written as

$$\mathbb{E}_j[u_{ih}^j(t_j, \sigma_j)] = \mathbb{E}_j[v_h(t_j)] - \lambda(\sigma_j - \sigma_{ih})^2, \quad (1)$$

where λ is a parameter that represents the importance of ideology on a voter's utility relative to policy and v_h is a twice-differentiable, strictly increasing and strictly concave

¹⁵As discussed in more detail previously, this completely novel feature of our model builds on the differentiated candidates framework of Krasa and Polborn (2010, 2012, 2014). The interaction between a candidate's ideology and his ability to deliver on a campaign promise diverges from the main assumptions in probabilistic voting models in which voters care about ideology and policy in an additively-separable way. The dependence of the voters' evaluation of a candidate's policy position here on his fixed status as an outsider necessitates that we model the voters' payoffs in a more general way.

function of a group- h voter's private consumption, where $v_h(t_j)$ and $v'_h(t_j)$ are bounded for all $t_j \in [0, 1]$ and $j \in \{L, R\}$. Equation (1) implies that a voter's ideological utility is higher from the candidate who is ideologically closer to her. The group- h voter's expected policy payoff is candidate-specific and is calculated based on the probability that candidate $j \in \{L, R\}$ delivers on his campaign promise t_j such that

$$\mathbb{E}_j[v_h(t_j)] = p_j(t_j, \sigma_j)v_h(t_j) + [1 - p_j(t_j, \sigma_j)]v_h(t_q). \quad (2)$$

Note that equations (1) and (2) together imply that the voters' preferences are not additively-separable across a candidate's ideology and policy promise. This is due to the fact that a candidate's ideology plays two separate roles in our model: It enters the voters' utility functions directly as an inherent source of utility and determines the probability that voters assign on this candidate's ability to implement his promised policy. This dual role played by a candidate's ideology violates the Uniform Candidate Ranking (UCR) property of voters' preferences defined in Krasa and Polborn (2012).¹⁶ Specifically, the complementarity between the extremeness of a candidate's ideology and his policy promise introduced via the probability function $p_j(t_j, \sigma_j)$ implies that whether a voter receives a higher policy payoff from a candidate depends not only on the policy itself but also on the candidate's fixed outsider status as defined by his ideological position. To gain an intuition for how our set-up allows for such an interaction between a candidate's ideology and policy promise, consider the following examples that respectively represent a voter with UCR and non-UCR preferences:

Example 1. *Suppose $|\sigma_L| < |\sigma_R|$ and the personal ideology of a skilled voter i is such that $|\sigma_L - \sigma_{is}| < |\sigma_R - \sigma_{is}|$, as seen in Figure 1. If the candidates could fully commit to implementing their policy promises upon being elected so that $p_j(t_j, \sigma_j) = 1$ for all (t_j, σ_j) and $j \in \{L, R\}$, then equation (1) collapses to an additively-separable form such that $u_{is}^j(t_j, \sigma_j) = v_s(t_j) - \lambda(\sigma_j - \sigma_{is})^2$ for $j = L, R$. In this case of UCR preferences, if $t_L = t_R$, then voter i always chooses candidate L , because only her ideological preferences matter for comparing the two candidates.*

Example 2. *Considering the same candidates and the skilled voter in Figure 1, now suppose there is only partial commitment to campaign promises. If $t_L = t_R < t_q$ so that the skilled voter i prefers the promised policy to the status-quo, then it is not necessarily*

¹⁶This property states that in an environment in which two candidates have different fixed characteristics, such as their social ideology, a voter's choice between them is based solely on ideological proximity as long as the candidates choose the same policy. See Krasa and Polborn (2012) for a more extensive discussion of this property and its implications for policy convergence in equilibrium.

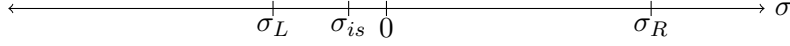


Figure 1: A skilled voter with an ideological preference for candidate L .

true that she always chooses candidate L , despite greater ideological proximity to candidate L than to candidate R . To see this, let $p_L(t_L, \sigma_L) = 0.5$ and $p_R(t_R, \sigma_R) = 0.75$ when $t_L = t_R$ so that $\mathbb{E}_L[u_{is}^L(t_L, \sigma_L)] = 0.5v_s(t_L) + 0.5v_s(t_q) - \lambda(\sigma_L - \sigma_{is})^2$ and $\mathbb{E}_R[u_{is}^R(t_R, \sigma_R)] = 0.75v_s(t_R) + 0.25v_s(t_q) - \lambda(\sigma_R - \sigma_{is})^2$. Despite the fact that $(\sigma_L - \sigma_{is})^2 < (\sigma_R - \sigma_{is})^2$ and $t_L = t_R$, voter i chooses candidate R if $v_s(t_L) = v_s(t_R)$ is sufficiently high and $v_s(t_q)$ is sufficiently low that candidate R 's policy advantage with this voter dominates his ideological disadvantage. On the other hand, if $t_L = t_R > t_q$ so that the skilled voters strictly prefer the status-quo, then candidate L unambiguously becomes this voter's preferred candidate. Therefore, voters do not always vote for the candidate closer to their own ideology even when the candidates offer the same policy, violating the UCR property.

These examples demonstrate that the voters' preferences in our model do not satisfy the UCR property, because identical policy promises from the candidates do not necessarily imply identical policy utilities for the voters. In the following section, we present possible micro-foundations for why the candidates' differentiated abilities to deliver on their campaign promises might depend on their statuses as outsider candidates. In addition, our framework provides micro-foundations for the relationship between a candidate's probability of delivering on his policy promise and the proximity of this promise to the status-quo.

4 Micro-foundations for Differentiated Candidates

Consider a post-election policy implementation stage to the model described in the previous section in which the winning candidate, referred to as the government from here on, is lobbied by two different special interest groups. We model this process as one of competing to persuade the government on the merits of the two potential policies on the table: the government's campaign promise as a candidate and the status-quo. While the *status-quo lobby* expends resources to persuade the government that the tax rate t_q is the better policy for satisfying whatever objective a government may have post-election, the *reform lobby* expends resources in support of the tax rate t_j that was

promised by the then-candidate government $j \in \{L, R\}$ before the election.¹⁷ These resources take the form of lobbying efforts such as meeting with the administration staff, producing research reports and mobilizing media outlets.¹⁸ Upon observing the lobbies' arguments, the government j updates his prior belief that t_q or t_j is the better policy using Bayes' rule.¹⁹ The policy decision is then made based on the government's posterior belief.²⁰

Let $a_1 \geq 0$ and $a_2 \geq 0$ denote the arguments the status-quo and the reform lobbies respectively present in favor of their preferred policies to persuade the government. The cost of producing these arguments for lobby $k \in \{1, 2\}$ is represented by the function $c_{k,j}(a_k; \gamma_{k,j})$ for $j \in \{L, R\}$, where $\gamma_{k,j} \in (0, 1)$ is a parameter that indicates the strength of lobby k 's connections in government j . We assume that the function $c_{k,j}(a_k; \gamma_{k,j})$ is increasing and convex in a_k , and decreasing in $\gamma_{k,j}$. Higher values of $\gamma_{k,j}$ for $k = 1, 2$ and $j = L, R$ correspond to the strong access lobby k enjoys in government j , whereas lower values of $\gamma_{k,j}$ represent the opposite. Since the status-quo lobby prefers the policy t_q , we assume that the status-quo (reform) lobby 1 (2) has better connections to the government of the establishment (outsider) candidate j ($-j$) than to the government of the outsider (establishment) candidate so that $\gamma_{1,j} > \gamma_{1,-j}$ and $\gamma_{2,-j} > \gamma_{2,j}$, where j is such that $|\sigma_j| < |\sigma_{-j}|$. Intuitively, it is reasonable to assume that the establishment candidate has a sufficiently long experience in politics that he has played a role in enacting the status-quo policy in the past and has established relationships with the interest groups supporting it in the process. The opposite reasoning applies to the reform lobby that supports the alternative to the status-quo.²¹

In Appendix A, we provide the details and the solution to the above-described model of government persuasion by two competing lobbies. For concreteness, suppose the establishment candidate wins the election, leading to a lower marginal cost of persuasion

¹⁷For example, if $t_q < t_j$, the status-quo lobby represents interests that are aligned with the skilled voters in the population and the reform lobby represents the interests of the unskilled.

¹⁸Such efforts are distinct from campaign contributions or bribes.

¹⁹Note that there exists no uncertainty in our main model and we maintain the assumption that candidates are purely office-motivated before the election. However, a government may have separate objectives once elected, such as maintaining a good relationship with the Congress, that are better served with one of the available policies. It is thus reasonable to assume that while candidates announce policies with a pure office motivation before the election, they may have secondary objectives once elected, for which they may rely on the arguments of the lobbies.

²⁰It is important to recognize that the micro-foundation we present here is not a model of communication between a privately-informed sender and a receiver who takes an action that is payoff-relevant for both parties. The scope for strategic interactions between the lobbies and the government is significantly more limited in our context.

²¹While the interests the two lobbies represent switch depending on the relative positions of t_j and t_q , this does not affect their relative advantages with one government over the other.

for the status-quo lobby and a higher marginal cost for the reform lobby. Our analysis indicates that the status-quo lobby optimally presents more arguments and the reform lobby presents less arguments as a result to the establishment government. Accordingly, we show that the establishment government places a greater likelihood on the event that the status-quo policy is better compared to an outsider one, leading to a higher probability that the status-quo policy prevails if the establishment candidate is elected.

5 Equilibrium

This section solves for the equilibrium of the voting game in which the two candidates simultaneously announce their policy platforms and the voters choose their preferred candidate based on both the candidates' fixed characteristics and their policy promises. For a more intuitive exposition of the results, we make the following assumption on the functional form for $p_j(t_j, \sigma_j)$ that yields candidate j 's probability of implementing his policy announcement after the election:

Assumption 1. *The probability function $p_j : [0, 1] \times \mathbb{R} \rightarrow [0, 1]$ for candidate $j \in \{L, R\}$ is additively-separable such that $p_j(t_j, \sigma_j) = \bar{p}(\sigma_j) + \tilde{p}(t_j)$.*

Based on the assumptions on the properties of the function p_j , it follows that $\bar{p}(\sigma_j)$ is strictly increasing in $|\sigma_j|$ and $\tilde{p}(t_j)$ is strictly decreasing in $|t_j - t_q|$ for any given t_q and $j \in \{L, R\}$. Furthermore, since a candidate's ideology and hence outsider status are fixed, we let $\bar{p}(\sigma_j) \equiv \bar{p}_j$ for $j \in \{L, R\}$. While we assume for now that \bar{p}_j for $j \in \{L, R\}$ is determined by a candidate's ideology σ_j , note that other factors such as the candidate's previous occupation or some other fixed characteristic may also impact his status as an outsider. Such factors will be discussed in the subsequent sections.

The following section begins the equilibrium analysis by describing the voters' optimal behavior.

5.1 The Swing Voters

Given the candidates' fixed characteristics σ_j and their policy announcements t_j for $j = L, R$, a voter i in group $h \in \{s, u\}$ votes for candidate L over candidate R if and only if $\mathbb{E}_L[u_{ih}^L(t_L, \sigma_L)] \geq \mathbb{E}_R[u_{ih}^R(t_R, \sigma_R)]$, which can be written as

$$\lambda(\sigma_R - \sigma_{ih})^2 - \lambda(\sigma_L - \sigma_{ih})^2 \geq \mathbb{E}_R[v_h(t_R)] - \mathbb{E}_L[v_h(t_L)], \quad (3)$$

where the expected policy utilities $\mathbb{E}_j[v_h(t_j)]$ for $j = L, R$ are calculated according to equation (2). Equating the two sides of inequality (3) implies that for any given pair of tax rates (t_L, t_R) , a voter i in group $h \in \{s, u\}$ with the following ideology must be indifferent between the two candidates:²²

$$\bar{\sigma}_h(t_L, t_R) \equiv \bar{\sigma}_h = \frac{\mathbb{E}_R[v_h(t_R)] - \mathbb{E}_L[v_h(t_L)] - \lambda(\sigma_R^2 - \sigma_L^2)}{2\lambda(\sigma_L - \sigma_R)}. \quad (4)$$

In other words, $\bar{\sigma}_h : [0, 1]^2 \rightarrow \mathbb{R}$ as defined in (4) is a function that yields the ideology of the swing voter in group $h \in \{s, u\}$. Since $\sigma_L < 0 < \sigma_R$, equations (3) and (4) imply that all the voters i in group $h \in \{s, u\}$ with ideologies σ_{ih} to the left of their group's swing voter $\bar{\sigma}_h$ vote for candidate L and all the voters to the right of it vote for candidate R . When choosing their optimal policy platforms, the swing voters are the ones the candidates target.

To investigate the behavior of the swing voters, first suppose $t_L = t_R$ and $|\sigma_L| = |\sigma_R|$ so that $\mathbb{E}_R[v_h(t_R)] = \mathbb{E}_L[v_h(t_L)]$ for $h = s, u$. In this case, the voters determine which candidate to vote for based solely on their ideology so that the swing voter is defined by $\bar{\sigma}_h = \frac{\sigma_L + \sigma_R}{2} = 0$ for each group h . On the other hand, if $|\sigma_L| \neq |\sigma_R|$ so that the candidates have differentiated abilities to deliver on their campaign promises, then $t_L = t_R \equiv t$ implies

$$\bar{\sigma}_h = \frac{(\bar{p}_R - \bar{p}_L)(v_h(t) - v_h(t_q))}{2\lambda(\sigma_L - \sigma_R)} + \frac{\sigma_L + \sigma_R}{2} \quad (5)$$

for $h \in \{s, u\}$. Equation (5) makes it clear that the swing voter in each group has an ideology that lies at the midpoint between the candidates' ideologies σ_L and σ_R if and only if $\bar{p}_L = \bar{p}_R$ and/or $t = t_q$. In other words, when the candidates promise the same policy, the swing voter is ideologically unbiased toward the candidates if and only if the candidates are undifferentiated in how they affect the voters' policy utilities.

Consider the skilled voters for concreteness and notice that when $t < t_q$ so that $v_s(t) > v_s(t_q)$, the skilled swing voter is such that $\bar{\sigma}_s > \frac{\sigma_L + \sigma_R}{2}$ if and only if $\bar{p}_R < \bar{p}_L$. The same condition holds for the skilled swing voter when $t > t_q$ if and only if $\bar{p}_R > \bar{p}_L$. In other words, the skilled swing voter is ideologically biased toward candidate R when either a) $t < t_q$ and $\bar{p}_R < \bar{p}_L$, or b) $t > t_q$ and $\bar{p}_R > \bar{p}_L$, because these two sets of conditions ensure that a skilled voter is relatively hurt by candidate R 's policy choice. Intuitively, this is due to the fact that candidate R is less likely than candidate L to deliver when the skilled voter prefers the proposed tax rate to the status-quo, and vice-

²²Note that the ideology of the indifferent voter is uniquely defined for each group.

versa. On the other hand, when either a) $t < t_q$ and $\bar{p}_R > \bar{p}_L$, or b) $t > t_q$ and $\bar{p}_R < \bar{p}_L$, the skilled swing voter has an ideological bias for candidate L such that $\bar{\sigma}_s < \frac{\sigma_L + \sigma_R}{2}$. By the same intuition, this is because now candidate L becomes less likely to deliver than candidate R when the skilled swing voter prefers the proposed tax rate, and vice-versa. The same analysis and intuition applies equally to an unskilled swing voter.²³ Note that the biases of the skilled and the unskilled swing voters must always be for different candidates due to the two groups' opposite tax rate preferences.

Now suppose $t_L \neq t_R$. Equation (4) that defines the ideology of a swing voter demonstrates a novel implication of our model when the candidates promise different tax rates: Even if a voter strictly prefers a candidate's policy promise and ideology, she may nevertheless find it optimal to vote for the other candidate. To see this, consider again the skilled voters without loss of generality and let $t_L > t_R > t_q$. Suppose candidate R is the outsider so that $|t_R - t_q| < |t_L - t_q|$ and $\bar{p}_R > \bar{p}_L$ together imply $p_R(t_R, \sigma_R) > p_L(t_L, \sigma_L)$. Even though a skilled voter strictly prefers t_R to t_L , her most preferred option is that the status-quo policy t_q prevails. Therefore, if $p_L(t_L, \sigma_L)$ and $t_L - t_R$ are both sufficiently small that $\mathbb{E}_R[v_s(t_R)] < \mathbb{E}_L[v_s(t_L)]$ is true, then the skilled swing voter $\bar{\sigma}_s$ would have an ideological bias toward candidate R . This implies that there exist skilled voters with ideologies $\sigma_{is} \in (\frac{\sigma_L + \sigma_R}{2}, \bar{\sigma}_s)$ who vote for candidate L despite being ideologically closer to candidate R and preferring his policy promise to that of candidate L . In this scenario, it is the desirability of the status-quo for the skilled voters that propel those with more moderate ideologies to express a preference for the establishment candidate. Alternatively, consider the unskilled voters in the same scenario for whom the status-quo is the worst option. If $p_L(t_L, \sigma_L)$ and $t_L - t_R$ are both sufficiently small that $\mathbb{E}_R[v_u(t_R)] > \mathbb{E}_L[v_u(t_L)]$ holds, then the unskilled swing voter has an ideological bias for candidate L and there exist left-wing unskilled voters with ideologies $\sigma_{iu} \in (\bar{\sigma}_u, \frac{\sigma_L + \sigma_R}{2})$ who vote for candidate R . In this case, moderate left-wing unskilled voters prefer the outsider right-wing candidate due to the greater assurance they receive for moving away from the status-quo.

In standard probabilistic voting models, the identity of the swing voter is determined by the balance between the voters' relative ideological and policy utilities from the two candidates. However, the fact that the candidates are able to only partially commit to their campaign promises implies that it is the relative expected policy utilities that matter in our model. As a result, our model can explain recent electoral phenomena

²³The fact that a swing voter can be ideologically biased toward one candidate when the proposed tax rates are equal differentiates our model from the results pertaining to the swing voters in standard probabilistic voting models and can be traced to the underlying differentiated candidates framework developed by Krasa and Polborn (2010).

such as some left-wing unskilled voters who were supporters of the redistributive policies of Bernie Sanders during the Democratic Party primaries in the U.S. voting for the outsider candidate Donald Trump over the establishment candidate Hillary Clinton in the general election. More generally, the above scenarios suggest that as the policy platforms shift, the ideology of the swing voters responds in a different fashion than in the more standard models due to the candidates' differentiated abilities to deliver on their campaign promises. This argument is presented in the following lemma:²⁴

Lemma 1. *The function $\bar{\sigma}_h : [0, 1]^2 \rightarrow \mathbb{R}$, where $\bar{\sigma}_h(t_L, t_R) \equiv \bar{\sigma}_h$ for $h = s, u$ is given by (4) for any given t_j and σ_j for $j = L, R$, is a non-monotonic function of the policy t_j .*

Lemma 1 indicates that as a candidate's promised tax rate changes, the ideologies of the swing voters in each group do not change monotonically in response. The underlying driver of this behavior is the dual role a candidate's campaign promise plays on the voters' evaluation of a candidate: While a marginally different policy would affect the voters' consumption should the candidate win the election and deliver on his promise, a new level of proximity to the status-quo also implies a different ability to deliver for that candidate. We call the former the *consumption effect* and the latter the *status-quo effect*. Whether the swing voter ideologies $\bar{\sigma}_s$ and $\bar{\sigma}_u$ increase or decrease as a result of a marginal change in a candidate's promised tax rate depends on which of these two effects dominates in equilibrium. For example, suppose $t_q > t_L$ so that a marginal increase in candidate L 's promised tax rate t_L implies an increase in the value of $p_L(t_L, \sigma_L)$. While an unskilled voter prefers the higher t_L so that candidate L 's support from the unskilled voters enjoys a positive consumption effect, the fact that the new t_L decreases the chances of t_q prevailing implies a negative status-quo effect on candidate L 's support from this same group. If the positive consumption effect dominates the negative status-quo effect so that an unskilled voter's expected policy utility from candidate L increases, then the ideology of the unskilled swing voter $\bar{\sigma}_u$ increases toward candidate R 's ideology. Otherwise, it decreases toward candidate L 's ideology. On the other hand, if we let $t_q < t_L$ so that a higher tax promise t_L translates into a lower value of $p_L(t_L, \sigma_L)$, then the direction of change in $\bar{\sigma}_u$ is determined by a similar positive consumption effect and a negative status-quo effect that is now due to an increased probability of remaining in a relatively undesirable status-quo.

As mentioned above, this framework can shed light on some recent episodes of seemingly-odd electoral behavior. For instance, consider a left-wing unskilled voter facing an electoral contest between the candidates Sanders (S), Clinton (C) and Trump

²⁴All the proofs are in Appendix B.

(T). Let $\sigma_S < \sigma_C < \sigma_T$ and $|\sigma_S| = |\sigma_T| > |\sigma_C|$. Furthermore, suppose these candidates announce policies such that $t_S > t_C > t_T$. If this voter initially preferred candidate S , then a model with monotone swing voter behavior would predict her to switch her support to candidate C upon candidate S dropping out of the race. However, our framework implies that this voter can rationally pick candidate T over candidate C if she is sufficiently hurt by the status-quo. In particular, if the promised tax rates t_C and t_T are not too far apart and candidate T 's outsider status is sufficiently great compared to his opponent C , then the expected policy utility from candidate T may outweigh the left-wing unskilled voter's ideological dislike of him. Such non-monotone voter behavior is a consequence of the candidates' differentiated abilities to deliver on their campaign promises and thus of the channel through which the candidates' fixed ideologies interact in equilibrium with the voters' evaluation of their promised policies.

5.2 Policy Divergence

Taking as given each group of voters' optimal voting behavior and their distributions of ideologies F_s and F_u , candidates choose policy platforms in order to maximize their vote shares given by

$$V_L(t_L, t_R) = \alpha_u F_u(\bar{\sigma}_u) + \alpha_s F_s(\bar{\sigma}_s) \quad (6)$$

for candidate L , and

$$V_R(t_L, t_R) = \alpha_u(1 - F_u(\bar{\sigma}_u)) + \alpha_s(1 - F_s(\bar{\sigma}_s)) \quad (7)$$

for candidate R . The following proposition characterizes the main property of the candidates' equilibrium policies:

Proposition 1. *There exists a unique pure-strategy equilibrium (t_L^*, t_R^*) when the candidates have sufficiently different ideologies. Moreover, the equilibrium tax rates $t_j^* \in (0, 1)$ for $j = L, R$ are such that $t_L^* \neq t_R^*$ if and only if $|\sigma_L| \neq |\sigma_R|$.*

The existence result in Proposition 1 is based on Matakos and Xefteris (2017a), who prove the existence of a unique pure-strategy equilibrium in a general class of models with differentiated candidates that includes ours. Our first main result in Proposition 1 states that this equilibrium is asymmetric if and only if the candidates have different outsider statuses. In standard probabilistic voting models, the equilibrium is symmetric as the candidates face the same fundamental optimization problem. However, in our setting, the differentiated abilities of the candidates to implement their campaign promises after

the election imply that each faces a different optimization problem and hence has a different optimum. Specifically, whenever the candidates' fixed characteristics are such that one is relatively an outsider and the other is relatively an establishment candidate, they do not find the same policy optimal for maximizing their vote shares, because their policy promises translate differently into policy utilities for the voters.

As the vote share equations (6) and (7) also indicate, the candidates determine their optimal policies by trading off support from the skilled and the unskilled voters, where a group's relative importance is determined by its size in the population and the distribution of its ideological preferences. In an interior equilibrium, the changes in vote shares among the skilled and the unskilled voters due to a marginally different tax rate are equalized for each candidate and the relative changes in swing voter ideologies are equalized across the two candidates such that the following condition is satisfied:

$$\frac{\partial \bar{\sigma}_s(t_L^*, t_R^*) / \partial t_L}{\partial \bar{\sigma}_u(t_L^*, t_R^*) / \partial t_L} = \frac{\partial \bar{\sigma}_s(t_L^*, t_R^*) / \partial t_R}{\partial \bar{\sigma}_u(t_L^*, t_R^*) / \partial t_R} = -\frac{\alpha_u f_u(\bar{\sigma}_u)}{\alpha_s f_s(\bar{\sigma}_s)}. \quad (8)$$

Equation (8) illustrates that the relative movements in the swing voter ideologies for skilled and unskilled voters in response to a marginal change in each candidate's policy promise must be equal in equilibrium. These movements in swing voter ideologies are driven by how each group's policy utility is affected by the marginal policy change in expectation. As discussed in the previous section, the relative magnitudes of the consumption and the status-quo effects for each group determine this net effect. Note that (8) implies policy convergence in the equilibrium of models in which a voter's policy utility is not candidate-specific. However, the responses of the swing voters to the same marginal policy change differ based on the candidate here, leading to the policy divergence result in Proposition 1.

To gain an intuition for why condition (8) is satisfied in equilibrium, suppose the policies t_L and t_R are such that (8) fails to hold. This implies that there exist policy changes that would lead to vote gains in one group that more than compensate for the loss of support in the other group. For instance, if t_L and t_R are such that $\alpha_s f_s(\bar{\sigma}_s) \partial \bar{\sigma}_s(t_L, t_R) / \partial t_R > -\alpha_u f_u(\bar{\sigma}_u) \partial \bar{\sigma}_u(t_L, t_R) / \partial t_R$, then candidate R can increase his total vote share by changing t_R such that the voters' expected marginal utilities from his election change, which is inconsistent with equilibrium. However, the non-monotonicity of the function $\bar{\sigma}_h(t_L, t_R)$ for $h \in \{s, u\}$ established in Lemma 1 suggests that the directional change in t_R that would achieve equilibrium is ambiguous and depends on the relative magnitudes of the consumption and the status-quo effects.

A main equilibrium implication of probabilistic voting models is that the candidates

choose policies that relatively benefit the group that rewards policy the most, i.e. the group with the greatest number of swing voters. While this central finding continues to hold in our differentiated candidates framework, the fact that equilibrium is asymmetric yields new insights on the equilibrium alignments between the candidates and the groups. However, before proceeding to formally stating our next result on these alignments, we first make the following assumption that the voters' policy utilities are linear in their post-tax incomes:

Assumption 2. *The function $v_h : [0, 1] \rightarrow \mathbb{R}$ for $h = s, u$ is linear in post-tax income such that*

$$v_u(t_j) = B[I_u + \alpha_s t_j (I_s - I_u)], \quad (9)$$

$$v_s(t_j) = B[I_s - \alpha_u t_j (I_s - I_u)], \quad (10)$$

where $B > 0$ is a constant.²⁵

Assumption 2 significantly improves the exposition of the analysis and will be maintained in the remainder of the paper. The following proposition summarizes our second main result on the equilibrium alignments between the candidates and the groups of voters:

Proposition 2. *In equilibrium, candidate j 's policy announcement t_j is such that $t_j > t_q$ for $j \in \{L, R\}$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$. Moreover, $|t_L - t_q| > |t_R - t_q|$ if and only if $|\sigma_L| > |\sigma_R|$, irrespective of the ordering of the groups' densities.*

The first part of Proposition 2 states that both candidates pander to the group with the greater density of swing voters in equilibrium, which is a result that echoes the findings of more standard probabilistic voting models. Since the swing voters are those that are most easily influenced by policies, they become the candidates' natural targets in equilibrium. Accordingly, the candidates offer a tax hike if there exists a greater density of unskilled swing voters than skilled swing voters, and a tax cut in the opposite scenario. This occurs as the candidates' optimal policies maximize (minimize) the expected redistribution relative to the status-quo when unskilled (skilled) swing voters

²⁵If a voter's utility is given by $U(C_x, C_y) = C_x^\alpha C_y^{1-\alpha}$, where $\alpha \in (0, 1)$ is a parameter and C_x and C_y respectively denote the consumption of good x with price p and the consumption of the numeraire good y , then the indirect utility of a voter with disposable income I^D equals $\frac{\alpha^\alpha (1-\alpha)^{1-\alpha}}{p^\alpha} I^D$. In a small open economy in which voters supply a fixed amount of labor, their pre-tax incomes are constant as long as the prices do not change. Therefore, our assumption that the voters' utilities are linear in disposable income is quite general. In fact, a utility function that is homogeneous of degree one in the consumption of all goods that represents homothetic preferences can be written as $\nu(\mathbf{p})I^D$, where \mathbf{p} is the price vector.

are ideologically more concentrated. Thus, the ideologically more homogeneous group in the neighborhood of its swing voters receives a more favorable treatment in equilibrium relative to the other group as the candidates find it more receptive toward their pandering.

While both candidates pander to the same group in equilibrium, the extent of this pandering depends on the candidate whenever equilibrium is asymmetric, as stated in the second part of Proposition 2. Specifically, the outsider candidate always offers the greater deviation from the status-quo: If the equilibrium features tax hikes, then the outsider candidate offers the greater tax increase, and if it features tax cuts, then the establishment candidate offers the higher tax rate. Intuition for these results can be gained by considering the candidates' inherent advantages in pandering to the voters: While the outsider candidate is better at keeping his campaign promise, the establishment candidate has a greater ability to maintain the status-quo. For example, if the candidates promise tax increases, it is the skilled voters that favor the status-quo and the unskilled voters that prefer either candidate's campaign promise to it. Hence, the establishment candidate has a natural advantage in appealing to the skilled voters, while the same is true for an outsider candidate with unskilled voters. Consequently, Proposition 2 indicates that it will be the outsider candidate that promises the greater tax hike in this equilibrium. Similarly, if the candidates promise tax cuts so that it is now the unskilled voters who favor the status-quo, the establishment candidate's greater ability to maintain the status-quo makes him relatively appealing for the unskilled voters, which the establishment candidate in turn exploits by offering the higher tax rate.

Note that the reason why the establishment candidate always offers less change relative to the status-quo compared to the outsider candidate is not an underlying electoral advantage he enjoys over his opponent and the subsequent costs he would bear in case of his more probable election if he does not deliver. Instead, this equilibrium behavior is grounded in his inherent ability to maintain the status-quo better than the government of the outsider candidate. Therefore, our model is able to generate equilibrium policy announcements by the outsider candidate that diverge further from the status-quo compared to the establishment candidate without resorting to an explanation based on an aversion to not fulfilling campaign promises.

These results suggest that more extreme candidates considered to be outside of mainstream politics have an advantage with the groups of voters that are relatively hurt by the status-quo and seek to dismantle it. In such periods, preferences against the status-quo may translate into a vote for an extremist candidate, despite his ideological position for some voters. The same is true for an establishment candidate, who could be appeal-

ing despite his ideology to those who are the beneficiaries of the status-quo. Cognizant of such voter behavior, the candidates promise policies that accentuate their natural advantages, leading to policy polarization.

5.3 Comparative Statics

This section explores the implications for equilibrium policies and vote shares of changes in the model's main parameters such as a candidate's ideology and income inequality between skilled and unskilled voters. The ultimate goal of this exercise is to establish a relationship between our theoretical predictions and the recent empirical observations on the success of outsider candidates, which we discuss further in the following section.

Proposition 2 indicated that the candidates' optimal policies always lie on the same side of the status-quo tax rate as they either maximize or minimize expected redistribution depending on the relative ideological densities of the skilled and unskilled swing voters. A consequence of this finding is that changes in a group's size in the population do not affect the equilibrium as long as the distribution of its ideological preferences remains the same.²⁶ Similarly, changes to the distribution of a group's ideological preferences that preserve the ranking of the groups' densities in the neighborhood of their respective swing voters do not affect equilibrium either. It is only when such changes imply a reversal in the inequality between $f_u(\bar{\sigma}_u)$ and $f_s(\bar{\sigma}_s)$ that the equilibrium tax rates change in the same direction for both candidates.

In contrast to group size or ideological preferences, changes in a candidate's ideology lead to interesting equilibrium effects due to the interaction between the candidates' fixed ideologies and the voters' policy utilities. Specifically, the voters are impacted through two separate channels that include a direct effect on their ideological utility from the candidate and an indirect effect through which the candidate's new outsider status changes how a given policy promise translates into their policy utility. In the following proposition, we summarize the net effect of these two forces on the candidate's equilibrium tax rate. The implications of greater ideological extremism for a candidate's vote share are analyzed subsequently.

Proposition 3. *The equilibrium tax rate t_j proposed by candidate $j \in \{L, R\}$ increases as his ideology σ_j becomes more extreme if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$.*

²⁶While an increase, for example, in the proportion of the unskilled voters would imply a greater number of swing voters at the given tax rates, the simultaneous decrease in the proportion of skilled voters means that the per-capita redistribution is decreasing. These two effects cancel each other out in equilibrium, leading to no changes in the equilibrium tax rates.

Proposition 3 states that as a candidate becomes more ideologically extreme, the change in his policy promise depends on the relative ideological densities of the two groups' swing voters. Recall that it was established in Proposition 2 that while the candidates always pander to the same group with the greater density of swing voters in equilibrium, the outsider candidate does so more intensely by offering the closer tax rate to this group's ideal than the establishment candidate. As a candidate becomes more extreme, the same forces that lead to this equilibrium behavior push the candidate toward increasing the extent to which he panders to the favored group. Specifically, a greater outsider status strengthens the candidate's appeal to the group that dislikes the status-quo relative to the announced policies. When there exists a higher density of unskilled swing voters, the equilibrium tax rates are always above the status-quo and a candidate promises a greater tax hike as he becomes more extreme. In the opposite scenario, becoming more ideologically extreme increases the candidate's appeal with the skilled voters, which the candidate duly exploits by offering a larger tax cut.

An immediate consequence of Proposition 3 is that the group with the higher concentration of swing voters unambiguously benefits economically from greater ideological polarization between the candidates through an increase in the outsider status of the more extreme one. However, as also mentioned above, both the ideological and policy utilities of voters are affected by a change in a candidate's ideology, rendering the overall impact of such a change on the voters ambiguous. The following result disentangles these two effects in order to characterize the impact on the candidates' vote shares:

Proposition 4. *Suppose private consumption is sufficiently valuable for the voters. Then, for $j \in \{L, R\}$, candidate j 's vote share increases among unskilled voters and decreases among skilled voters as his ideology σ_j becomes more extreme if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$.*

As observed in equations (6) and (7), how a candidate's vote share responds to his greater ideological extremism depends on the movements in each group's swing voters, which in turn depend on the net effect that greater extremism has on the voters' ideological and policy utilities from the candidate. Note that the direct effect of such a change on the voters' ideological utilities is unambiguous - the swing voter ideologies always move in the same direction extremism takes. For example, when candidate L becomes more extreme so that σ_L decreases, this direct effect pushes the swing voters to the left, indicating a loss of support among the more moderate voters who now prefer candidate R . On the other hand, the fact that the candidates' abilities to deliver on their campaign promises depend on their outsider statuses implies that greater extremism has

policy as well as ideological consequences for the voters. Specifically, if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$ so that both candidates pander to the unskilled voters in equilibrium, then this indirect policy effect pushes the unskilled swing voters in the opposite direction of extremism, pointing to increased support from the voters in this group as they benefit economically as described in Proposition 3. At the same time, the skilled swing voter ideology moves in the same direction as extremism. Thus, greater extremism necessarily leads to a loss of support for this candidate among the skilled voters when the unskilled are politically more important, since the ideology and policy effects push their swing voters in the same direction. However, whether the candidate's support among the unskilled voters increases or decreases as a result of greater extremism would depend on which of the ideology or policy effects dominates. We find that the indirect policy effect always dominates the direct ideological effect of extremism for the group with the greater swing voter density for sufficiently large values of the parameter B that represents the importance of private consumption to the agents. On the other hand, for the group with the lower density of swing voters, the direct and indirect effects of extremism work in the same direction, leading to the unambiguous result that the candidate that becomes more extreme loses vote share among that group. Thus, whether a group of voters rewards an ideologically more extreme candidate with a greater vote share or penalizes it with a lower one depends on the relative concentrations of swing voter ideologies.

While Proposition 4 described the responses of an ideologically more extreme candidate's vote shares among the two separate groups of voters, the candidates (and the parties that nominate them) are ultimately interested in their total vote shares, which the following corollary focuses on:

Corollary 1. *Suppose private consumption is sufficiently valuable for the voters. Then, for $j \in \{L, R\}$, candidate j 's total vote share increases as his ideology σ_j becomes more extreme.*

Corollary 1 indicates that becoming more ideologically extreme always increases a candidate's vote share and therefore his payoff, regardless of which group has a greater density of swing voters in equilibrium. Therefore, it must be the case that the candidate's increased support among the politically more important group dominates his loss in the other group. This is consistent with the candidates' equilibrium behavior as described in Proposition 3: The candidate panders to the politically more important group to a greater extent as he becomes more ideologically extreme precisely to increase his vote share, securing an economic advantage with that group that dominates his economic disadvantage with the other group and general ideological disadvantage in the popula-

tion. Therefore, while the candidate's total vote share always takes a hit from greater ideological extremism, he is able to more than correct this through greater pandering and commitment.

Even though this section has so far focused only on changes to ideology, it is important to recognize that other factors might also affect a candidate's outsider status without necessarily altering his ideological position. In other words, the function $\bar{p}(\sigma_j)$ for $j \in \{L, R\}$ may have other arguments that are held fixed in our analysis. For example, the disclosure of candidate j 's previously unpublicized relationships with the political establishment may decrease the value of $\bar{p}(\sigma_j)$ for any given σ_j , leading the voters to update their expected policy utilities from the candidate without changing their ideological utilities.

For such shocks, the previous results continue to hold as they are all driven by the candidates' different statuses as outsiders. Furthermore, Proposition 4 and Corollary 1 no longer require large parameter values for the importance of consumption to the voters, since a positive shock to the candidate's outsider status that leaves his ideology intact eliminates the direct ideology effect that dampened his economic advantage with the politically more important group. Specifically, holding his ideology intact, a candidate's vote share always benefits from greater anti-establishment credentials. This is due to the fact that a change in a candidate's outsider status without an accompanying change in his ideology only has a policy effect that benefits the politically more important group while placing the other group at a disadvantage in case of his election. Since a candidate always panders sufficiently more to the politically more important group that more than compensates for his economic disadvantage with the other group, the policy impact of a candidate's greater outsider status necessarily benefits his vote share. On the other hand, as discussed above, obtaining greater anti-establishment credentials through more ideological extremism comes at the cost of losing ideologically moderate voters. Since this effect disappears for positive shocks to outsider status that leave a candidate's ideology intact, a candidate always improves his vote share in this situation. Thus, our results do not fundamentally depend on the assumption that greater ideological extremism drives outsider status.

Having described how the equilibrium tax rates and the candidates' vote shares respond to greater ideological extremism or shocks to outsider status, we next consider the equilibrium effects of changes to pre-tax income inequality. Since the analysis indicates that the equilibrium tax rates either maximize or minimize expected redistribution given by $p_j(t_j, \sigma_j)(t_j - t_q)$ for $j \in \{L, R\}$, they are independent of pre-tax income inequality, represented by the difference $I_s - I_u$. However, with the equilibrium tax rates constant

in income inequality, an increase in $I_s - I_u$ raises the absolute amount of effective redistribution from skilled to unskilled voters. Consequently, the swing voter ideologies and therefore the candidates' vote shares must be influenced by shocks to income inequality, as described in the following proposition:

Proposition 5. *The vote share of the outsider candidate increases among unskilled voters and decreases among skilled voters in response to an increase in pre-tax income inequality if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$.*

Proposition 5 indicates that when pre-tax income inequality increases, for instance due to skill-biased technological change or a trade shock, the candidates experience polarization in support from the two groups. Specifically, when there exists a greater density of unskilled swing voters, the outsider candidate gains support among the unskilled voters while losing skilled voters, whereas the establishment candidate does relatively better with the skilled voters. In the opposite scenario of higher skilled swing voter density, the outsider candidate gains skilled voters while the establishment candidate becomes relatively more appealing to the unskilled voters. Given constant equilibrium tax rates, the channel through which an income inequality shock affects the candidates' vote shares is the change in the amount of redistribution a given tax rate implies. The following corollary summarizes the impact of such shocks on the candidates' total vote shares:

Corollary 2. *Greater income inequality between skilled and unskilled voters always increases the total vote share of the outsider candidate and decreases the total vote share of the establishment candidate.*

Similar to Corollary 1, the above result indicates that the outsider candidate's vote gains among one group always dominates his loss of support in the other group as income inequality rises. Consequently, greater income inequality always benefits the outsider candidate and works against the establishment one. While the underlying intuition for this result is similar to Corollary 1, it is important to note here that the candidates do not proactively pander more to a given group as income inequality increases. Instead, each given optimal policy promise now translates into a different amount of transfers from the skilled to the unskilled, changing the voters' evaluations of the candidates. Specifically, the outsider candidate's equilibrium advantage with the group that dislikes the status-quo relative to the promised policies is amplified with an increase in income inequality, unambiguously leading to higher support from that group. However, the same shock does not lead to an equivalent increase in support from the other group for the establishment candidate. The underlying driver of such asymmetric movements in voter

support is the candidates' differentiated abilities to implement their announced policies: Voters support the outsider candidate for his ability to keep his campaign promise, whose value rises as the stakes to both groups grow with income inequality.

The final comparative statics exercises we present concern the parameter λ , which represents the common relative importance of ideology to policy for the voters. Note that a change in λ has no effect on equilibrium in the standard probabilistic voting models as it affects neither the underlying distribution of the voters' ideological preferences nor the ideology of the swing voters.²⁷ However, when candidates have differentiated abilities to deliver on their campaign promises so that the ideology of a swing voter is defined by equation (4), changes in λ are expected to affect the equilibrium vote shares by shifting each group's swing voters. The following proposition considers such a positive shock that would signify an intensification of the voters' ideological preferences:

Proposition 6. *In response to a positive shock to λ that increases the importance of ideology to all voters, the vote share of the outsider candidate decreases among unskilled voters and increases among skilled voters if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$.*

In response to a positive shock to the relative importance of ideology for the voters, Proposition 6 predicts the exact opposite movements in the candidates' vote shares that were observed for a positive income inequality shock. To gain an intuition for this result, recall that the outsider candidate panders more to the group with the greater density of swing voters in equilibrium. While this makes him a more desirable candidate in terms of policy for that group, his greater ideological extremism always hurts him with both groups, as discussed in more detail below Proposition 4. Thus, when all voters attach more importance to ideology relative to policy, the equilibrium policy advantage of the outsider candidate with the favored group is diminished, leading to a loss of support among that group. While some support from the other group comes back to the outsider as a result of his less effective pandering, this cannot make up for losing his appeal with the favored group, resulting in an overall decrease in his vote share. This is summarized in the following corollary:

Corollary 3. *When the importance of a candidate's ideology relative to his policy promise increases for all voters, the total vote share of the outsider candidate always decreases and the total vote share of the establishment candidate always increases.*

²⁷This can also be seen in equation (4), where the two expected values would be equalized in the symmetric equilibrium of a probabilistic voting model with $p_j(t_j, \sigma_j) = 1$ for $j = L, R$ so that the parameter λ would consequently drop out.

The common element between the three corollaries in this section that focused on the candidates' total vote shares is the fact that the outsider always benefits when a shock elevates his natural ability to deliver new policy and loses when it emphasizes ideology. For instance, the last two corollaries indicated that greater income inequality and less importance placed on ideology, which unambiguously make policy the more prominent component of a voter's utility, always benefit the outsider candidate while hurting the establishment one. When the policy and ideological components of the voters' utilities are in conflict, as is the case in the first corollary when a candidate becomes ideologically more extreme, the outsider benefits only when his policy advantage dominates his ideological disadvantage. Hence, our framework allows us to observe how the candidates' differentiated abilities to implement their announced policies result in asymmetric equilibrium effects.

Even though the shock to λ considered above affected skilled and unskilled voters equivalently, this need not be so. For example, it is reasonable to consider the possibility that each group of voters attaches a different relative importance to ideology, i.e. λ_h for $h = s, u$ is such that $\lambda_s \neq \lambda_u$. The rest of this section considers two possible mechanisms through which such differences may arise. First, we analyze a shock that increases the value of λ_u while decreasing λ_s . For example, in an environment in which ideological engagement requires time and effort to follow the news media and gather information about the candidates' fixed characteristics, a shock that increases the opportunity cost of leisure for the skilled voters and decreases it for the unskilled voters would yield such movements. Second, we analyze an opposite shock that decreases the value of λ_u while increasing λ_s . Such movements may occur as a result of a shock that accentuates the ideological concerns of a voter as a luxury good. In the following proposition, we describe how the candidates' vote shares would be affected as a result:

Proposition 7. *In response to a shock that increases λ_u and decreases λ_s , the vote share of the outsider candidate increases if and only if $f_s(\bar{\sigma}_s) > f_u(\bar{\sigma}_u)$. The outsider candidate's vote share increases in response to an opposite shock if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$.*

Similar to Corollary 3, intuition for Proposition 7 can be gained by looking at whether the shock elevates the outsider candidate's inherent ability to deliver on his campaign promise. When λ_u increases and λ_s decreases so that the unskilled care more and the skilled care less about ideology, the outsider candidate unambiguously gains vote share if and only if the skilled voters have a greater density of swing voters. This is because the outsider candidate has a policy advantage with the skilled group of voters in this

situation and this advantage is strengthened as the skilled voters start to care relatively more about policy. On the other hand, a reverse shock in which λ_u decreases and λ_s increases benefits the outsider candidate for exactly the opposite reason when the unskilled swing voters are ideologically more concentrated.

Based on our main equilibrium characterization, each of the results in this section makes a theoretical prediction on how either the tax rates promised by the candidates or their vote shares will be affected as a result of a specific shock to one of the model's parameters. In the following section, we discuss each of these predictions in light of the existing empirical evidence on the recent rise of outsider candidates in local and national elections.

6 Empirical Implications

The main goal of our analysis has been to offer a mechanism that sheds light on the rise of outsider candidates observed not only in the recent presidential elections of the U.S. in 2016 or France in 2017, but also at the local level through the widely documented shift toward the ideological extremes in the U.S. Congress. While formally testing the empirical implications that are spelled out in the results of Section 5.3. is beyond the scope of this paper, we discuss our findings in this section in light of the various empirical studies on the factors behind the growing support for extremism.

In Autor, Dorn, Hanson and Majlesi (2016), the authors find evidence that extremist candidates became successful in congressional elections in the U.S. in districts that were disproportionately hurt by international trade. There has also been a number of analyses documenting that President Trump won by a larger margin in counties dominated by unskilled jobs that are threatened by technology and trade exposure. The mechanism we introduced in this paper, in which voters perceive the more extremist candidate as an outsider who is more likely to upset the status-quo, can account for this relationship between a higher vote share for the more extreme candidate and economic distress if the unskilled swing voters are ideologically more concentrated in the districts this outcome was observed. Our results further indicate that rising income inequality would exacerbate this outcome as the unskilled voters reward the outsider candidate for greater promised expected absolute redistribution. Therefore, our findings are consistent with the evidence that local economies that are either in distress or are in danger of becoming so due to forces such as automation or import competition were more likely to have favored Trump over Clinton in the 2016 U.S. election or vote for Brexit in the U.K.

In response to the studies that point to fundamental economic drivers behind the rise of outsider candidates, Freund and Sidhu (2017) emphasize the importance of cultural issues and ideology. Specifically, the authors show that the counties that shifted their support to either party compared to the 2012 election had similar shares of manufacturing employment in their populations. In fact, they indicate that significant number of counties with low unemployment rates overwhelmingly voted for Trump. While we primarily provide an economic rationale for the rise of outsider candidates by introducing a channel through which a candidate's fixed ideology interacts with his ability to deliver on his policy promise, our results can also provide a theoretical foundation for evidence on the primacy of ideology over economic issues. For instance, if the unskilled voters simultaneously experienced greater ideological extremism and an intensification of their ideological preferences, then our results would indicate that the outsider candidate's vote share increases as a result.²⁸

Given the existing evidence on the importance of economic and ideological issues as drivers of the support for more extreme candidates, our theoretical framework can help shed light on the mechanisms that give rise to such voter behavior. In this regard, it is important to recognize that economic and ideological issues need not be mutually exclusive in producing greater support for outsider candidates. Our goal in this paper is to provide one channel through which these two drivers of voting behavior may interact by creating a perception that more extreme politicians are better at changing the status-quo. Thus, in addition to disentangling these two effects, empirical work that identifies specific channels of interaction between economic issues and ideology is potentially valuable in explaining the success of extremist candidates.

7 Concluding Remarks

This paper studied the rise in the vote shares of outsider candidates vis-a-vis establishment ones using an electoral competition model with differentiated candidates. The model featured imperfect commitment to policies such that the outsider candidate has a greater chance of implementing a given policy and the establishment candidate is better at maintaining the status-quo. While the voters cared both about ideology and policy, they also evaluated each candidate's ability to deliver on his policy promise. Such voting

²⁸For studies that document the increasing ideological polarization in the U.S among both voters and legislators, see Poole and Rosenthal (2000), McCarty, Poole and Rosenthal (2006) and Harbridge and Malhotra (2011). The American National Election Survey also reports growth during the previous decade in the percentage of respondents who claimed an extreme personal ideological preference.

behavior based on expected payoffs constituted the basis for the equilibrium interaction between the candidates' fixed ideological positions and their policy promises.

The equilibrium in our model features policy divergence and pandering to the same group of voters by the candidates. Due to his greater ability to implement his policy promise, the outsider candidate always panders relatively more in equilibrium to the favored group. Similarly, the establishment candidate's advantage in maintaining the status-quo implies that his proposed policy is relatively closer to the preferred policy of the group that favors the status-quo. In equilibrium, greater ideological extremism and income inequality result in polarization of support between the two groups of voters. Nonetheless, we find that these two forces always benefit the outsider candidate's vote share regardless of which group of swing voters has the greater ideological concentration. These theoretical results offer a mechanism through which the empirical evidence on the link between economic hardship and support for outsider candidates may be rationalized. Moreover, our results do not necessarily imply that purely economic factors are the sole determinants of voter support for extremism. Instead, we find that specific shifts in the relative importance of ideology for a given group of voters can drive support for outsider candidates under certain conditions. Thus, our theoretical results provide a foundation for the evidence pointing to the importance of ideological as well as economic factors behind the rise of anti-establishment movements in politics.

While this paper operationalizes the source of economic preference disparity between skilled and unskilled voters with a redistribution policy in the form of an income tax rate, it is important to emphasize that our theoretical results are robust to any type of redistribution policy over which the groups of voters fundamentally disagree. For example, the policy variable might take the form of trade protection or immigration restrictions that imply a redistribution of wealth from one group of voters to another. While the main equilibrium characterization would remain the same, studying our model in the context of different policies would yield novel insights into the nature of electoral competition between an outsider and an establishment candidate. Furthermore, an exhaustive analysis of outsider candidates requires understanding the party nomination process and competition between rivals within a party. Along with extensions to other policies such as trade protections, we believe endogenizing candidate selection to be a fruitful pursuit for future research.

8 Appendix A: Micro-foundations

The result of the lobbies' competing efforts to persuade the government can be represented as the outcome of a contest. The model that we present here builds on Skaperdas and Vaidya (2012), who formally establish a relationship between the widely-used contest success functions in the literature and a persuasion game between an uninformed audience and two interested parties that present evidence in favor of their positions.²⁹

The main result in Skaperdas and Vaidya (2012) implies in our setting that when government j decides between t_q and t_j probabilistically, the contest success function that yields the status-quo lobby's winning probability also yields the government's posterior belief that t_q is the better policy.³⁰ Based on this framework, let $s \in S = \{t_q, t_j\}$ for $j \in \{L, R\}$ denote a state of the world, where $s = t_q$ indicates that t_q is the better policy and $s = t_j$ indicates that government j 's campaign promise t_j is the better policy.³¹ The probability of observing a given pair of arguments $(a_1, a_2) \in \mathbb{R}_+^2$ when t_q is the better policy is then given by $L_q(a_1, a_2) = \text{prob}[(a_1, a_2) \mid s = t_q]$ and the probability of observing the pair $(a_1, a_2) \in \mathbb{R}_+^2$ when t_j is the better policy is given by $L_j(a_1, a_2) = \text{prob}[(a_1, a_2) \mid s = t_j]$ for $j \in \{L, R\}$. Following Skaperdas and Vaidya (2012), we assume that government j utilizes the following power-law form for the ratio of these two likelihood functions:

$$\frac{L_q(a_1, a_2)}{L_j(a_1, a_2)} \equiv \beta \left(\frac{a_1}{a_2} \right)^\mu, \quad (11)$$

where $\beta > 0$ and $\mu > 0$. Letting η denote the government's (common knowledge) prior belief that $s = t_q$ and $\eta'(a_1, a_2)$ denote his posterior belief after observing the lobbies' arguments, Bayes' rule implies

$$\eta'(a_1, a_2) = \frac{\eta L_q(a_1, a_2)}{\eta L_q(a_1, a_2) + (1 - \eta) L_j(a_1, a_2)}. \quad (12)$$

²⁹Konrad (2009) provides an overview of contest success functions. For specific applications in which contest success functions are used to model persuasion, see Baron (1994), Nitzan (1994), Grossman and Helpman (1996) or Epstein and Nitzan (2006).

³⁰The fact that the government determines policy based on his posterior belief about whether or not the status-quo policy is better does not contradict our assumption that the candidates are purely office-motivated. Given that this posterior belief is common knowledge, each candidate still announces a policy before the election in order to maximize his vote share.

³¹As also emphasized in Section 4, these states refer to which policy would be better at fulfilling an objective the elected government may have, which we do not model.

Together, equations (11) and (12) yield the following expression for the government's posterior belief that t_q is the better policy:³²

$$\eta'(a_1, a_2) = \frac{\beta\eta(a_1)^\mu}{(1-\eta)(a_2)^\mu + \beta\eta(a_1)^\mu}. \quad (13)$$

Note that given the lobbies' arguments, the government's posterior belief as given in (12) is increasing in the likelihood that t_q is the better policy. Accordingly, equations (11) and (12) imply that assuming either that the parameter β , which represents the government's bias, and/or the prior belief η is greater for the establishment candidate yields the desired result that an establishment government is more likely to implement the status-quo policy t_q than an outsider one. However, for a more rigorous micro-foundation, we describe below the lobbies' optimal choice of arguments to present to each type of government.

Let Q_k and J_k respectively denote the fixed benefit to lobby $k \in \{1, 2\}$ from the implementation of policies t_q and t_j by government $j \in \{L, R\}$ such that $Q_1 > J_1$ and $J_2 > Q_2$. Given that the government determines the policy based on his posterior belief obtained via Bayes' rule, each lobby $k = 1, 2$ simultaneously and independently chooses its argument a_k in order to maximize its expected payoff, taking the other lobby's argument a_{-k} as given:

$$\max_{a_k} \eta'(a_k, a_{-k})Q_k + [1 - \eta'(a_k, a_{-k})]J_k - c_{k,j}(a_k; \gamma_{k,j}). \quad (14)$$

Assuming that the two candidates have the same parameter values for β and μ , and the same prior belief that t_q is the better policy, the necessary and sufficient first-order conditions for the solution to (14) indicate that while the marginal benefits of an extra unit of argument are equivalent across the two types of governments for a given lobby $k \in \{1, 2\}$, the fact that $\gamma_{k,L} \neq \gamma_{k,R}$ implies that the marginal costs differ (as long as $\gamma_{k,j}$ does not simply determine a fixed cost). Specifically, we know that $c'_{1,L}(a_1; \gamma_{1,L}) < c'_{1,R}(a_1; \gamma_{1,R})$ for any given a_1 if and only if L is the establishment government and $c'_{2,L}(a_2; \gamma_{2,L}) < c'_{2,R}(a_2; \gamma_{2,R})$ for any given a_2 if and only if L is the outsider government.

Solving for the Nash equilibrium pair of arguments based on (14) indicates that each lobby's best response function is decreasing in the other lobby's arguments, provided that the governments' prior belief η that $s = t_q$ is not too high. Imposing the stabil-

³²This expression is derived in a slightly different form in Proposition 1 in Skaperdas and Vaidya (2012).

ity condition on equilibrium that each lobby responds to a unit change in the other lobby's arguments by less than a unit allows us to perform comparative statics on equilibrium. As the status-quo lobby optimally presents more arguments and the reform lobby presents less arguments to the establishment government, equation (11) implies that $L_q(a_1, a_2)/L_j(a_1, a_2)$ takes greater values for an establishment government than for an outsider one. Accordingly, by equation (12), an establishment government has a greater posterior belief that the status-quo policy is better compared to an outsider, which in turn results in a higher probability that the status-quo prevails. The same arguments can be used to show that the government's campaign promise has a greater chance of being implemented under an outsider government.

In order to focus exclusively on the relationship between the government's status as an outsider and the probability that the status-quo prevails, the above analysis assumed that the distance of the policy from the status-quo did not matter for a government's ability to deliver on his campaign promise. However, our assumption that the probability that the status-quo policy is implemented is increasing in its distance from the government's campaign promise can be motivated based on the framework laid out in this Appendix. For example, it is reasonable to argue that the government pays relatively less attention to the lobbies' arguments when the two policy options are close and there exist few discernible differences between their impacts. As the two policies diverge, the government starts paying more attention to the lobbies' arguments. This reasoning can be formalized by assuming that the parameter μ that appears in equation (11) and measures a government's attentiveness to the lobbies' arguments is in fact an increasing function of $|t_j - t_q|$.³³ As the value of the function μ increases, government j 's posterior belief also increases. Alternatively, each lobby k 's fixed benefits Q_k and J_k from the implementation of policies may depend on the distance $|t_j - t_q|$. This would lead the government's posterior belief, and hence the probability that the status-quo prevails, to depend on the distance between the two possible tax rates through the lobbies' endogenous argument choices. Either approach establishes a channel through which greater stakes from abandoning the status-quo lead to a status-quo bias that applies equally to both candidates.

³³See Skaperdas and Vaidya (2012) and their references for a more detailed discussion of the parameters that appear in equation (11).

9 Appendix B: Proofs

Proof of Lemma 1. The assumption that the function $v_h(t_j)$ is twice-differentiable along with the given functional form of a voter's ideological utility imply that the function $\bar{\sigma}_h(t_L, t_R)$ is also twice-differentiable for $h = s, u$. Differentiating $\bar{\sigma}_h(t_j, t_{-j})$ with respect to t_j for any given t_{-j} , $h \in \{s, u\}$ and $j \in \{L, R\}$ yields

$$\frac{\partial \bar{\sigma}_h(t_j, t_{-j})}{\partial t_j} = \frac{1}{2\lambda(\sigma_{-j} - \sigma_j)} [\tilde{p}'(t_j)(v_h(t_j) - v_h(t_q)) + p_j(t_j, \sigma_j)v'_h(t_j)]. \quad (15)$$

Note that $\tilde{p}'(t_j) > 0$ if and only if $t_j < t_q$. Furthermore, the two expressions in the brackets in (15) always have opposite signs so that the sign of $\frac{\partial \bar{\sigma}_h(t_j, t_{-j})}{\partial t_j}$ depends on whose magnitude dominates. For example, letting $h = u$, $j = L$ and $t_q > t_L$ indicates that (15) is positive if and only if $p_L(t_L, \sigma_L)v'_u(t_L) > |\tilde{p}'(t_L)(v_u(t_L) - v_u(t_q))|$.

The twice-differentiability of the functions p_j and v_h for $j = L, R$ and $h = s, u$ implies that the functions $|\tilde{p}'(t_j)(v_h(t_j) - v_h(t_q))|$ and $|p_j(t_j, \sigma_j)v'_h(t_j)|$ must be continuous on $[0, 1]$ for any given σ_j . First, let $h = s$ and choose the bounds on the functions $v_s(t_j)$ and $v'_s(t_j)$ for $j = L, R$ such that $\tilde{p}'(0)(v_s(0) - v_s(t_q)) > |p_j(0, \sigma_j)v'_s(0)|$ and $\tilde{p}'(1)(v_s(1) - v_s(t_q)) < |p_j(1, \sigma_j)v'_s(1)|$. By the Intermediate Value Theorem, there exists $t_j \in (0, 1)$ such that $\tilde{p}'(t_j)(v_s(t_j) - v_s(t_q)) = |p_j(t_j, \sigma_j)v'_s(t_j)|$ for $j \in \{L, R\}$. Thus, $\bar{\sigma}_s(t_j, t_{-j})$ is a non-monotonic function of t_j , since neither expression's magnitude dominates the other's for all $t_j \in [0, 1]$ and therefore $\bar{\sigma}_s(t_j, t_{-j})$ is both increasing and decreasing in t_j on its domain. Second, let $h = u$ and choose the bounds on the functions $v_u(t_j)$ and $v'_u(t_j)$ for $j = L, R$ such that $|\tilde{p}'(0)(v_u(0) - v_u(t_q))| < p_j(0, \sigma_j)v'_u(0)$ and $|\tilde{p}'(1)(v_u(1) - v_u(t_q))| > p_j(1, \sigma_j)v'_u(1)$. The same arguments used for skilled voters yield the result that $\bar{\sigma}_u(t_j, t_{-j})$ is also a non-monotonic function of t_j . This completes the proof that the ideologies of the swing voters respond non-monotonically to changes in a candidate's promised tax rate. \square

Proof of Proposition 1. Matakos and Xefteris (2017a) consider the same fundamental model as ours in which two candidates with fixed ideologies choose tax rates to compete for the support of two groups of voters that differ in their incomes. The authors model candidate differentiation by letting $w_{j,h}$ be a different function for each $j \in \{L, R\}$ and $h \in \{s, u\}$, where $w_{j,h}(t_j)$ yields a group- h voter's policy utility from the election of candidate j . In this more general setting, they prove the existence of a unique pure-strategy equilibrium if the candidates have sufficiently different ideologies. Letting $w_{j,h}(t_j) \equiv \mathbb{E}_j[v_h(t_j)]$ for $j = L, R$ and $h = s, u$, where $\mathbb{E}_j[v_h(t_j)]$ is given by equation (2),

our model of candidate differentiation becomes a special case of their setting. Therefore, we can conclude by Proposition 7 in Matakos and Xefteris (2017a) that there exists a unique pure-strategy equilibrium (t_L^*, t_R^*) of our model, provided that the candidates' ideologies σ_L and σ_R are sufficiently different.

The necessary and sufficient first-order condition for an interior solution that characterizes candidate j 's optimal tax rate $t_j \in (0, 1)$ for $j \in \{L, R\}$ is given by

$$\alpha_u f_u(\bar{\sigma}_u) \frac{\partial \bar{\sigma}_u(t_j, t_{-j})}{\partial t_j} + \alpha_s f_s(\bar{\sigma}_s) \frac{\partial \bar{\sigma}_s(t_j, t_{-j})}{\partial t_j} = 0, \quad (16)$$

which can be re-written using equation (15) as

$$-\frac{\alpha_u f_u(\bar{\sigma}_u)}{\alpha_s f_s(\bar{\sigma}_s)} = \frac{\tilde{p}'(t_j)[v_s(t_j) - v_s(t_q)] + p_j(t_j, \sigma_j)v'_s(t_j)}{\tilde{p}'(t_j)[v_u(t_j) - v_u(t_q)] + p_j(t_j, \sigma_j)v'_u(t_j)}. \quad (17)$$

Equation (17) implies that its right-hand side is equalized for candidates L and R in an interior solution. On the other hand, we have a corner solution such that $t_j = 1$ and only if $\alpha_u f_u(\bar{\sigma}_u) \frac{\partial \bar{\sigma}_u(t_j, t_{-j})}{\partial t_j} \Big|_{t_j=1} + \alpha_s f_s(\bar{\sigma}_s) \frac{\partial \bar{\sigma}_s(t_j, t_{-j})}{\partial t_j} \Big|_{t_j=1} \geq 0$ for $j \in \{L, R\}$. Similarly, a corner solution exists in which $t_j = 0$ if and only if $\alpha_u f_u(\bar{\sigma}_u) \frac{\partial \bar{\sigma}_u(t_j, t_{-j})}{\partial t_j} \Big|_{t_j=0} + \alpha_s f_s(\bar{\sigma}_s) \frac{\partial \bar{\sigma}_s(t_j, t_{-j})}{\partial t_j} \Big|_{t_j=0} \leq 0$ for $j \in \{L, R\}$.

Consider an interior solution characterized by (17) for $j = L, R$ and suppose this equilibrium is such that $t_L^* = t_R^*$. Then, equating the right-hand sides of (17) for $j = L, R$ yields the result that $\bar{p}_L = \bar{p}_R$. Since $\bar{p}(\sigma_j)$ is strictly increasing in $|\sigma_j|$ for $j \in \{L, R\}$, it must be true that $|\sigma_L| = |\sigma_R|$. To see that the converse also holds, let $|\sigma_L| = |\sigma_R|$ so that $\bar{p}_L = \bar{p}_R$. Then, since the function $\tilde{p}(t_j)$ is not candidate-specific, the probability function $p_j(t_j, \sigma_j)$ ceases to be candidate-specific as well such that the voters' preferences now satisfy the UCR property. In this environment, equation (15) implies $\left| \frac{\partial \bar{\sigma}_h(t_L, t_R)}{\partial t_L} \right| = \left| \frac{\partial \bar{\sigma}_h(t_L, t_R)}{\partial t_R} \right|$ for $h \in \{s, u\}$, which further implies that the candidates face the same necessary and sufficient first-order condition for optimality given in (16). As a result, we must have $t_L^* = t_R^*$.

Note that this result holds only in one direction for possible corner solutions. Specifically, if $|\sigma_L| = |\sigma_R|$, then the candidates solve the same problem and $t_L^* = t_R^*$ must be true regardless of whether the optimum is interior or at a corner. However, the converse is not necessarily true. For example, consider an equilibrium such that $t_L^* = t_R^* = 1$, which implies $\alpha_u f_u(\bar{\sigma}_u) \frac{\partial \bar{\sigma}_u(t_j, t_{-j})}{\partial t_j} \Big|_{t_j=1} + \alpha_s f_s(\bar{\sigma}_s) \frac{\partial \bar{\sigma}_s(t_j, t_{-j})}{\partial t_j} \Big|_{t_j=1} \geq 0$ for $j = L, R$. If $\alpha_u f_u(\bar{\sigma}_u)$ is sufficiently greater than $\alpha_s f_s(\bar{\sigma}_s)$, then candidates with different outsider statuses may still choose $t_L^* = t_R^* = 1$, indicating that $t_L^* = t_R^*$ in a corner solution

equilibrium does not necessarily imply $|\sigma_L| = |\sigma_R|$. \square

Proof of Proposition 2. By Assumption 2, the necessary condition for candidate j 's optimal tax rate $t_j \in (0, 1)$ given in (16) can be written as

$$\frac{B\alpha_u\alpha_s(I_s - I_u)[f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s)][\tilde{p}'(t_j)(t_j - t_q) + p_j(t_j, \sigma_j)]}{2\lambda(\sigma_R - \sigma_L)} = 0, \quad (18)$$

which implies $\tilde{p}'(t_j)(t_j - t_q) + p_j(t_j, \sigma_j) = 0$. The second-order condition for optimality such that $f_u(\bar{\sigma}_u) \neq f_s(\bar{\sigma}_s)$ yields the condition $(f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s))(\tilde{p}''(t_j)(t_j - t_q) + 2p'_j(t_j, \sigma_j)) < 0$. Thus, at the optimum, $\tilde{p}''(t_j)(t_j - t_q) + 2p'_j(t_j, \sigma_j) < 0$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$. This implies that if the optimal t_j is such that $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$, then $p_j(t_j, \sigma_j)(t_j - t_q)$ is maximized, and if the optimal t_j is such that $f_u(\bar{\sigma}_u) < f_s(\bar{\sigma}_s)$, then $p_j(t_j, \sigma_j)(t_j - t_q)$ is minimized. Notice that $p_j(t_j, \sigma_j)(t_j - t_q) = 0$ when $t_j = t_q$ and $p_j(t_j, \sigma_j)(t_j - t_q) > 0$ if and only if $t_j > t_q$. Consequently, the optimal t_j for $j \in \{L, R\}$ must be such that $t_j > t_q$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$.

To complete the proof of the first part of Proposition 2, consider optimal tax rates such that $f_u(\bar{\sigma}_u) = f_s(\bar{\sigma}_s)$, which require the optimality condition $\alpha_s f'_u(\bar{\sigma}_u) + \alpha_u f'_s(\bar{\sigma}_s) < 0$ to be satisfied. Since the swing voter ideologies are uniquely defined, equilibrium requires that there exists at most one such density value where the slopes of the groups' density functions are not both positive. Note that constant density distributions such as a uniform distribution that are widely assumed in the literature clearly do not satisfy these conditions. Furthermore, for other types of distributions, the equilibrium is indeterminate as there exist more than a unique pair of taxes that would satisfy the optimality conditions, ruling out reasonable comparative static exercises.³⁴ For example, a left-skewed distribution of ideologies would allow a continuum of pairs of tax rates to satisfy the necessary and sufficient equilibrium conditions. Therefore, since this type of equilibrium does not exist with the commonly-used uniform distribution and it is characterized by indeterminacy problems when it does exist, we rule out such equilibria for the rest of the analysis.

To prove the second part of the proposition, first consider an equilibrium in which $t_j > t_q$ for $j = L, R$. Suppose $t_L > t_R$. Since $\tilde{p}'(t_L) < \tilde{p}'(t_R) < 0$ and $t_L - t_q > t_R - t_q$, the condition $\tilde{p}'(t_j)(t_j - t_q) + p_j(t_j, \sigma_j) = 0$ for $j \in \{L, R\}$ that must be true in equilibrium implies $p_L(t_L, \sigma_L) > p_R(t_R, \sigma_R)$. By the fact that $\tilde{p}(t_L) < \tilde{p}(t_R)$, we have $\bar{p}_L > \bar{p}_R$, which implies $|\sigma_L| > |\sigma_R|$. This proves the statement that if $t_L > t_R > t_q$, then $|\sigma_L| > |\sigma_R|$. To

³⁴This indeterminacy arises due to Assumption 2 that makes the swing voter ideologies depend linearly on the candidates' tax rates.

see that the converse is also true, let $|\sigma_L| > |\sigma_R|$ so that $\bar{p}_L > \bar{p}_R$. Suppose $t_R > t_L > t_q$. Together, $\bar{p}_L > \bar{p}_R$ and $\tilde{p}(t_L) > \tilde{p}(t_R)$ imply $p_L(t_L, \sigma_L) > p_R(t_R, \sigma_R)$, which in turn implies that $\tilde{p}'(t_L)(t_L - t_q) < \tilde{p}'(t_R)(t_R - t_q)$. Since $t_R - t_q > t_L - t_q$ by assumption and $\tilde{p}'(t_j) < 0$ for $j \in \{L, R\}$, the inequality $|\tilde{p}'(t_R)| < |\tilde{p}'(t_L)|$ must hold, yielding the contradiction that $t_R < t_L$. Hence, if $|\sigma_L| > |\sigma_R|$, then $t_L > t_R > t_q$.

Second, following a similar analysis as above, consider an equilibrium in which $t_j < t_q$ for $j = L, R$. Suppose $t_R < t_L$. Since $\tilde{p}'(t_j) > 0$ here, the inequalities $|t_L - t_q| < |t_R - t_q|$ and $\tilde{p}'(t_L) < \tilde{p}'(t_R)$ together imply that $p_R(t_R, \sigma_R) > p_L(t_L, \sigma_L)$. Given $\tilde{p}(t_R) < \tilde{p}(t_L)$, we must have $\bar{p}_R > \bar{p}_L$, i.e. $|\sigma_R| > |\sigma_L|$. This proves that $t_R < t_L < t_q$ implies $|\sigma_R| > |\sigma_L|$. For the converse of this result, let $|\sigma_R| > |\sigma_L|$ so that $\bar{p}_R > \bar{p}_L$ is true, but suppose $t_L < t_R$. Given that $p_R(t_R, \sigma_R) > p_L(t_L, \sigma_L)$ holds since $\tilde{p}(t_R) > \tilde{p}(t_L)$, we must have $\tilde{p}'(t_R)|t_R - t_q| > \tilde{p}'(t_L)|t_L - t_q|$. The assumption $|t_L - t_q| > |t_R - t_q|$ indicates that $\tilde{p}'(t_R) > \tilde{p}'(t_L)$, which implies $t_R < t_L$, a contradiction. Hence, if $|\sigma_R| > |\sigma_L|$, then $t_R < t_L < t_q$. This completes the proof of Proposition 2. \square

Proof of Proposition 3. The proof of Proposition 2 indicated that equation (18) implicitly defines candidate j 's optimal tax rate t_j for $j \in \{L, R\}$ when the second-order condition $(f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s))(\tilde{p}''(t_j)(t_j - t_q) + 2\tilde{p}'_j(t_j, \sigma_j)) < 0$ is satisfied. Thus, implicitly differentiating (18) with respect to $|\sigma_j|$ yields

$$\frac{B\alpha_u\alpha_s(I_s - I_u)}{2\lambda(\sigma_R - \sigma_L)}(f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s)) \left[[\tilde{p}''(t_j)(t_j - t_q) + 2\tilde{p}'_j(t_j)] \frac{\partial t_j}{\partial |\sigma_j|} + \frac{\partial \bar{p}(\sigma_j)}{\partial |\sigma_j|} \right] = 0. \quad (19)$$

Since $\bar{p}(\sigma_j)$ is increasing in $|\sigma_j|$, equation (19) implies that the optimal t_j is increasing in $|\sigma_j|$ for $j \in \{L, R\}$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$. \square

Proof of Proposition 4. Consider candidate L without loss of generality. The definition of a group- h swing voter in equation (4) for $h \in \{s, u\}$ yields

$$\frac{\partial \bar{\sigma}_u}{\partial |\sigma_L|} = \frac{\frac{\partial \mathbb{E}_L[v_u(t_L)]}{\partial t_L} \frac{\partial t_L}{\partial |\sigma_L|} + \frac{\partial \mathbb{E}_L[v_u(t_L)]}{\partial |\sigma_L|}}{2\lambda(|\sigma_L| + \sigma_R)} + \frac{\mathbb{E}_R[v_u(t_R)] - \mathbb{E}_L[v_u(t_L)]}{2\lambda(|\sigma_L| + \sigma_R)^2} - \frac{1}{2} \quad (20)$$

for $h = u$, which can be re-written using Assumption 2 and imposing the necessary first-order condition (18) as follows:

$$\frac{\partial \bar{\sigma}_u}{\partial |\sigma_L|} = \frac{B\alpha_s(I_s - I_u)(t_L - t_q) \frac{\partial \bar{p}(\sigma_L)}{\partial |\sigma_L|}}{2\lambda(|\sigma_L| + \sigma_R)} + \frac{B\alpha_s(I_s - I_u)[p_R(t_R, \sigma_R)(t_R - t_q) - p_L(t_L, \sigma_L)(t_L - t_q)]}{2\lambda(|\sigma_L| + \sigma_R)^2} - \frac{1}{2}. \quad (21)$$

Notice that letting $|\sigma_L| = |\sigma_R|$ makes the second term above equal zero since equilibrium would be symmetric by Proposition 1. If $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$ so that $t_L > t_q$ in equilibrium, then a sufficiently large value for parameter B would make (21) positive, which implies that the vote share of candidate L among the unskilled voters increases as he becomes more ideologically extreme. At the same time, it can be verified by calculating $\frac{\partial \bar{\sigma}_s}{\partial |\sigma_L|}$ that his support among the skilled voters decreases. Note that if the ideological utility that voter i from group $h \in \{s, u\}$ receives from candidate $j \in \{L, R\}$ were to take a different functional form such as $\lambda|\sigma_j - \sigma_{ih}|$, then the second expression in (21) would disappear altogether, thereby making the conclusion that $\frac{\partial \bar{\sigma}_u}{\partial |\sigma_L|} > 0$ and $\frac{\partial \bar{\sigma}_s}{\partial |\sigma_L|} < 0$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$ for sufficiently large values of B hold more generally for any σ_L and σ_R . \square

Proof of Corollary 1. Consider again candidate L without loss of generality. To simplify the analysis, first note that $\frac{dV_L}{d|\sigma_L|} = \frac{\partial V_L}{\partial t_L} \frac{\partial t_L}{\partial |\sigma_L|} + \frac{\partial V_L}{\partial |\sigma_L|} = \frac{\partial V_L}{\partial |\sigma_L|}$ by optimality, which yields

$$\frac{\partial V_L}{\partial |\sigma_L|} = \frac{B\alpha_u\alpha_s(I_s - I_u)(t_L - t_q)(f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s))\frac{\partial \bar{p}(\sigma_L)}{\partial |\sigma_L|}}{2\lambda(|\sigma_L| + \sigma_R)} \quad (22)$$

$$- \frac{B\alpha_u\alpha_s(I_s - I_u)(f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s))[p_L(t_L, \sigma_L)(t_L - t_q) - p_R(t_R, \sigma_R)(t_R - t_q)]}{2\lambda(|\sigma_L| + \sigma_R)^2} - \frac{1}{2}[\alpha_u f_u(\bar{\sigma}_u) + \alpha_s f_s(\bar{\sigma}_s)].$$

By the same arguments in the proof of Proposition 4, letting $|\sigma_L| = |\sigma_R|$ makes the second term of (22) equal to zero, which again implies that $\frac{\partial V_L}{\partial |\sigma_L|} > 0$ for sufficiently large values of the parameter B since $(t_L - t_q)(f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s)) > 0$ always holds in equilibrium. Note that this second term disappears altogether again if the voters' ideological utilities admit a different functional form such as $\lambda|\sigma_j - \sigma_{ih}|$ for $j \in \{L, R\}$ and $h \in \{s, u\}$. This implies that $\frac{\partial V_L}{\partial |\sigma_L|} > 0$ would be true for any σ_L and σ_R . \square

Proof of Proposition 5. Differentiating the swing voter ideologies $\bar{\sigma}_u$ and $\bar{\sigma}_s$ as defined in equation (4) yields

$$\frac{\partial \bar{\sigma}_u}{\partial (I_s - I_u)} = \frac{B\alpha_s[p_L(t_L, \sigma_L)(t_L - t_q) - p_R(t_R, \sigma_R)(t_R - t_q)]}{2\lambda(\sigma_R - \sigma_L)}; \quad (23)$$

$$\frac{\partial \bar{\sigma}_s}{\partial (I_s - I_u)} = \frac{B\alpha_u[p_R(t_R, \sigma_R)(t_R - t_q) - p_L(t_L, \sigma_L)(t_L - t_q)]}{2\lambda(\sigma_R - \sigma_L)}. \quad (24)$$

Notice that $\frac{dp_j(t_j, \sigma_j)(t_j - t_q)}{d|\sigma_j|} = [\tilde{p}'_j(t_j)(t_j - t_q) + p_j(t_j, \sigma_j)]\frac{\partial t_j}{\partial |\sigma_j|} + (t_j - t_q)\frac{\partial \bar{p}(\sigma_j)}{\partial |\sigma_j|} = (t_j - t_q)\frac{\partial \bar{p}(\sigma_j)}{\partial |\sigma_j|}$ for $j \in \{L, R\}$ since $\tilde{p}'_j(t_j)(t_j - t_q) + p_j(t_j, \sigma_j) = 0$ by optimality. By the fact that

$\bar{p}(\sigma_j)$ is increasing in $|\sigma_j|$ for $j \in \{L, R\}$ and Proposition 2 according to which $t_j > t_q$ for $j \in \{L, R\}$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$, we have $\frac{dp_j(t_j, \sigma_j)(t_j - t_q)}{d|\sigma_j|} > 0$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$. Therefore, when $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$, it must be true that $\frac{\partial \bar{\sigma}_u}{\partial(I_s - I_u)} > 0$ if and only if $|\sigma_L| > |\sigma_R|$ and $\frac{\partial \bar{\sigma}_s}{\partial(I_s - I_u)} > 0$ if and only if $|\sigma_L| < |\sigma_R|$. Similarly, when $f_s(\bar{\sigma}_s) > f_u(\bar{\sigma}_u)$, we have $\frac{\partial \bar{\sigma}_u}{\partial(I_s - I_u)} > 0$ if and only if $|\sigma_L| < |\sigma_R|$ and $\frac{\partial \bar{\sigma}_s}{\partial(I_s - I_u)} > 0$ if and only if $|\sigma_L| > |\sigma_R|$. \square

Proof of Corollary 2. Consider candidate L without loss of generality. Differentiating $V_L(t_L, t_R)$ using the equations (23) and (24) from the proof of Proposition 5 yields

$$\frac{\partial V_L(t_L, t_R)}{\partial(I_s - I_u)} = \frac{B\alpha_u\alpha_s[p_L(t_L, \sigma_L)(t_L - t_q) - p_R(t_R, \sigma_R)(t_R - t_q)](f_u(\bar{\sigma}_u) - f_s(\bar{\sigma}_s))}{2\lambda(\sigma_R - \sigma_L)}. \quad (25)$$

The proof of Proposition 5 indicated that $\frac{dp_j(t_j, \sigma_j)(t_j - t_q)}{d|\sigma_j|} > 0$ for $j \in \{L, R\}$ if and only if $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$. Therefore, the expression (25) is always positive for the outsider candidate and negative for the establishment one. \square

Proof of Proposition 6. Differentiating the swing voter ideologies $\bar{\sigma}_u$ and $\bar{\sigma}_s$ as defined in equation (4) yields $\frac{\partial \bar{\sigma}_h}{\partial \lambda} = -\lambda^{-1}(I_s - I_u)\frac{\partial \bar{\sigma}_h}{\partial(I_s - I_u)}$ for $h = s, u$, where the partial derivatives of the swing voter ideologies with respect to income inequality are respectively given for unskilled and skilled voters in equations (23) and (24). Therefore, using the same argument as in the proof of Proposition 5, when $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$, we have $\frac{\partial \bar{\sigma}_u}{\partial \lambda} > 0$ if and only if $|\sigma_R| > |\sigma_L|$ and $\frac{\partial \bar{\sigma}_s}{\partial \lambda} > 0$ if and only if $|\sigma_R| < |\sigma_L|$. Likewise, when $f_s(\bar{\sigma}_s) > f_u(\bar{\sigma}_u)$, it follows that $\frac{\partial \bar{\sigma}_u}{\partial \lambda} > 0$ if and only if $|\sigma_R| < |\sigma_L|$ and $\frac{\partial \bar{\sigma}_s}{\partial \lambda} > 0$ if and only if $|\sigma_R| > |\sigma_L|$. \square

Proof of Corollary 3. Consider candidate L without loss of generality. The fact that $\frac{\partial \bar{\sigma}_h}{\partial \lambda} = -\lambda^{-1}(I_s - I_u)\frac{\partial \bar{\sigma}_h}{\partial(I_s - I_u)}$ for $h = s, u$ as established in the proof of Proposition 6 implies $\frac{\partial V_L(t_L, t_R)}{\partial \lambda} = -\lambda^{-1}(I_s - I_u)\frac{\partial V_L(t_L, t_R)}{\partial(I_s - I_u)}$. Thus, it follows by the positivity (negativity) of $\frac{\partial V_L(t_L, t_R)}{\partial(I_s - I_u)}$ for the outsider (establishment) candidate established in Corollary 2 that $V_L(t_L, t_R)$ must be decreasing in λ if and only if L is the outsider candidate. \square

Proof of Proposition 7. By Proposition 6, when $f_s(\bar{\sigma}_s) > f_u(\bar{\sigma}_u)$, we have $\frac{\partial \bar{\sigma}_u}{\partial \lambda_u} > 0$ if and only if L is the outsider candidate and $\frac{\partial \bar{\sigma}_s}{\partial \lambda_s} > 0$ if and only if R is the outsider candidate. Therefore, when λ_u increases and λ_s decreases, both $\bar{\sigma}_u$ and $\bar{\sigma}_s$ increase, indicating less support for candidate R and more support for candidate L , if and only if L is the outsider candidate. For the opposite shock in which λ_u decreases and λ_s

increases, the same results from Proposition 6 imply that when $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$, we have $\frac{\partial \bar{\sigma}_u}{\partial \lambda_u} > 0$ if and only if R is the outsider candidate and $\frac{\partial \bar{\sigma}_s}{\partial \lambda_s} > 0$ if and only if L is the outsider candidate. Thus, this opposite shock leads $\bar{\sigma}_u$ and $\bar{\sigma}_s$ to increase if and only if L is the outsider candidate and $f_u(\bar{\sigma}_u) > f_s(\bar{\sigma}_s)$. \square

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