If you can’t move, be ambiguous: How income inequality can increase party platform ambiguity in majoritarian and proportional systems

John Marshall*

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Although political information is receiving increasing attention, most analysts focus on the acquisition and consumption of information. This paper instead focuses on the strategic supply of information by political parties. The paper proposes a new explanation for party platform ambiguity: where policy-motivated parties are not completely flexible in the policies they can present to the electorate, they use ambiguity to move the expected policy outcome toward their ideal point. This underlying motivation applies in both majoritarian and proportional electoral systems, despite the two systems providing different kinds of incentives for parties to be ambiguous. The model is applied to redistributive politics, and suggests that income inequality typically increases platform ambiguity, especially for left parties. Empirical analysis of 15 Western European democracies using expert surveys to reduce bias in measures of ambiguity provides support for the theoretical model.

*PhD candidate, Department of Government, Harvard University. jmarsh@fas.harvard.edu. Thanks go to James Alt, Nilesh Fernando, Torben Iversen, Kenneth Shepsle and participants at the University of Tampere Summer Workshop in June 2011 for insightful comments and support.
1 Introduction

The role of political information is receiving increasing attention by researchers and policy-makers. Differences in information by social group can have wide ranging consequences for public policy, as Bartels (2008) shows with respect to the Bush income and estate tax cuts in the United States. Alvarez (1998) finds that the uncertainty surrounding policy platforms in US presidential elections has rendered many voters unable to form issue preferences. While the consumption or demand side of voter information is being increasingly researched, the supply side—especially empirically—has yet to catch up. This paper examines the supply of political information, considering the incentives for political parties who care about policy to provide ambiguous platforms concerning redistributive policy in both majoritarian and proportional representation (PR) systems when they are partially constrained in their platforms by the need to send centrist messages to the electorate. In addition to a formal theoretical analysis highlighting a new incentive for employing ambiguity, the paper tentatively provides data supporting the claim that income inequality increases platform ambiguity in both electoral systems.

Previous research has provided a variety of explanations for why political parties may choose to adopt ambiguous platforms in majoritarian systems. Downs (1957) argued that political parties aim to appeal to rationally ignorant voters, and thus faced strong incentives to remain ambiguous about their policy platforms to maximize their probability of winning. Shepsle (1972) countered that where voters are fully informed and risk-averse, no challenger would choose an ambiguous platform to defeat an incumbent. Shepsle’s analysis suggested that ambiguity would be reserved for risk-loving electorates—a condition that the empirical work of Bartels (1996) suggests is unlikely to hold.

In light of Shepsle’s (1972) observation and Page’s (1976) critique of the strong assumptions of the Downsian world, motivations for ambiguity have focused on models of majoritarian politics where voters remain risk-averse but there exist information imperfections. Alesina and Cukierman (1990) allow an incumbent who cares about office and ideology to choose their level of preference ambiguity whilst in office by employing inefficient policy instruments to prevent voters from inferring policy preferences. In equilibrium, ambiguity increases as a party places greater weight on future policy outcomes, but also as voters become more risk-acceptant. Aragones and Neeman (2000) provide similar results where candidates symmetrically compete for office (i.e. without incumbency effects). In a two-stage game where candidates first choose ideology and then ambiguity, and candidate utility is increasing in ambiguity (to flexibly deal with shocks once in office), uncertainty about the location of the median voter permits ambiguity to exist in equilibrium even when voters are risk-averse. Both models see ambiguity as a means of retaining room for manoeuvre in office. In the model of majoritarian politics most similar to that proposed here, Alesina and Holden (2008) suggest that policy-oriented parties balance pressures to converge toward the median voter with campaign contributions obtained by offering extreme positions (both increasing the probability of winning the election) by choosing ambiguous platforms. With voter uncertainty over the true preferences of the candidates, a positive level of ambiguity is chosen in equilibrium. An alternative form of uncertainty induces ambiguity in two-stage elections: Meirowitz (2005) suggests that when primary elections reveal information about the electorate, there is an option
value for candidates to remain ambiguous in primaries in expectation of standing a better chance in a general election.

Most recently, Callander and Wilson (2008) have challenged the traditional behavioural assumptions of voters and argued that ambiguity emerges in equilibrium because voting is context-dependent. In particular, preference for one candidate increasing in the dislike of the other. They show that context-dependent voters like ambiguity even when they have risk-averse and single-peaked preferences, and in equilibrium (using an otherwise standard ambiguity model) this can cause policy-oriented parties to offer ambiguous platforms.

Far less attention has been devoted to investigating platform ambiguity empirically. This is most likely because of the measurement and endogeneity problems associated with voter perception-based measures of political ambiguity (Tomz and Van Houweling 2009). Existing empirical work has mostly focused on voter perceptions of ambiguity and its effect as an independent variable. An interesting exception is Tomz and Van Houweling (2009), whose lab experiment finds informed and risk-averse voters are less likely to vote for an ambiguous candidate. However, ambiguity may be used to gain support from a party’s own supporters without suffering losses from opposition voters. On average, ambiguity does not harm a candidate’s election prospects.

The model proposed here adds to this literature in several ways. First, it provides a rationale for ambiguity based in the policy preferences of parties that are not able to fully depart from sending messages appealing to the median voter. Second, in addition to providing a model of ambiguity in majoritarian systems, similar results are identified in a simple bargaining framework characterizing the post-election bargaining underpinning a PR systems. Third, the model links platform ambiguity to redistributive politics and generates predictions that more directly link to the empirical electoral competition literature. Furthermore, this paper moves beyond the abstract results of previous research and provides a preliminary test of the model’s implications. This represents the first test of which I am aware of models where ambiguity is chosen strategically by parties.

The theoretical model integrates political competition and the opportunity for party platform ambiguity—where ambiguity is defined as the support of the distribution of the policy platform—into the context of unidimensional conflict over redistribution. The starting point is the economic environment of Romer (1975) and Meltzer and Richard (1981) where voter preferences for redistribution differ with pre-tax income. In addition to the literature on ambiguity, the results thus also speak to the large literature examining political competition over redistribution (e.g. Alesina and Glaeser 2004; Austen-Smith 2000; Bartels 2008; Iversen and Soskice 2006; Karabarbounis 2011; Moene and Wallerstein 2001, 2003; Persson and Tabellini 2003; Roemer 1998). My model is particularly relevant to Iversen and Soskice (2006) because it may be interpreted as endogenizing the probability that a party leader in a majoritarian system will defect toward their ideal point. Crucially, the model assumes that parties care about policy outcomes as well as winning office and are not entirely free to choose their platform—in particular, a platform must always place positive probability on the policy appealing to the median voter. The most obvious justification for this important restriction on platforms is within-party heterogeneity where some party members have more centrist preferences or election requires greater median convergence. I will show that despite operating through different logics, increasing income inequality is likely to increase platform
ambiguity in both majoritarian and PR systems comprising risk-averse voters.

The model of two-party majoritarian competition relies upon uncertainty created by a probabilistic voting model akin to Lindbeck and Weibull (1987). Parties that care about policy outcomes choose an ambiguous policy platform as a means of moving policy, in expectation, away from the median and toward their ideal point. They can achieve this in equilibrium because the probability of winning is not discontinuous (as in Wittman 1983 and Calvert 1985). Given that voter get diminishing marginal utility from income, an increase in income inequality—conceptualized most effectively as a mean and median preserving spread—increases the sensitivity of poor voters to policy and thus permits the left party to choose more ambiguous platforms with relatively little cost. The impact on right parties is less clear, as they balance the incentive to increase their probability of winning by appealing to poorer voters with the scope to increase its own ambiguity that the left’s ambiguity permits. In general, income inequality raises the ambiguity of left parties in particular.

Political competition with three parties operates very differently in PR systems. Abstracting from voter responses to ambiguity, the model of post-election bargaining requires two parties to form a winning coalition. Importantly, the probability of being recognized as formateur is increasing in income inequality for non-centrist parties, on account of inequality increasing the number of poor and rich voters. In addition, electoral platforms serve as important commitments because the bargaining policy outcome is a weighted average of these platforms. Using a bargaining model similar to Baron (1993) and Baron and Ferejohn (1989), I show that an increase in income inequality increases the bargaining power of non-centrist parties and thus provides an incentive to provide more ambiguous platforms that move expected policy outcomes toward the ideal point of non-centrist parties. Therefore, by affecting the ability of parties to form coalitions, income inequality can also increase ambiguity in PR systems.

Following different underlying political logics, one based on appeals to voters and the other based on appeals to potential coalition partners, income inequality typically increases platform ambiguity in both majoritarian and PR systems. This result may be surprising to those that would expect party messages to become clearer in polarized environments (e.g. McCarty et al. 2006).

However, the empirical analysis provides support for the theoretical model in Western Europe using a new approach to measuring platform ambiguity utilizing expert surveys. Not only is income inequality positively associated with platform ambiguity in both majoritarian and PR systems, but we find that increasing income inequality allows left parties to be more ambiguous. Although I make no claims of causal identification, the empirical analysis is consistent with the predictions of the theoretical model.

The paper is structured as follows. Section 2 defines the basic features of the theoretical model. Sections 3 and 4 introduce two employ two simple formal models of platform choice—one under majoritarian electoral rules and a second focusing on a setting when post-election bargaining is required. Section 5 uses expert surveys to provide a consistency check on the theoretical results. Section 6 concludes.
2 Model

In this section I will first outline the economic and general political environment. Sections 3 and 4 then analyze party platform choice under majoritarian and reduced form PR rules with post-election bargaining.

2.1 Economic environment

The economic environment is a simplified version of the Romer (1975) and Meltzer and Richard (1981) framework where voter income determines redistributive preferences. We start with a continuum of voters of unit mass, differentiated by their exogenous income $y$. Income is distributed according to cumulative density function $F(y)$ with density $f(y)$ on support $\mathcal{Y} = (0, +\infty)$. The government chooses the tax and benefit policy pair $(\tau, T)$, where $\tau \in [0, 1]$ is a proportional tax rate on $y$ and $T \geq 0$ is a lump sum transfer made to all citizens. There is a reduced form convex cost $\tau^2 \bar{y}/2$ to increasing $\tau$, where $\int ydF(y) = \bar{y}$ is the mean income.\footnote{This cost can, for example, be conceived of in terms of labour supply disincentives, capital misallocation or the inefficiency of revenue collection.} Thus, the government budget constraint is

$$\left(\tau - \frac{\tau^2}{2}\right) \bar{y} \leq T. \quad (1)$$

Given the budget constraint will bind in equilibrium, the problem simplifies to a single policy dimension $\tau$.

A voter of type $y \in \mathcal{Y}$ has the following policy utility function:

$$u(\tau; y) = (1 - \tau)y^\alpha + \left(\tau - \frac{\tau^2}{2}\right) \bar{y}^\alpha. \quad (2)$$

Since $\alpha \in (0, 1)$, $u(\tau; y)$ is concave in $y$ and $\bar{y}$. The particular functional form chosen here is designed to capture the concavity of utility in income, and thus the standard assumption that there is diminishing marginal utility from income, but also provide a tractable form for the following analysis. The results apply more generally to $u(\tau; y)$ concave in $y$ and $\tau$. Given preferences are strictly concave in $\tau$, they are single-peaked. We can thus identify the ideal policy of a voter with income $y$ as:

$$\tau(y) = 1 - \frac{y^\alpha}{\bar{y}^\alpha} \quad (3)$$

and thus, akin to Romer-Meltzer-Richard, rich voters prefer lower tax rates (less redistribution). It is important to note for the subsequent analysis that tax rates have two effects on voter utility: redistribution of income and a (disincentive) cost to increasing taxation. Given $y > 0$ the cost to taxation ensures that no individual has a preferred tax rate of $\tau = 1$. All $y > \bar{y}$ prefer $\tau = 0$. The voter with median income $y_m$ desires $\tau(y_m)$.\footnote{This cost can, for example, be conceived of in terms of labour supply disincentives, capital misallocation or the inefficiency of revenue collection.}
Finally, it is assumed that \( F(y) \) is distributed log-normally: \( Y \sim \ln \mathcal{N}(\mu, \sigma^2) \), where \( \mu \) controls the (log) scale and \( \sigma^2 \) controls the shape. The log-normal distribution is right-skewed, has continuous support over \((0, +\infty)\) and increasing the variance increases both tails, and thus captures important properties of real-world income distributions.\(^2\) Moene and Wallerstein (2003) argue the log-normal distribution provides a good approximation to the typical income distribution in an advanced democracy.

### 2.2 General political environment

The political environment builds upon the claim that office-seeking political parties have policy preferences. In addition to receiving Downs’ (1957) office “rents” \( W > 0 \), parties also care about legislative outcomes. Therefore, achieving office is, at least in part, instrumental to the implementation of desirable policies. Accordingly, a party \( p \in \mathcal{P} \) has the following utility function:

\[
z(\tau; y_p) = I_p W + u(\tau; y_p)
\]

where \( I_p \in \{0, 1\} \) is an indicator for whether party \( p \) is in office, and policy preferences are identical to those of voters. If \( W \) is large, parties place relatively little weight on the policies they implement once in office; as \( W \to \infty \), we approach Downsian discontinuous probabilities of winning. In the real world where perfect median convergence clearly does not hold, partisan preferences is a highly plausible assumption.

A strategy for party \( p \) is a probability distribution \( h_p(\tau) : [0, 1] \mapsto [0, 1] \) such that \( \int_0^1 h_p(\tau) d\tau = 1 \). We can think of parties simultaneously choosing a mixed strategy over \( \tau \). \( h_p(\tau) \) represents the probability attached to each \( \tau \) by \( p \)’s platform. The party strategy profile is simply \( h(\tau) = \{h_p(\tau)\}_{p \in \mathcal{P}} \).

Party platform are restricted in two ways. First, parties must place positive probability on the position preferred by the median voter \( \tau(y_m) \) (i.e. the solution that would occur if parties did not care about policy). This assumption captures the idea that parties are cannot completely freely pursue their preferred platform. The motivation for this assumption is that parties with non-median preferences are internally heterogeneous and different factions within parties are likely to send different messages to the public; Roemer (1998, 2001) proposes that parties contain extremist, moderate and opportunist factions. Even if the leadership wishes to commit to a policy that is not the median, there will remain some party members that wish to convey a median message, possibly because this is valuable for their own re-election or because their policy preferences diverge from the locus of the party. Empirically, there is considerable historical evidence to support the existence of preference-based factionalism (e.g. Aldrich 1995; Cohen et al. 2008; Cronin et al. 2011;\(^3\))

\(^2\)The log-normal distribution also possesses the useful mathematical property that any \( n \)th moment can be calculated as \( \mathbb{E}(Y^n) = \exp(n\mu + n^2\sigma^2/2) \); this fact will prove useful when integrating \( \int y^n dF(y) \).

\(^3\)Some theorists have argued that incumbency affects how parties convey their messages (Alesina and Cukierman 1990; Shespsle 1972). Although incumbency effects are plausible, it is unclear in which direction they should work. Moreover, changing circumstances—such as changes in the income distribution—are likely to mean that incumbents do not compete on exactly the same issues in every election or have the same preferences. Therefore, I implicitly assume party histories do not affect the clarity of the messages chosen by parties or the decision made by voters. However, the comparative static results should be robust to a Stackelberg leadership reformulation.
Kitschelt 1994; Lowndes 2008). Consequently, parties use ambiguity to move policy closer to their ideal point. Parties being constrained in the support they can apply to \( h_p(\tau) \) is critical to the paper’s results. If this were not the case, the results would simply replicate Wittman (1983) and Calvert (1985) where parties choose a pure strategy to maximize \( E[z(\tau; y_p)] \).

Second, parties must employ a uniform distribution. Hence, party \( p \) chooses \( h_p(\tau) \sim U[\tau_p, \tau_p] \) where \( \tau_p \) and \( \tau_p \) are the lower and upper limits of the uniform distribution with density \( 1/(\tau_p - \tau_p) \). The uniformity assumption does not drive the implications and comparative statics of the model (only the particular solution); it is imposed to permit clear analysis of the model.\(^4\) The uniformity assumption may also be realistic in that parties cannot offer several sharply different policy (e.g. either an income tax rate of 20% or 40%), but must instead offer a range of policies (e.g. the tax rate could equally be anywhere between 20% and 40%). The uniform distribution also gives a clear meaning to ambiguity in the model: a platform is more ambiguous where the interval \([\tau_p, \tau_p]\) of policies with positive support is larger.

Throughout this paper I will assume that in choosing a platform, \( p \) is committing to \( h_p(\tau) \) in the sense that this distribution will constrain \( p \)'s policy options if \( p \) enters office. I provide further details below when outlining the specifics of the majoritarian and PR games. Although Fiorina (1997) finds evidence that parties in the USA generally stay true to their campaign claims, the problems of credible commitment and time-inconsistency have become a key focus in institutional analysis (e.g. Alesina 1988; Iversen and Soskice 2006). Without a commitment assumption, rational voters would gleam nothing from pre-electoral politics because they recognize that parties are not bound by the pre-election policy platforms once in office. Although this assumption is often made, it is nevertheless strong.\(^5\) Alesina (1988) provides a rationale for commitment in terms of repeated games, showing that if voters punish defection and parties care about the future, then parties will honour their pre-election promises even when they are unbound once in office. More generally, reputation-based arguments are used to justify this assumption. Nevertheless, it should be noted that voters punishing their preferred candidate in future may be incredible (Aragonés and Postlewaite 2002).\(^6\) Since platforms represent commitments, the final policy outcome is an independent draw from the winning probability distribution(s).

In both electoral systems, voters cast their vote for party \( p \) after observing the set of party platforms \( h(\tau) \). Thus, a strategy for a voter is \( v(h(\tau); y) : [0, 1]^{\left|\mathcal{P}\right|} \rightarrow p \), where \( \left|\mathcal{P}\right| \) is the number of parties in the system. Voters always turn out, and will have no incentive to vote strategically. A strategy profile for voters is \( v(h(\tau)) = \{v(h(\tau); y)\}_{y \in \mathcal{Y}} \).

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\(^4\)If parties could freely choose a distribution, they would seek to emulate the Wittman-Calvert result by placing all but a tiny weight on a policy arbitrarily close to the Wittman-Calvert pure strategy divergence position. Nevertheless, some ambiguity would remain as positive weight is placed on the median’s desired policy. In light of the parties being forced to place positive probability on the median voter’s ideal point, the uniform distribution assumption exaggerates the ambiguity result by forcing equal probability mass onto all points between the limits.

\(^5\)See Besley and Coate (1997) and Osbourne and Slivinski (1996) for an alternative citizen-candidate approach where candidates cannot commit to policy before an election.

\(^6\)A further issue is whether voters can identify cases where parties renege on their promises. When parties are ambiguous it is often unclear whether the actual policy implemented is consistent with the pre-election claims. Future research might consider the conditions under which voters choose to punish or not believe their favored party (according to its stated policy position), in conjunction with the way in which defection is actually identified and perceived.
3 Majoritarian politics

The majoritarian politics game $\Gamma_M$ is a simple probabilistic voting model (see Lindbeck and Weibull 1987) under plurality rule. In majoritarian systems, there are strong pressures reducing the number of competing parties to two (Duverger 1954; Cox 1997) and preventing the entry of new party (Palfrey 1984). Accordingly, the analysis assumes the existence of only two parties $p \in \{l, r\}$; $l$ will represent the poor because $y_l$ is below the median income $y_m$, while $r$ has $y_r > y_m$ and will represent the rich.\(^7\) The game is structured as follows:

1. Parties $p \in \{l, r\}$ commit to $h_p(\tau)$ to maximize $\mathbb{E}z(\tau; y_p)$.
2. Voters observe $h(\tau)$, and choose their vote $v(h(\tau); y)$ to maximize $\mathbb{E}u(\tau; y)$.
3. The election is decided by plurality rule, and the winning party $w$ implements policy according to their pre-election platform $h_w(\tau)$.

The solution concept for this sequential game is subgame perfect Nash equilibrium (SPNE). The full strategy profile for $\Gamma_M$ is $\sigma_M = (h(\tau), v(h(\tau)))$. A SPNE is thus $\sigma_M^* = (h^*(\tau), v^*(h(\tau)))$. I will proceed to solve this game using backward induction.

3.1 Voting

First consider the actions of voters. In addition to gaining utility from policy according to $u(\tau; y)$, voters are also subject to common shock $\delta$ as in Lindbeck and Weibull (1987). A voter of type $y$ votes for party $l$ iff:

$$\int_0^1 h_l(\tau)u(\tau; y)d\tau \geq \int_0^1 h_r(\tau)u(\tau; y)d\tau + \delta. \tag{5}$$

The shock can be thought of as a valence term affecting all voters equally (Persson and Tabellini 2000). $\delta$ is realized before voting occurs but after party platforms are chosen. Thus party $p$ only knows the distribution of $\delta$ when choosing $h_p(\tau)$, and this generates the continuous probability of winning function. It is assumed that $\delta \sim U[-b - 1/2\varphi, -b + 1/2\varphi]$ is uniformly distributed with density $\varphi > 0$, where $b \geq 0$ represents an inherent bias among voters in favor of party $l$.\(^8\) Defining $\Delta(h(\tau); y) \equiv \int_0^1 h_l(\tau)u(\tau; y)d\tau - \int_0^1 h_r(\tau)u(\tau; y)d\tau$ as the difference in utility obtained by voter $y$ between party $l$ and party $r$, we may write the probability that $l$ wins as:

$$P(h(\tau)) = \Pr(l \text{ wins}) = \frac{1}{2} + \varphi b + \varphi \int \Delta(h(\tau); y)dF(y). \tag{6}$$

\(^7\)As Palfrey (1984) has shown, when parties are competing to win office (for essential or instrumental reasons)—rather than maximizing their vote share—there is no incentive for a third party to enter to challenge to existing parties. This result reflects sequential action. Shaked (1982) demonstrates that a mixed strategy equilibrium exists where three parties simultaneously choose their policy positions, and each is equally likely to win office.

\(^8\)The uniform distribution assumption is relatively strong, but is standard in the literature. Uniformity is important for ensuring the existence of an equilibrium (see Banks and Duggan 2005).
Party \( r \) wins with probability \( 1 - P(h(\tau)) \). It is assumed that \( P(h(\tau)) \in (0, 1) \).\(^9\)\(^10\)

By adopting a probabilistic voting model, the probability function \( P(h(\tau)) \) that \( l \) wins the election is continuous in \( h(\tau) \). This allows for the possibility of departure from the sharp convergence results that arise where the probability function is discontinuous (as in Hotelling 1929 and Downs 1957). In particular, Wittman (1983) and Calvert (1985) have shown that when parties are policy-motivated and the probability of winning is continuous in \( h(\tau) \), median voter convergence does not occur when parties compete on a single policy dimension. Without both of these features the equilibrium is simply a degenerate probability distribution on \( \tau(y_m) \).

### 3.2 Party platforms

Now consider the strategies of parties in the first stage. In general, party \( p \) solves the following problem (where for generality \( P(h_p(\tau), h^*_p(\tau)) \) here denotes \( Pr(p) \); henceforth \( P(h_p(\tau), h^*_p(\tau)) \) will refer to \( Pr(l \text{ wins}) \), given the equilibrium choice \( h^*_p(\tau) \) of the other party):

\[
\max_{h_p(\tau)} \left\{ P(h_p(\tau), h^*_p(\tau))Z_p(h_p(\tau), h^*_p(\tau)) + \int_0^1 z(\tau; y_p)h^*_p(\tau)d\tau \right\}
\]

(7)

where the relative benefit from winning is defined as \( Z_p(h_p(\tau), h^*_p(\tau)) \equiv \int_0^1 z(\tau; y_p)h_p(\tau)d\tau - \int_0^1 z(\tau; y_p)h^*_p(\tau)d\tau \).

Recalling the uniformity and positive probability on the median position restrictions on \( h_p(\tau) \) outlined above, it is clear that a policy-motivated party will always choose \( \tau(y_m) \) as one of the limits of \( h_p(\tau) \). This is because parties choose \( h_p(\tau) \) to produce the Wittman-Calvert solution in expectation, and since voters are risk-averse they seek to do so using the narrowest possible \( h_p(\tau) \). Therefore, a strategy for party \( l \) is to choose \( \tau_l \), while \( r \) chooses \( \tau_r \). Applying the log-normal distribution and integrating out gives the probability function:

\[
P(\tau_l, \tau_r) = \frac{1}{2} + \varphi b + \frac{\varphi(\tau_l - \tau_r)}{6} \left( 3 \left( \bar{y}^n - \exp \left( \alpha \mu + \frac{\alpha^2 \sigma^2}{2} \right) \right) - \bar{y}^n(\tau_l + \tau_r + \tau(y_m)) \right).
\]

(8)

### 3.3 Equilibrium and comparative statics

I now analyze the equilibrium of this game, first showing that a unique SPNE exists before examining the comparative statics characterizing such an equilibrium. All proofs are contained in Appendix 1.

We first assert the existence of a unique SPNE. However, an additional assumption is required to guarantee the existence of a unique equilibrium.\(^11\)

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\(^9\)Sufficient conditions should be obvious given the linearity of \( P(h(\tau)) \).

\(^10\)Note that \( u(\tau; y) \), and thus \( \Delta(h(\tau); y) \), must be non-linear in \( y \) in order to generate interesting results. If \( \Delta(h(\tau); y) \) were linear in \( y \) then \( \int \Delta(h(\tau); y)dF(y) \) would depend only upon \( \bar{y} \), but not the distribution \( F(y) \). To see this remember that \( \int ydF(y) = \bar{y} \).

\(^11\)Note that this is only a convenient sufficient condition. Banks and Duggan (2005) show that weaker assumptions are generally required for the existence of mixed strategy equilibria in probabilistic voting models.
**Assumption 1.** \( \bar{y}^\alpha (3 - 2\tau_l - \tau(y_m)) > 3 \exp\left(\alpha \mu + \frac{\alpha^2 \sigma^2}{2}\right) > \bar{y}^\alpha (3 - 2\tau_r - \tau(y_m)), \forall \mu, \sigma^2. \)

Under Assumption 1 the probability of \( l \) winning, \( P(\tau_l, \tau_r) \), is decreasing in \( \tau_l \) and \( \tau_r \). This ensures the natural insight that as either party moves probability mass away from the median’s preferred policy they are less likely to win the election. Note that Assumption 1 can be rearranged to give a range between \( \tau_r \) and \( \tau_l \); Lemma 1 below establishes this range is non-empty. Given this assumption, we may now the state:

**Proposition 1.** Suppose Assumption 1 holds. There exists a unique SPNE \( \sigma^*_M \) for the game \( \Gamma_M \).

Furthermore, we can establish that \( \tau^*_l > \tau^*_r \), which is akin to Wittman-Calvert divergence. This Lemma is useful in understanding the comparative statics of the equilibrium.

**Lemma 1.** In the SPNE \( \sigma^*_M \) of \( \Gamma_M \), \( \tau^*_l > \tau^*_r \).

Since the maximands of both parties are fourth-order polynomials in the choice variables (equations 17 and 18 in Appendix 1), a closed form solution is not typically possible. However, the main results of interest are the comparative statics with respect to income inequality, which can be obtained using the implicit function theorem with a system of equations. Increasing income inequality will be defined in two ways: as a mean-preserving spread (MPS) and a mean and median preserving spread.\(^{12}\) A MPS reflects the idea that we have countries with similar levels of wealth, but variation in the dispersion of income. For example, the United Kingdom and Sweden have broadly similar GDP per capita, but Sweden has much less income inequality by any measure (lower \( \sigma^2 \) in log-normal terms). I will also consider a less conventional comparative static interpretation that gives clearer predictions because it does not imply altering \( y_m \).

To examine a MPS, we manipulate the properties of the log-normal distribution. For a MPS, first note that the mean of the log-normal distribution is \( \exp(\mu + \sigma^2/2) \). To prevent \( \bar{y} \) from changing with \( \sigma^2 \), we fix \( \mu = \ln \bar{y} - \sigma^2/2 \). If \( \tau(y_m) \) does not also change, a MPS of income increases the probability that a party with interests aligned with poorer voters will win the election for any given set of platforms. This is because voter utility is concave in \( y \), and thus it is relatively harder to win over the votes of the poor (compared to the rich with a lower marginal utility from \( y \)) for any valence shock \( \delta \). However, if \( \tau(y_m) \) is not fixed then the direction of the effect of \( \sigma^2 \) on \( P(\tau_l, \tau_r) \) is uncertain because the median of the log-normal is \( \exp(\mu) \) and decreases in \( \sigma^2 \) given \( \mu = \ln \bar{y} - \sigma^2/2 \).

To produce clearer comparative statics, we employ an additional assumption:

**Assumption 2.** \( D \equiv \frac{\partial FOC\backslash \tau_l}{\partial \tau_l} \frac{\partial FOC\backslash \tau_r}{\partial \tau_r} - \frac{\partial FOC\backslash \tau_l}{\partial \tau_r} \frac{\partial FOC\backslash \tau_r}{\partial \tau_l} > 0 \), where \( FOC\backslash \tau_p \) refers to the first-order condition with respect to \( \tau_p \).

Assumption 2 is relatively technical, and its use becomes clear in the proof of Proposition 2. This assumption says that the product of the two second-order conditions (which is positive given the concavity proved in Proposition 1) is larger than the product of the cross-partial of the maximand

\(^{12}\)I third possible measure is a median-preserving spread. The results for such a measure reverse those of a MPS because a median-preserving spread increases \( \sigma^2 \) in part by increasing \( \bar{y} \)
with respect to the choice variables. This assumption is highly plausible given that, unlike the second-order conditions, both cross-partialities contain conflicting effects (which cannot be clearly signed). We write the cross-partialities \( \partial \text{FOC}/\partial \tau_l \partial \tau_r \) and \( \partial \text{FOC}/\partial \tau_l \partial \tau_l \) as:

\[
C_p \equiv \frac{\partial \text{FOC}/\partial \tau_p}{\partial \tau_{-p}} = \frac{\varphi}{18} \left[ 3\gamma^\alpha \left( g^\alpha (3 - \tau_l - \tau_r - \tau(y_m)) - \exp \left( \alpha \mu + \frac{\alpha^2 \sigma^2}{2} \right) \right) 
+ \bar{g}^\alpha \left( 3(3 - \tau_l - \tau_r - \tau(y_m)) \exp \left( \alpha \mu + \frac{\alpha^2 \sigma^2}{2} \right) - \bar{g}^\alpha (3 - 2\tau_l - \tau(y_m))(3 - 2\tau_r - \tau(y_m)) \right] \right]
\]

where \( \tau_p \) and \( \tau_{-p} \) are generic limits that refer to \( \tau_l \) and \( \tau_r \). Recalling Assumption 1, neither term inside the large bracket can be clearly signed. However, it is likely that \( C \) is relatively small—this supports Assumption 2. The theoretical uncertainty comes from the conflicting concavity of the utility function against the convexity of the costs of taxation. This is compounded by the strategic effects on the probability of winning. Nevertheless, there is an intuitive direction for the cross-partialities: since utility is concave in \( y \), the largest effects should be observed for changes in \( \tau \) when \( \tau \) is small, utility is most concave and disincentives are least convex; accordingly, \( \partial Z_p/\partial \tau_l \) is likely to dominate the effect of \( \partial Z_p/\partial \tau_l \), making \( C_p > 0 \). Given the theoretical uncertainty, however, this may be best left as an empirical question for Section 5. If \( C_l > 0 \) and \( C_r < 0 \), then Assumption 2 is not required.

The comparative static results for a MPS when \( \tau(y_m) \) is fixed are:

**Proposition 2.** Suppose Assumptions 1 and 2 hold, and fix \( \tau(y_m) \). In the SPNE \( \sigma^*_{M} = (h^*(\tau), v^*(h(\tau))) \) for \( \Gamma_M \), the following comparative static conditions hold for a mean-preserving spread of a log-normal distribution of \( y \):

1. If \( C_l > 0 \) or more generally \( C_l > \bar{C}_l \) such that \( \left( \bar{C}_l \frac{\partial \text{FOC}/\partial \tau_l}{\partial \sigma^2} = \frac{\partial \text{FOC}/\partial \tau_r}{\partial \sigma^2} \right), \partial \tau_l / \partial \sigma^2 > 0 \).

2. If \( C_r < \bar{C}_r \) such that \( \left( \bar{C}_r \frac{\partial \text{FOC}/\partial \tau_r}{\partial \sigma^2} = \frac{\partial \text{FOC}/\partial \tau_l}{\partial \sigma^2} \right), \partial \tau_r / \partial \sigma^2 < 0 \).

Proposition 2 states the conditions under which a MPS of income inequality will increase \( l \) and \( r \)'s platform ambiguity in the sense that the support of \( h_l(\tau) \) increases. A sufficient condition for a MPS to increase the ambiguity of both parties is that \( C_l > 0 \) and \( C_r < \bar{C}_r < 0 \). Given the propensity for \( C_p > 0 \), it is more likely that a MPS will increase the ambiguity of \( l \) than \( r \).

In the case of fixed \( \tau(y_m) \), the support of \( h_l(\tau) \) increases \( C_l > \bar{C}_l \) as \( l \) seeks to woo poor voters who have a higher marginal utility from income with higher \( \mathbb{E}\tau \) (due to the assumption that \( u(\tau; y) \) is concave in \( y \)), and are thus relatively better targets for policy since a valence shock is less likely to win over such voters. Since \( y_l < y_m \), \( l \) is also able to move \( \mathbb{E}\tau \) further toward their ideal point without electoral loss following the increase in \( P(\tau_l, \tau_r|MPS) \). In response, \( r \) manages conflicting incentives: since \( y_r > y_m \), \( r \) would like to move away from \( y_m \) and is more able to do so knowing that \( l \) will have also moved away from the median policy too; however, \( l \) has a conflicting incentive in that poorer votes are easier to win with policy, and so moving away from the median reduces \( r \)'s probability of winning the election, and thus probability of being able to implement a policy program it prefers to \( l \)'s.
The clarity of Proposition 2 depends upon whether the limit \( \tau(y_m) \) is fixed—\( \tau(y_m) \) is not fixed if this policy can be updated in response to the increase in \( \sigma^2 \). Since \( \partial y_m / \partial \sigma^2 < 0 \), the median’s ideal tax rate increases following a MPS. If \( \tau(y_m) \) is not fixed, the results are significantly complicated. The upper bound of \( h_r(\tau) \) and the lower bound of \( h_l(\tau) \) fall, and this affects not only \( P(\bar{\pi}_l, \bar{\pi}_r | MPS) \) but also \( Z_p \). The effect of \( \sigma^2 \) on \( P(\bar{\pi}_l, \bar{\pi}_r | MPS) \) is now uncertain is both parties have an incentive to increase \( \tau \) to pander toward a now poorer median. Furthermore, since the limits on \( h(\tau) \) change it is now harder to determine whether ambiguity has increased because it is hard to compare the relative change in the limits.

An important problem with the results of Proposition 2 is that the median and mean of the distribution are not held fixed. Consequently, the results incorporate two effects: the strategic effect on the extreme limits of \( h_p(\tau) \) that I have focused on, but also a recalibration of \( \tau(y_m) \). A clearer result for income inequality emerges if we can fix both \( y_m \) and \( \bar{y} \). To do so we use a less conventional approach. By adding \( \varepsilon > 0 \) to all \( y > y_m \) and subtracting \( \varepsilon \) from all \( y < y_m \) we leave \( y_m \) unchanged, but also leaves \( \bar{y} \) unchanged by definition of the mean. However, the variance \( \nabla(Y) \) of the log-normal distribution clearly increases. Since \( \partial \nabla(Y) / \partial \sigma^2 > 0 \), such monotonicity implies that we obtain the clearer comparative result from the first case in Proposition 2 using the chain rule. The result becomes clearer because \( \tau(y_m) \) does not change, and thus changes in ambiguity purely reflect changes in \( \bar{\pi}_l \) and \( \bar{\pi}_r \).

**Proposition 3.** Add \( \varepsilon > 0 \) to all \( y > y_m \) and subtract \( \varepsilon \) from all \( y < y_m \), leaving \( y_m \) unchanged. In the SPNE \( \sigma^*_M = (h^*(\tau), v^*(h(\tau))) \) for \( \Gamma_M \), the results from Proposition 2 hold for \( \nabla(Y) \) instead of \( \sigma^2 \) when policy for the median is fixed, with the exception of different but similar conditions for \( \bar{C}_p \).

Proposition 3 shows that the central strategic implication of Proposition 2 is robust, and thus an increase in income inequality induces political parties—especially \( l \)—to propose more ambiguous platforms under plausible conditions.

We can also identify some other comparative static results under the assumptions that \( C_l > 0 \) and \( C_r < 0 \), which are highly intuitive, and thus lend further support to supposing \( C_l > 0 \) and \( C_r < 0 \). First, increasing \( W \) reduces the ambiguity of both parties, a result shown by Calvert (1985). Second, increasing \( b \) allows \( l \) to move toward its ideal point given its structural advantage, while \( r \) faces conflicting incentives: while \( r \) can increase it probability of winning by moving toward the centre, it can also afford to move further from the median given \( l \) will definitely do so. If \( r \) had the structural advantage the incentives for the parties would be reversed. The results for \( b \) provide support for the logic of Iversen and Soskice (2006) in that if a party has a structural advantage in a majoritarian system they can move policy in their desired direction and increase their probability of winning. Third, the impact of changing \( \varphi \) is uncertain, depending upon \( \partial^2 P(\bar{\pi}_l, \bar{\pi}_r) / \partial \bar{\pi}_l \partial \varphi \) and \( \partial^2 P(\bar{\pi}_l, \bar{\pi}_r) / \partial \bar{\pi}_r \partial \varphi \). However, given \( b \geq 0 \), there exists a plausible condition where the results mirror \( b \). Finally, the comparative statics with respect to \( \alpha \) typically give \( r \) more room for manoeuvre as the concavity of utility function decreases.
3.4 Summary

This section has shown that under probabilistic voting in a majoritarian system where parties have policy preferences, an increase in income inequality often increases the ambiguity of parties with policy preferences aligned with poorer voters and under certain assumptions may also increase the ambiguity of parties with policy preferences aligned with richer voters. The logic of these results is that because the marginal utility of increasing income is greater for poorer voters, an increase in income inequality enables the left party to move toward its high tax ideal point with relatively little reduction in their probability of winning the election. Therefore, following an increase in income inequality the left party loses relatively fewer votes than the right party by moving away from the median. While the right party wants to win the election to implement its preferred policy, and thus has an incentive to be less ambiguous and move toward the median, it would also like to move policy toward its ideal point if it wins office and may thus respond to the left party’s increase in ambiguity by also offering a more ambiguous platform. Hence, the right party typically has stronger conflicting incentives when it comes to changing its level of ambiguity. The logic of inequality increasing ambiguity in majoritarian systems is thus based in parties exploiting changes in the sensitivity of voters to policy.

4 Post-election bargaining in PR systems

Unlike the majoritarian analysis, the analysis of PR systems will abstract from the voting stage and present a logic based on post-election coalition formation. It is assumed that three parties are represented in the legislature (as in Austen-Smith and Banks 1988 and Baron 1991), and that no party has a majority of the seats. I first introduce the bargaining game before showing that income inequality increases ambiguity by increasing in the bargaining power of more extreme parties who again use ambiguity to move toward their ideal points.

4.1 Bargaining game

As in the majoritarian context, the policy space remain unidimensional, focusing on $\tau$. The post-election bargaining game $\Gamma_B$ is similar to Baron (1993) where legislative districts get differential benefits from a public good, and a legislative majority must determine the level of public good provision. This fits with the structure outlined in Section 2 and the assumption that parties have different policy preferences.

We now take three parties $p \in \{l, m, r\}$ in a legislature with income $y_l < y_m < y_r$ where $y_m$ is also the median’s income. Party preferences continue to be given by $z(\tau; y_p)$ in equation 4, where $W > 0$ is now obtained if a party is in the winning coalition. Prior to the election, parties choose the strategy profile $h(\tau) = \{h_p(\tau)\}_{p \in \{l, m, r\}}$, $h_p(\tau)$ is still restricted to be uniform and place positive probability on the median’s ideal policy $\tau(y_m)$, as defined in Section 2, and these policies represent commitments in a sense to be defined below.

Given the profile $h(\tau)$, voting takes place. Seats (voting power) in the legislature are allocated in direct proportion to the vote share $s_p$. With three parties, we assume no party will be able to
win a majority of the seats. This is not a strong assumption in the context of three party competition in unidimensional space, as Shaked (1982) has shown in the case of office-motivated parties each party receives the same expected vote share when seeking to maximize the probability of winning. Parties with policy preferences are likely to slightly deviate, by since party ideal points are distributed around the median this will not create a majority winner. However, the relative seat share depends upon the degree of income inequality in the economy \( \sigma^2 \). We make the important reduced form assumptions that \( s_p(\sigma^2) \) is continuous in \( \sigma^2 \) and increasing in \( \sigma^2 \) for parties \( l \) and \( r \) and is decreasing in \( \sigma^2 \) for \( m \): \( s_p'(\sigma^2) > 0, p = l, r \) and \( s_m'(\sigma^2) < 0 \). This formalizes the intuition that the party \( m \) with the preferences of the median voter loses votes as the (log-normal) income distribution disperses. This follows if \( y_p \) is fixed, parties are arrayed such that parties care about policy as well as winning office), and voters vote based on policy proximity (as assumed in equation 2). The assumption is simplifying because while \( s_p \) increasing in \( \sigma^2 \) is plausible for \( l \) and \( r \), \( s_p \) does not depend upon the policies chosen by the parties. This would probably act as a counterveiling force on \( s_p \), but the overall effect of \( \sigma^2 \) should remain robust. This assumption enables us to focus more clearly on the post-election bargaining incentives.

In order to form a winning coalition, a majority coalition must form in the legislature. In the case of three parties without a majority this requires a coalition between at least two of the parties. Coalition formation follows an infinitely repeated bargaining game with impatience, employing important features from Baron (1993) and Baron and Ferejohn (1989). We denote by \( H_t \) the set of complete histories of play up to round \( t \) in the bargaining game; a specific history is \( H_t \). Starting at round \( t = 0 \), a formateur \( f \) is chosen with probability \( q_p(s_p) > 0 \) such that \( \sum_{p \in P} q_p(s_p) = 1 \), \( q_p'(s_p) > 0, \forall p \). Thus, party \( l \) has probability \( q_l(s_l) \) of being recognized. Diermeier and Merlo (2004) provide support for the claim that formateur probability is increasing in seat share. The formateur \( f \) then proposes a coalition \( K_{ft}(h(\tau), H_t) \in \mathcal{K} \equiv \{l, lm, lr, lmr, m, mr, r\} \) from the full set of possible coalitions, where \( K_{ft} : [0, 1]^3 \times H_t \mapsto \mathcal{K} \) is a mapping from \( h(\tau) \) and the complete history of play to the set of coalitions \( \mathcal{K} \). There will be no incentive to form a grand coalition \( lmr \) in equilibrium, and so this possibility will be ignored. The defining feature of coalition \( K_{ft}(h(\tau), H_t) \) is that the coalition’s policy distribution function is a weighted sum of the platforms (probability distributions \( h_p(\tau) \)) of its members. More precisely,

\[
h(K_{ft} = fp) = \gamma h_f(\tau) + (1 - \gamma) h_p(\tau)
\]

(10)

where \( \gamma \in (0, 1) \) is the weight attached to the platform of \( f \). Therefore, pre-election platforms serve as commitments that affect policy outcomes and thus the set of coalitions that will form in equilibrium. Unlike other coalition frameworks, policy is tightly constrained here by electoral platforms, again capturing the idea that parties must remain true to their election promises. This represents an important distinction from the majoritarian model: whereas in the majoritarian case parties use ambiguity to move policy toward their ideal point by presenting ambiguity to voters who may be more or less favorable to the implied changes in \( \mathbb{E} \tau \), in the proportional case parties instead use ambiguity to make sufficiently attractive coalition partners.

Parties then vote \( v_p(K_{ft}) \in \{0, 1\} \) over coalition proposal \( K_{ft} \), where \( v_p(K_{ft}) = 1 \) denotes accepting the proposal. A voting profile is thus \( v(K_{ft}) = \{v_p(K_{ft})\}_{p \in \{l, m, r\}} \), and voting is a mapping
\( v_p : [0, 1]^3 \times \mathcal{K} \times \mathcal{H}_t \rightarrow \{0, 1\} \) from policy platforms, coalition proposal and complete prior history to a party’s vote. Assume that parties restrict attention to weakly undominated voting strategies. If a majority approves \( K_{ft} \), then the bargaining game ends and the policy outcome is a random draw from \( h(K_{ft}) \). If a majority rejects \( K_{ft} \), the bargaining process repeats starting in round \( t = 1 \) where each party is recognized with probability \( q_p(s_p) \). Parties discount across bargaining rounds with factor \( \beta \in (0, 1) \). Note that each round of the legislative bargaining subgame is structurally equivalent.

The dynamic structure can thus be summarized as:

1. Before the election, parties \( p \in \{l, m, r\} \) choose platforms \( h_p(\tau) \).
2. Elections allocate seats to parties directly in proportion to their vote share \( s_p(\sigma^2) \).
3. If no party has a seat majority \((s_p \geq 1/2)\), policy follows an infinitely repeated bargaining game with rounds \( t = 0, 1, ..., \infty \):
   
   - (a) At round \( t \) a formateur \( f_t \) is chosen randomly according to recognition probabilities \( q_p(s_p) \), where \( \sum_{p \in \mathcal{P}} q_p(s_p) = 1 \)
   - (b) The formateur \( f_t \) proposes coalition \( K_{ft}(h(\tau), H_t) \in \{l, lm, lr, lmr, m, mr, r\} \) with associated policy distribution \( \tau(K_{ft}) \).
   - (c) Parties then vote \( v_p(K_{ft}) \in \{0, 1\} \) whether to accept coalition \( K_{ft} \). If a majority of parties approve \( K_{ft} \), the bargaining game ends and we proceed to stage 4. If a majority of parties does not approve \( K_{ft} \), we return to stage a) of the bargaining game, at a discounting cost \( \beta \in (0, 1) \).
4. Once a coalition is agreed, the policy outcome is a draw from the distribution \( h(K_{wt}) \) of the winning coalition \( K_{wt} \).

Naturally, we again search for a SPNE \( \sigma^*_B = (h^*(\tau), K^*(h^*(\tau), H), v^*(K^*)) \) to game \( \Gamma_B \).

### 4.2 Stationary equilibrium and comparative statics

Given the wide range of potentially complex punishment strategies available to support a variety of SPNEs, I focus on stationary SPNE. A SPNE is stationary if the continuation values \( V_p(h(\tau)) \) for each structurally equivalent subgame of stage 3 are the same. Accordingly, the subscript \( t \) will be dropped and stationary strategies cannot condition upon \( H_t \). This refinement is very common in bargaining games of this type. We now seek to identify a unique stationary SPNE.

First consider the conditions when a coalition offer will be accepted. If \( f \) is the formateur, party \( p \neq f \) will accept coalition proposal \( K_f \) iff:

\[
\mathbb{E}[z(\tau, y_p)|h(K_f)] \geq \beta V_p(h(\tau))
\]  

(11)

where \( \mathbb{E}[z(\tau, y_p)|h(K_f)] = \int_0^1 z(\tau, y_p|h(K_f))d\tau \) is \( p \)'s expected utility under coalition \( K_f \) and \( V_p(h(\tau)) \) is \( p \)'s continuation value defined as:

\[
V_p(h(\tau)) = q_l(\sigma^2)\mathbb{E}z_{pl} + q_r(\sigma^2)\mathbb{E}z_{pr} + [1 - q_l(\sigma^2) - q_r(\sigma^2)]\mathbb{E}z_{pm}.
\]

(12)
where $\mathbb{E}z_{pf} \equiv \mathbb{E}[z(\tau; y_p)|h(K_f)]$ is short-hand for the expected utilities. The continuation value $V_p(h(\tau))$ is a measure of the bargaining power of $p$, and thus bargaining power increases in the probability of being chosen as formateur $q_p(\sigma^2)$.

Now consider which coalitions will be proposed. Given parties care about policy, $\mathbb{E}\tau_l < \mathbb{E}\tau_m < \mathbb{E}\tau_r$, $l$ and $r$ will seek to gain the support of only $m$—otherwise $h(K_l)$ and $h(K_r)$ would further depart from their policy preferences. Since $W$ is obtained in any coalition, this has no impact upon coalition proposals. Furthermore, in equilibrium, neither $l$ nor $r$ can successfully propose a coalition containing only their own probability distribution; since $m$ will be indifferent between the proposals of $l$ and $r$, the condition in equation 11 will never be satisfied. $m$ occupies a privileged position—as in Baron (1991) and Laver and Shepsle (1996) in multidimensional policy space—and we make the simplifying assumption:

**Assumption 3.** When $f = m$, if $m$ proposes $K_m = m$, it will be accepted by at least one of $l$ or $r$. Alternatively put, $\exists p \neq m, \mathbb{E}[z(\tau; y_p)|h_m(\tau)] \geq V_p(h(\tau))$.

This assumption ensures that $m$ can implement its ideal point as a minority government. The assumption is weak because $m$ is the median party on the policy dimension, and given $z(\tau; y)$ is concave in both arguments extreme parties are likely to prefer the median’s policy with certainty to the lottery that the continuation game entails.

In bargaining games of complete information, agreement will always be reached in the first round. It is clear from Assumption 3 that $m$ will exploit its privileged centre position and always choose a degenerate probability distribution placing all mass on $\tau(y_m)$. Given this knowledge, $l$ and $r$ will choose $\tau_l$ and $\tau_r$ to make equation 11 bind for $m$—i.e. when chosen as formateur these more extreme parties will cede the minimum possible to gain the support of $m$. In a stationary equilibrium, $\tau_l^*$ and $\tau_r^*$ solve the following two equations:

$$\mathbb{E}z_{ml}(\tau_l) = \beta\left[q_l(\sigma^2)\mathbb{E}z_{ml}(\tau_l) + q_r(\sigma^2)\mathbb{E}z_{mr}(\tau_r) + [1 - q_l(\sigma^2) - q_r(\sigma^2)]\mathbb{E}z_{mm}\right]$$

$$\mathbb{E}z_{mr}(\tau_r) = \beta\left[q_l(\sigma^2)\mathbb{E}z_{ml}(\tau_l) + q_r(\sigma^2)\mathbb{E}z_{mr}(\tau_r) + [1 - q_l(\sigma^2) - q_r(\sigma^2)]\mathbb{E}z_{mm}\right]$$

Solving simultaneously yields the main insight of the equilibrium:

**Proposition 4.** Suppose Assumption 3 holds. The unique stationary SPNE $\sigma^*_B$ of the game $\Gamma_B$ is defined by:

1. Policy platforms where $h^*_l(\tau) \sim \mathcal{U}[\tau(y_m), \tau_l^*], \ h^*_m(\tau) = \tau(y_m)$ and $h^*_r(\tau) \sim \mathcal{U}[\tau_r^*, \tau(y_m)]$, such that $\int z(\tau; y_m)h_l(\tau_l)d\tau = \int z(\tau; y_m)h_r(\tau_r)d\tau = \mathbb{V}$ where:

$$\mathbb{V} = z(\tau(y_m); y_m)\left[\beta[1 - q_l(\sigma^2) - q_r(\sigma^2)] - (1 - \gamma)[1 - \beta(q_l(\sigma^2) + q_r(\sigma^2))]\right]$$

2. Coalition proposals $K_l = l m$, $K_m = m$ and $K_r = m r$. 

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3. Legislative voting is such that \( v_m(K_f) = 1, \forall f \), for \( p' = l, r, v_{p'}(K_{p'}) = 1 \) and \( v_{p'}(K_{-p'}) = 0 \), and at least one of \( l \) and \( r \) votes for \( K_m = m \).

Proposition 3 unifies the logic outlined in the preceding analysis. It says that the formateur will always successfully propose a winning coalition and while \( m \) may form a minority government with the support of at least one another party, both \( l \) and \( m \) must include \( m \) in a winning coalition and provide sufficient policy benefits to ensure \( m \) prefers to accept the offer than wait for another formateur to emerge.

Unlike the majoritarian case, the proportional model yields clear comparative statics predictions for an increase in income inequality holding mean and median incomes constant:

**Proposition 5.** Add \( \varepsilon > 0 \) to all \( y > y_m \) and subtract \( \varepsilon \) from all \( y < y_m \), leaving \( y_m \) unchanged. In the SPNE \( \sigma_B^* \) for \( \Gamma_M \), an increase in \( \mathbb{V}(Y) \) increases \( \tau_l \) and reduces \( \tau_r \).

Akin to Proposition 3, we use \( \varepsilon > 0 \) to preserve the median and mean of the distribution. The result is now clear: a mean and median-preserving increase in the distribution of income increases the ambiguity of both party \( l \) and party \( r \). The intuition is that an increase in income inequality increases the vote share of the non-median parties and thereby increases their seat shares, and thus their probability of being recognized as the formateur. Being the formateur increases a party’s bargaining power once chosen and in terms of the continuation game, and the increase in bargaining power due to the increase in income inequality allows the left and right parties to move policy away from the party with the most centrist preferences.

Following similar logics about bargaining power, parties \( l \) and \( r \) can move policy toward their ideal points when \( \gamma \) is large and \( \beta \) is small. These results can be seen by differentiating \( \mathbb{V} \). Note that \( W \) cannot be used as a bargaining chip against \( m \) because \( m \) will always be included in a governing coalition.

### 4.3 Summary

In focusing on post-election bargaining in PR systems, Section 4 has shown that increases in income inequality increase the ambiguity of non-median parties. The logic is simple: given parties remain constrained to offer policies appealing to the median voter, they become more ambiguous in order to commit to a policy closer to their ideal point when income inequality increases their bargaining power. These results also imply that centrist parties in PR systems will be least ambiguous. In sum, despite operating through very different mechanisms—incents to be included in the coalition that forms after an election, rather than through appeals to voters—increases in income inequality typically increase platform ambiguity in both majoritarian and PR systems.

### 5 Empirical analysis

The implications of the formal theory proposed above are tested on a sample of the largest parties in the lower legislative house of 15 advanced European democracies. These countries are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands,
Portugal, Spain, Sweden, and UK. To fit with the theoretical analysis, I focus on only the two largest parties in majoritarian systems and the three largest parties in PR systems. Although the analysis makes no claim to causal identification, the results provide cross-country correlative support for the hypotheses derived from the theoretical model.

5.1 Hypotheses

The theoretical model suggest a variety of testable implications. I only test some of the main comparative statics with regard to income inequality, partisanship and electoral systems in this paper. In particular, the model suggests the following hypotheses:

1. Party platforms are more ambiguous in PR systems, and likely to be more ambiguous in majoritarian systems.

2. Left parties offer less ambiguous platforms than right parties, on average.

3. Left parties are more ambiguous following an increase in income inequality than right parties, especially in majoritarian systems.

The first hypothesis captures the headline implication of the theoretical model. The second hypothesis follows from the convex disincentive cost of increasing taxation, which makes it more costly for a left party to deviate from the median because this entails increasing \( \tau \); note that this could be counteracted by the concavity of voter utility function in income. The third hypothesis reflects the importance of concave voter utility function in majoritarian systems—given PR systems depend primarily on post-coalition bargaining, this effect is expected to be larger in majoritarian systems.

5.2 Data

5.2.1 Dependent variable: platform ambiguity

In Section 2 platform ambiguity was defined as the support, \( \tau_p - \tau_p^* \), of the uniform distribution \( h_p(\tau) \) proposed by party \( p \). Quantifying such ambiguity is clearly a difficult task, because ultimately ambiguity is defined in the eye of the beholder. Furthermore, it is not obvious how to translate the stylized formal models to the data.

Most previous empirical research has used voter perceptions to quantify uncertainty over party policy platforms. Approaches to capturing such uncertainty have varied in the directness of their methods. At one end of the spectrum, Alvarez and Franklin (1994) used survey questions asking voters to quantify their uncertainty over what parties stand for. At the other, Bartels (1996) and Berinsky and Lewis (2007) employed measures based on the probability that a respondent answered “don’t know” when asked to place a party on a standard policy scale. Others have used the standard deviation of voter responses (e.g. Campbell 1983).

However, attempts to quantify policy uncertainty face a variety of measurement problems. Bartels (1986) points out that standard deviations (and other similar measures) may over or understate the true level of ambiguity if voters are decisive about incorrect placements or indecisive about
correct placements of parties. Berinsky and Lewis (2007) replicate Bartels (1986) but find opposing results. Alvarez and Franklin’s (1994) direct approach suffers from a limited number of surveys employing the relevant questions. Furthermore, Tomz and Van Houweling (2009) point out that in addition to measurement problems endogeneity biases in voter perceptions arise from three sources. First, voters are attentive to the politicians that they like and thus more likely to be uncertain about parties they are uninterested in. Second, ambiguity may induce voters to incorrectly identify ambiguous policy stances. Finally, politicians are likely to make different statements to different audiences—often offering members of the public the vaguest policy platforms because they are least likely to tangibly sanction the party in response.

To at least mitigate these problems, I instead use expert surveys. As with voter surveys, professional country experts are asked to place a party on a policy scale. Given that experts are presumed to be able to access and process diverse sources of information about contemporary politics and political parties (Hooghe et al. 2010), the potential sources of bias that may afflict voter perceptions should be substantially reduced. Clearly expert surveys are not perfect (see Benoit and Laver 2006; Hooghe et al. 2010), but averaging any bias across a sample of well-informed experts should significantly improve upon voter perception-based measures. Furthermore, only if the dependent variable suffers from systematic bias will measurement error produce biased coefficient estimates. As argued above, systematic bias is likely to be lower among political experts than voters.

My analysis will use three expert survey waves from the Chapel Hill Expert Survey Series project examining the attitudes of political parties in Western (and more recently Eastern) Europe toward European integration (Hooghe et al. 2010; Steenbergen and Marks 2007). Importantly for this paper, the surveys also include more questions about party left-right ideology and economic policy. The raw data required to construct measures of ambiguity was only available for the surveys conducted in 1999, 2002 and 2006. These surveys asked 10 experts, on average, from each country to place political parties on an integer scale ranging from 0 to 10. The two questions of particular interest for this analysis are:

We would like you to classify the parties in terms of their broad ideology. On the scale below, 0 indicates that a party is at the extreme left of the ideological spectrum, 10 indicates that it is at the extreme right and 5 means that it is at the centre. For each party, please circle the ideological position that best describes the party’s overall ideology.

Political scientists often classify parties in terms of their ideological stance on economic issues. Parties to the right emphasise a reduced economic role for government. They want privatization, lower taxes, less regulation, reduced government spending and a leaner welfare state. Parties to the left want government to play an active role in the economy. Using these criteria, indicate where parties are located in terms of their economic ideology.

The first question aims to capture a general left-right ideology, while the second more closely

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13These questions are taken from the 2002 survey and differ very slightly in wording, but not substance, from the 1999 and 2006 surveys.
resembles the fiscal policy areas that drive the formal model presented in this paper. Accordingly, the second question is given precedence in the empirical analysis.

The dependent variable, party platform ambiguity, is operationalized as the standard deviation of the expert ratings. Expert responses produce two dependent variables: the standard deviation of general left-right ideological expert party placements, *ideology ambiguity*, and the standard deviation of economic policy expert party placements, *fiscal ambiguity*. Although Bartels’ (1986) criticisms of this approach remain, the assumption that experts are similarly decisive *and* correct in expectation dampens the challenge. Larger values for the standard deviation denote greater policy ambiguity.

Figures 5.2.1 and 5.2.1 provide density plots for the two dependent variables, pooling across electoral systems and survey waves. Both figures suggest that the dependent variables are not dramatically different from being normally distributed, and this should come as no major surprise given that the variables are summaries of the raw expert responses. The slight positive skew may arises from the fact that ambiguity is censored at zero. Summary statistics are provided in Table 2 of Appendix 2.
5.2.2 Independent variables

To test the hypotheses identified by the theory, we also operationalize the main variables identified by the formal model. In particular, income inequality, partisanship and the electoral system.

To measure the partisan position of political parties I return to the Chapel Hill expert ratings used for the dependent variable. I simply use the placement of the mean expert response, and thus right partisanship is defined over the interval $[0, 10]$, where the maximum represents the extreme right of the policy dimension. In terms of the theory, this variable captures the mean of $h_p(\tau)$. A popular alternative approach groups political parties into families. However, such families are unable to capture changes over time and incorporate considerable within-group heterogeneity.$^{14}$

Quantifying income inequality is difficult, and almost every measure has been criticized (Atkinson 2003). Despite the measurement caveats, I measure market inequality as the Gini coefficient for market household income inequality given by the Standardized World Income Inequality Database (Solt 2009), which uses an algorithm designed to merge the data collected by the Luxembourg Income Study and United Nations to maximize comparability across countries. Fortunately, income inequality has generally been measured with greater precision in the European nations that form my sample. Market inequality is preferred to net inequality given the theory pertains to heterogeneity in pre-tax income $y$.\footnote{Note that market wealth inequality might represent a better fit with the theory, but unfortunately I am not aware of sufficient data for such analysis.}

Although Sections 3 and 4 differentiate majoritarian from PR systems, such a clean distinction does not apply in practice. Many countries now employ mixed systems including elements of both plurality and proportional electoral formulas (whether linked or unlinked), while electoral thresholds and district magnitude permit considerable variation among countries with similar formulas (e.g. Cox 1997). Accordingly, academics have argued over how systems should be categorized. Given that the theoretical suppositions above only pertain to pure majoritarian systems, I use a majoritarian indicator that excludes mixed variants and counts only France and the UK as majoritarian. The complementary group, loosely defined as PR systems, clearly forms a looser amalgam, although in virtually all cases post-election coalition bargaining occurs. Given the estimates for majoritarian systems are identified off only France and the UK, these estimates should be treated with caution.

5.2.3 Control variables

The theoretical model outlined above inevitably fails to capture important factors determining a party’s choice of platform ambiguity. However, given the lack of previous empirical research there is not an obvious set of controls to include. I propose several plausible control variables. Appendix 2 provides definitions and descriptive statistics for all the variables used in the analysis.

\footnote{Many groupings end of collecting very different parties under the same banner. For example, French Communists are often included alongside Britain’s New Labour and the Democrats in the US in a group of general leftists. New Labour also serves as a good example of a party that has shifted considerably and may now be better considered alongside many of Western Europe’s centre-right parties.}
First, previous theoretical research (Alesina and Cukierman 1990; Chappell 1994; Shepsle 1972) has identified government incumbency as a potential determinant of platform ambiguity. Although the direction of the relationship is disputed, I include an indicator, *incumbent*, for whether a party is a member of the governing coalition at the time of the survey.

Second, I include a measure of the degree of political *competition* by controlling for the absolute difference in vote share between a given party and the largest other party in the legislature. This could capture differing behaviour contingent upon political circumstance and be construed as room for manoeuvre. We might hypothesize that more competition encourages greater policy clarity.

Third, *economic growth* is also included as control variable (from World Bank 2010). Governing parties in particular may choose to be less ambiguous during periods of relative economic success (Alesina and Cukierman 1990).

Finally, to control for electoral cycle effects I include *years*, denoting the number of years until the next election (0 if an election was held in the year of the survey). Given parties face greater pressure to pursue specific platforms closer to elections, we might expect to find a positive coefficient on this variable.

### 5.3 Estimation

As the party and country variables enumerated above indicate, the data has a hierarchical structure with party observations *i* over time *t* nested within countries *j*. For the forthcoming regression analysis I pool observations across electoral systems and survey waves to produce a total sample of 108 observations. As noted above, I examine only the two largest parties in majoritarian systems and the three largest parties in non-majoritarian systems. To capture the hypothesized interplay between income inequality, electoral rules and partisanship, I use appropriate interactions.

The multiple levels of the data suggest that dependency should be taken seriously. A Wooldridge (2002) test fails to reject the null hypothesis that the certainty of a party’s platform—on either the economic policy or general ideological dimension—is not serially correlated at the 5% level for both dependent variables. The lack of temporal dependency considerably simplifies the statistical modelling. Residual plots, heteroskedasticity tests and the clustering of parties within the 15 countries suggest that standard errors should be clustered by country. Bias may arise if there exists stable unit heterogeneity at the party level. However, Breusch-Pagan (1979) and Hausman (1978) specification tests suggest unit heterogeneity is not a major concern, especially for the left-right ideology models.

---

16 The largest party receives the positive score for the difference between itself and the second largest party.

17 The test was conducted using the variables and observations from the main interactive specification (Models (2) and (7) below). The test returned an $F_{1,27}$ statistic of 0.74 with a corresponding *p*-value of 0.40 and an $F_{1,27}$ statistic of 0.89 with a corresponding *p*-value of 0.35 for the fiscal and ideology models respectively.

18 Breusch-Pagan (1979) tests for heteroskedasticity returned very large $\chi^2_1$ statistics of 63.39 and 18.59 for the fiscal and ideology models respectively; both easily reject the null of no heteroskedasticity.

19 The Breusch-Pagan test on the economic policy dependent variable returned an $\chi^2_1$ statistic of 9.19 with a corresponding *p*-value of less than 0.01. A follow-up Hausman test on the economic policy dependent variable returned an $\chi^2_5$ statistic of 11.48 with a corresponding *p*-value of 0.04. The Breusch-Pagan test on the general left-right policy dependent variable returned an $\chi^2_1$ statistic of 0.24 with a corresponding *p*-value of 0.63, and thus suggests that unit
Together, these considerations imply estimating the following full interactive model:

$$y_{ijt} = \beta_0 + \beta_1 \text{market inequality}_{jt} + \beta_2 \text{right partisanship}_{ijt} + \beta_3 \text{majoritarian}_j + \beta_4 (\text{market inequality}_{jt} \times \text{majoritarian}_j) + \beta_5 (\text{market inequality}_{jt} \times \text{right partisanship}_{ijt}) + \beta_6 (\text{majoritarian}_j \times \text{right partisanship}_{ijt}) + \beta_7 (\text{market inequality}_{jt} \times \text{right partisanship}_{ijt} \times \text{majoritarian}_j) + \epsilon_{ijt}$$

where $y_{ijt}$ is the dependent variable (either ideology ambiguity or fiscal ambiguity) and the normally distributed residual $\epsilon_{ijt} \sim N(0, \sigma^2_j)$ is clustered by country $j$. Equation 16 is estimated with OLS. A vector of control variables $x_{ijt}$ is added as a robustness check. To address concerns about possible unit heterogeneity I add party fixed effects $\eta_i$ to equation 16 as a robustness check. Note that all lower-order terms are included when interacting variables (Brambor et al. 2006).

### 5.4 Results

Table 1 shows the results from estimating equation 16. The left side of the table looks at fiscal ambiguity, while the right side looks at left-right ideology ambiguity. In sum, the results provide surprisingly strong support for the predictions of the theoretical model, in particular the first and second hypotheses, given the small sample size and potentially large measurement error in the data.

First consider the simple hypothesis that income inequality increases platform ambiguity in all systems. Model (1) for both dependent variables provides support for this claim, showing a highly statistically significant positive correlation in the linear model across electoral systems. Substantively, a standard deviation increase in income inequality (6.3 Gini points) increases platform ambiguity by about one sixth of a standard deviation for both fiscal and ideological ambiguity. In the simple linear model, there is no evidence that partisanship affects ambiguity—which is consistent with the theoretical claim that different electoral system produce different incentives for different types of party.

Model (2) examines the more nuanced interactive models, examining the third hypothesis and providing a different test of the second. First note that the coefficient on income inequality rises almost fourfold, while the effect of inequality is a further 50% larger in majoritarian systems on average. However, these coefficients apply only to the most extreme left-wing parties (partisanship score of 0)—the presence of a negative interaction between right partisanship and market inequality implies that the positive effect of inequality on ambiguity decreases as parties become more right-wing. This key observation provides support for the third hypothesis. For sufficiently low levels of inequality, right parties are more ambiguous than left parties (as the linear effect overpowers the interaction)—and this provides some support for the second hypothesis. Furthermore, the negative interaction between majoritarian and right partisanship shows that majoritarian politics has a more powerful conditioning effect on right parties that must appeal to voters than potential coalition partners. Again, the results are very similar for the fiscal and ideology measures.

Model (3) finds no support for the triple interaction, which would provide the strongest support for the claim that inequality affects right parties in majoritarian systems differently. Given the heterogeneity is not a concern for the general left-right variable.
Table 1: The effect of inequality and partisanship on platform ambiguity across electoral systems

<table>
<thead>
<tr>
<th></th>
<th>Fiscal (1)</th>
<th>Fiscal (2)</th>
<th>Fiscal (3)</th>
<th>Fiscal (4)</th>
<th>Fiscal (5)</th>
<th>Ideology (1)</th>
<th>Ideology (2)</th>
<th>Ideology (3)</th>
<th>Ideology (4)</th>
<th>Ideology (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>0.600***</td>
<td>-1.046</td>
<td>-1.005</td>
<td>-2.030**</td>
<td>-1.625</td>
<td>0.295</td>
<td>-1.233</td>
<td>-1.303</td>
<td>-2.460**</td>
<td>-5.784</td>
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<td></td>
<td>(0.173)</td>
<td>(0.787)</td>
<td>(0.877)</td>
<td>(3.400)</td>
<td>(0.210)</td>
<td>(0.733)</td>
<td>(0.772)</td>
<td>(0.895)</td>
<td>(3.541)</td>
<td></td>
</tr>
<tr>
<td><strong>Market inequality</strong></td>
<td>0.012***</td>
<td>0.046**</td>
<td>0.045**</td>
<td>0.063***</td>
<td>0.053</td>
<td>0.011**</td>
<td>0.044**</td>
<td>0.045**</td>
<td>0.065***</td>
<td>0.161*</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.018)</td>
<td>(0.020)</td>
<td>(0.018)</td>
<td>(0.071)</td>
<td>(0.004)</td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.018)</td>
<td>(0.086)</td>
</tr>
<tr>
<td><strong>Right partisanship</strong></td>
<td>-0.010</td>
<td>0.302**</td>
<td>0.294**</td>
<td>0.440**</td>
<td>0.786</td>
<td>0.008</td>
<td>0.303**</td>
<td>0.316**</td>
<td>0.449**</td>
<td>0.657</td>
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<tr>
<td></td>
<td>(0.117)</td>
<td>(0.133)</td>
<td>(0.155)</td>
<td>(0.450)</td>
<td>(0.021)</td>
<td>(0.119)</td>
<td>(0.127)</td>
<td>(0.182)</td>
<td>(0.493)</td>
<td></td>
</tr>
<tr>
<td><strong>Majoritarian</strong></td>
<td>-0.400</td>
<td>-0.768</td>
<td>-0.099</td>
<td>-9.408***</td>
<td>-0.485</td>
<td>0.140</td>
<td>-0.088</td>
<td>5.551</td>
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<tr>
<td></td>
<td>(0.252)</td>
<td>(0.947)</td>
<td>(0.262)</td>
<td>(2.990)</td>
<td>(0.286)</td>
<td>(0.800)</td>
<td>(0.196)</td>
<td>(6.141)</td>
<td></td>
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</tr>
<tr>
<td><strong>Maj × inequality</strong></td>
<td>0.023***</td>
<td>0.031</td>
<td>0.019**</td>
<td>0.185***</td>
<td>0.017**</td>
<td>0.002</td>
<td>0.014*</td>
<td>-0.118</td>
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<tr>
<td></td>
<td>(0.006)</td>
<td>(0.021)</td>
<td>(0.007)</td>
<td>(0.057)</td>
<td>(0.007)</td>
<td>(0.018)</td>
<td>(0.008)</td>
<td>(0.108)</td>
<td></td>
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</tr>
<tr>
<td><strong>Right × inequality</strong></td>
<td>-0.007**</td>
<td>-0.006**</td>
<td>-0.009**</td>
<td>-0.017*</td>
<td>-0.006**</td>
<td>-0.007**</td>
<td>-0.009**</td>
<td>-0.021</td>
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<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.009)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.012)</td>
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</tr>
<tr>
<td><strong>Maj. × right</strong></td>
<td>-0.104***</td>
<td>-0.037</td>
<td>-0.127***</td>
<td>0.099</td>
<td>-0.046</td>
<td>-0.156</td>
<td>-0.077*</td>
<td>0.248</td>
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<tr>
<td></td>
<td>(0.031)</td>
<td>(0.162)</td>
<td>(0.032)</td>
<td>(0.117)</td>
<td>(0.030)</td>
<td>(0.150)</td>
<td>(0.038)</td>
<td>(0.199)</td>
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<td></td>
</tr>
<tr>
<td><strong>Maj. × right × inequality</strong></td>
<td>-0.002</td>
<td></td>
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<td></td>
<td>(0.003)</td>
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<tr>
<td><strong>Incumbent</strong></td>
<td>-0.013</td>
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<td></td>
<td></td>
<td>-0.060</td>
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<tr>
<td></td>
<td>(0.071)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.091)</td>
</tr>
<tr>
<td><strong>Economic growth</strong></td>
<td>0.007</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.033*</td>
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<tr>
<td></td>
<td>(0.030)</td>
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<td></td>
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<td></td>
<td></td>
<td>(0.019)</td>
</tr>
<tr>
<td><strong>Competitiveness</strong></td>
<td>0.010</td>
<td></td>
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<td></td>
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<td></td>
<td>(0.007)</td>
</tr>
<tr>
<td><strong>Years</strong></td>
<td>0.037</td>
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<td></td>
<td></td>
<td>-0.005</td>
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<td></td>
<td>(0.049)</td>
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<td></td>
<td></td>
<td>(0.037)</td>
</tr>
<tr>
<td><strong>Party fixed effects</strong></td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Adjusted $R^2$</strong></td>
<td>0.011</td>
<td>0.016</td>
<td>0.007</td>
<td>0.058</td>
<td>0.559</td>
<td>0.012</td>
<td>0.003</td>
<td>0.006</td>
<td>0.093</td>
<td>0.494</td>
</tr>
</tbody>
</table>

Notes: All models estimated with OLS and country-clustered standard errors. * denotes $p < 0.1$, ** denotes $p < 0.05$, *** denotes $p < 0.01$. 
limits of the data, this should come as no great surprise. However, a significant negative coefficient on the triple interaction holds if the interaction between the majoritarian dummy and right partisanship is removed from the model.

Models (4) and (5) examine the robustness of the results. Model (4) includes four control variables, and shows that the results of Model (2)—the main specification—are if anything strengthened. Given the low adjusted $R^2$, this should not be surprising. However, the controls themselves are not good predictors, and reinforce the claim that the politics of ambiguity are not yet well understood empirically. Model (5) includes party fixed effects. This very demanding specification dramatically inflates the standard errors, which is unsurprising since the model estimates an additional 50 coefficients. Nevertheless, the directions of the key variables are robust, and some of the variables remain statistically significant. This supports the results of the Hausman tests suggesting party fixed effects are not needed.

5.5 Summary

The empirical analysis provides support for the theoretical model in Western Europe using a new approach to measuring platform ambiguity using expert surveys. Not only is income inequality positively associated with platform ambiguity in both majoritarian and PR systems, but we find that increasing income inequality allows left parties to be more ambiguous. The results are robust to the inclusion of possible confounding variables, and are even somewhat robust to the inclusion of party fixed effects in a specification that is extremely demanding on the data.

However, the results should be treated with caution for several reasons. First, the sample size is relatively small and, as noted above, the data may be subject to measurement error. However, by using experts such measurement error is less likely to be systematically biased and thus the fact that robust findings exist in the presence of measurement error only strengthens the results. Second, the electoral system interactions rest heavily on the difference between European PR systems and France and the UK. A broader sample is required to examine the generality of the results for majoritarian systems. Finally, it should be noted that analysis is not a well identified causal study, but rather shows suggestive correlations consistent with a micro-grounded theory.

6 Conclusion

This paper has proposed a new explanation for party platform ambiguity: where policy-motivated parties are not completely flexible in the policies they can present to the electorate, they use ambiguity to move the expected policy outcome toward their ideal point. This underlying motivation applies in both majoritarian and proportional electoral systems, despite the two systems providing different kinds of incentives for parties to be ambiguous. The model is applied to redistributive politics, and suggests that income inequality typically increases platform ambiguity, especially for left parties. Unlike the extant theoretical literature, these predictions are taken to the data. Using expert surveys as a means of avoiding systematic bias in measuring platform ambiguity, I find that the key predictions of the theoretical model are consistent with evidence from Western European democracies.
Appendix 1

Bringing together the restrictions on \( h_p(\tau) \), the log-normal distribution and the behavior of voters, we can restate the optimization problems in the majoritarian game as (after integrating out):

\[
\max_{\tau_l} \left\{ \frac{1}{2} + \phi b + \frac{\varphi(\tau_l - \tau_r^*)}{6} \left( 3 \left( y^\alpha - \exp \left( \alpha \mu + \frac{\alpha^2 \sigma^2}{2} \right) \right) - y^\alpha (\tau_l + \tau_r^* + \tau(y_m)) \right) \right. \\
\left. \times \left[ W + \frac{(\tau_l - \tau_r^*)}{6} (y^\alpha (3 - \tau_l + \tau_r^* - \tau(y_m)) - 3y^\alpha) \right] \\
+ \frac{y^\alpha (2 - \tau_l + \tau(y_m))}{2} - \frac{y^\alpha (\tau_l^2 + \tau_r (\tau(y_m) - 3) + [\tau(y_m)]^2)}{6} \right\}
\]

\[
\max_{\tau_r} \left\{ - \left[ \frac{1}{2} + \phi b + \frac{\varphi(\tau_r^* - \tau_r)}{6} \left( 3 \left( y^\alpha - \exp \left( \alpha \mu + \frac{\alpha^2 \sigma^2}{2} \right) \right) - y^\alpha (\tau_l + \tau_r + \tau(y_m)) \right) \right] \right. \\
\left. \times \left[ W - \frac{(\tau_l^* - \tau_r)}{6} (y^\alpha (3 - \tau_l + \tau_r - \tau(y_m)) - 3y^\alpha) \right] \\
+ \frac{y^\alpha (2 - \tau_l + \tau(y_m))}{2} - \frac{y^\alpha (\tau_r^2 + \tau_r (\tau(y_m) - 3) + [\tau(y_m)]^2)}{6} \right\},
\]

where the first term in each maximand is \( P(h(\tau)) \) multiplied by \( Z_p \), where both are evaluated at \( \tau_l, \tau_r \) and \( \tau(y_m) \). The first-order conditions can be stated more concisely as:

\[
\text{FOC}_{\tau_l} : \frac{\partial P(\tau_l, \tau_r^*)}{\partial \tau_r^*} Z_l + P(\tau_l, \tau_r^*) \frac{\partial Z_l}{\partial \tau_l} = 0 \tag{19}
\]

\[
\text{FOC}_{\tau_r} : - \frac{\partial P(\tau_r^*, \tau_r^*)}{\partial \tau_r^*} Z_r + (1 - P(\tau_l^*, \tau_r^*)) \frac{\partial Z_r}{\partial \tau_r^*} = 0 \tag{20}
\]

**Proof of Proposition 1.** Given voters are clearly playing a collective best response, a sufficient condition for the SPNE to be an equilibrium is that the maximization problems of \( l \) and \( r \) are strictly concave. We can demonstrate this by showing that the second-order conditions are satisfied. The SOCs are given by:

\[
\frac{\partial^2 U_l}{\partial \tau_l^2} = 2 \frac{\partial P(\tau_l, \tau_r)}{\partial \tau_l} \frac{\partial Z_l}{\partial \tau_l} + \frac{\partial^2 P(\tau_l, \tau_r)}{\partial \tau_l^2} Z_l + P(\tau_l, \tau_r) \frac{\partial^2 Z_l}{\partial \tau_l^2}
\]

\[
\frac{\partial^2 U_r}{\partial \tau_r^2} = -2 \frac{\partial P(\tau_l, \tau_r)}{\partial \tau_r} \frac{\partial Z_r}{\partial \tau_r} - \frac{\partial^2 P(\tau_l, \tau_r)}{\partial \tau_r^2} Z_r + (1 - P(\tau_l, \tau_r)) \frac{\partial^2 Z_r}{\partial \tau_r^2}
\]

where \( U_p \) denotes \( p \)'s maximand. \( P(\tau_l, \tau_r) \) is strictly decreasing in \( \tau_l \) and \( \tau_r \) under Assumption 1. Furthermore, \( Z_p \geq 0, \forall p; \) this is intuitive and is clearly the case because \( p \) can always at least mimic \( -p. \) In fact, \( Z_p > 0 \) in equilibrium where \( \tau_l^* > \tau_r^* \) (see Lemma 1.) By definition, \( P(\tau_l, \tau_r) \in (0, 1) \). Finally, it is clear that \( \frac{\partial^2 P(\tau_l, \tau_r)}{\partial \tau_l^2} < 0, \frac{\partial^2 Z_l}{\partial \tau_l^2} < 0, \frac{\partial^2 P(\tau_l, \tau_r)}{\partial \tau_r^2} > 0 \) and \( \frac{\partial^2 Z_r}{\partial \tau_r^2} < 0 \).
Putting together these observations it is clear that each term in equations 21 and 22 is negative, and thus \( \partial^2 U_l/\partial \tau_l^2 < 0 \) and \( \partial^2 U_r/\partial \tau_r^2 < 0 \). Therefore both problems are concave, and thus a unique SPNE exists.

**Proof of Lemma 1.** Suppose instead \( \tau_l \leq \tau_r \). In this case, \( Z_p \leq 0, \forall p \). Consider a deviation for \( l \) to \( \tau_l < \tau_l = \tau_l + \varepsilon \), which clearly entails \( Z_l > 0 \). Given \( P \) is continuous, even though \( P \) falls there remains a non-zero probability of winning. Therefore there must exist some \( \varepsilon > 0 \) such that \( U_l \) increases, which contradicts \( \tau_l \leq \tau_r \). Analogous arguments apply to \( r \).

**Proof of Proposition 2.** The probability function for a MPS (with \( \mu \) = \( \ln \bar{y} - \sigma^2/2 \)) becomes:

\[
P(\tau_l, \tau_r|MPS) = \frac{1}{2} + \varphi b + \frac{\varphi y^\alpha (\tau_l - \tau_r)}{6} \left( 3 \left( 1 - \exp \left( \frac{\sigma^2 \alpha (\alpha - 1)}{2} \right) \right) - \tau_l - \tau_r - \tau(y_m) \right). \tag{23}
\]

Given \( \alpha \in (0, 1) \) and Lemma 1, it is clear that \( P(\tau_l, \tau_r|MPS) \) is increasing in \( \sigma^2 \), if \( \tau(y_m) \) is fixed.

The implicit function theorem states:

\[
\begin{pmatrix}
\frac{\partial \tau_l}{\partial \sigma^2} \\
\frac{\partial \tau_r}{\partial \sigma^2}
\end{pmatrix} = -\begin{pmatrix}
\frac{\partial \text{FOC}\tau_l}{\partial \tau_l} & \frac{\partial \text{FOC}\tau_l}{\partial \tau_r} \\
\frac{\partial \text{FOC}\tau_r}{\partial \tau_l} & \frac{\partial \text{FOC}\tau_r}{\partial \tau_r}
\end{pmatrix}^{-1} \begin{pmatrix}
\frac{\partial \text{FOC}\tau_l}{\partial \sigma^2} \\
\frac{\partial \text{FOC}\tau_r}{\partial \sigma^2}
\end{pmatrix}, \tag{24}
\]

Solving the system yields:

\[
\begin{align*}
\frac{\partial \tau_l}{\partial \sigma^2} &= \left( \frac{\partial \text{FOC}\tau_l}{\partial \tau_l} \frac{\partial \text{FOC}\tau_r}{\partial \tau_l} - \frac{\partial \text{FOC}\tau_l}{\partial \tau_r} \frac{\partial \text{FOC}\tau_l}{\partial \tau_l} \right) / D \tag{25} \\
\frac{\partial \tau_r}{\partial \sigma^2} &= \left( \frac{\partial \text{FOC}\tau_l}{\partial \tau_l} \frac{\partial \text{FOC}\tau_r}{\partial \tau_r} - \frac{\partial \text{FOC}\tau_l}{\partial \tau_r} \frac{\partial \text{FOC}\tau_r}{\partial \tau_r} \right) / D \tag{26}
\end{align*}
\]

Assumption 2 tells us that \( D > 0 \). The derivatives for \( \sigma^2 \) are:

\[
\begin{align*}
\frac{\partial \text{FOC}\tau_l}{\partial \sigma^2} &= \frac{\partial P(\tau_l, \tau_r|MPS)}{\partial \tau_l} \frac{\partial Z_l}{\partial \sigma^2} + \frac{\partial^2 P(\tau_l, \tau_r|MPS)}{\partial \tau_l \partial \sigma^2} Z_l \\
&\quad + \frac{\partial P(\tau_l, \tau_r|MPS)}{\partial \tau_r} \frac{\partial Z_l}{\partial \sigma^2} + P(\tau_l, \tau_r|MPS) \frac{\partial^2 Z_l}{\partial \tau_r \partial \sigma^2} \\
\frac{\partial \text{FOC}\tau_r}{\partial \sigma^2} &= -\frac{\partial P(\tau_l, \tau_r|MPS)}{\partial \tau_l} \frac{\partial Z_r}{\partial \sigma^2} - \frac{\partial^2 P(\tau_l, \tau_r|MPS)}{\partial \tau_l \partial \sigma^2} Z_r \\
&\quad - \frac{\partial P(\tau_l, \tau_r|MPS)}{\partial \tau_r} \frac{\partial Z_r}{\partial \sigma^2} + (1 - P(\tau_l, \tau_r|MPS)) \frac{\partial^2 Z_r}{\partial \tau_r \partial \sigma^2} \tag{27}
\end{align*}
\]

For a MPS, we use the probability function given in 23. It is clear from inspection that the cross-partial of \( P(\tau_l, \tau_r|MPS) \) with respect to \( \tau_l \) and \( \tau_r \) is zero, while \( P(\tau_l, \tau_r|MPS) \) is increasing in \( \sigma^2 \). Also, \( Z_p \) does not depend upon \( \sigma^2 \). As noted in the text, Lemma 1 ensures \( \partial^2 P(\tau_l, \tau_r|MPS)/\partial \sigma^2 \partial \tau_l < 0 \) and \( \partial^2 P(\tau_l, \tau_r|MPS)/\partial \sigma^2 \partial \tau_r > 0 \). Again note that \( \partial Z_l/\partial \tau_l < 0 \) and \( \partial Z_r/\partial \tau_r > 0 \) and \( Z_p > 0, \forall p \). Putting these observations together implies that \( \partial \text{FOC}\tau_l/\partial \sigma^2 > 0 \) and \( \partial \text{FOC}\tau_r/\partial \sigma^2 > 0 \).
The signs of $\partial \tau_l / \partial \sigma^2$ and $\partial \tau_r / \partial \sigma^2$ thus depend upon $\partial \text{FOC} \backslash \tau_l / \partial \tau_r$ and $\partial \text{FOC} \backslash \tau_r / \partial \tau_l$. Neither derivative has a clear sign. However, putting together the observations above, we can say that if $\partial \text{FOC} \backslash \tau_l / \partial \tau_r > 0$ then $\partial \tau_l / \partial \sigma^2 > 0$, and $\partial \tau_r / \partial \sigma^2 > 0$. The solutions would solve a quadratic equation after integrating out. As noted in the text, the necessary conditions regarding $\tilde{E}$ come from setting equations 25 and 26 to zero.

**Proof of Proposition 3.** Given $y_m$ and $\bar{y}$ are held constant, $\tau(y_m)$ is also constant. However, the addition and subtraction of $\varepsilon > 0$ increases the variance $V(Y) = [\exp(\sigma^2) - 1] \exp(2\mu + \sigma^2)$. The chain rule implies:

$$ \frac{\partial P(\tau_l, \tau_r)}{\partial V(Y)} = \frac{\partial P(\tau_l, \tau_r)}{\partial \sigma^2} \frac{\partial \sigma^2}{\partial V(Y)} $$

(29)

where $\partial \sigma^2 / \partial V(Y) > 0$ follows from differentiating $V(Y)$ implicitly, and $\partial P(\tau_l, \tau_r) / \partial \sigma^2 > 0$ follows from Case 1 of Proposition 2. The cross-partial effects are thus the same as in Case 1 of Proposition 2. The proof thus proceeds identically to Proposition 2, but produces a different condition for $\tau_r$ to decrease.

**Proof of Proposition 4.** Continuing the analysis in the text, solving equations 13 and 14 simultaneously for $E z_{ml}(\tau_l)$ and $E z_{mr}(\tau_r)$ to give $V$. Part 1 of the Proposition simply then notes that $E z_{ml} = \int z(\tau; \tau_l) h_t(\tau_l) d\tau$ and similarly for $E z_{mr}(\tau_r)$, and thus defines $\tilde{\tau}_l$ and $\tilde{\tau}_r$ implicitly. The solutions would solve a quadratic equation after integrating out. As noted in the text, the coalition proposals in Part 2 are intuitive. Equations 13 and 14 ensure that $m$ always vote for a proposal by $l$ or $r$, while $m$ clearly votes for its own proposal of its idea point. When formateur, $l$ and $r$ vote for their own proposals. When excluded from a coalition $K_f$, the vote of $p \neq f$, $m$ does not affect the outcome and thus any action is an equilibrium. However, a unique stationary equilibrium follows from the assumption of weakly undominated voting strategies. This ensures parties vote sincerely when their vote does not affect the outcome on the equilibrium path.

**Proof of Proposition 5.** We can first show that $V$ is decreasing in $p_l$ and $p_r$ (using the quotient rule):

$$ \frac{\partial V}{\partial q_p} = -\frac{(1 - \beta)\beta \gamma z(\tau; y_m; y_m)}{\gamma^2 [1 - \beta(q_l(\sigma^2) + q_r(\sigma^2))]^2} < 0, p = l, r. $$

(30)

To complete the proof, we use the chain rule repeatedly:

$$ \frac{\partial \tilde{\tau}_l}{\partial V(Y)} = \frac{\partial \tau_l}{\partial \tilde{\tau}_l} \frac{\partial \tilde{\tau}_l}{\partial q_l} \frac{\partial q_l(s_l)}{\partial s_l} \frac{\partial \sigma^2}{\partial V(Y)} = 0 $$

(31)

$$ \frac{\partial \tilde{\tau}_r}{\partial V(Y)} = \frac{\partial \tau_r}{\partial \tilde{\tau}_r} \frac{\partial \tilde{\tau}_r}{\partial q_r} \frac{\partial q_r(s_r)}{\partial s_r} \frac{\partial \sigma^2}{\partial V(Y)} < 0 $$

(32)

where the proof of Proposition 3 establishes that $\partial \sigma^2 / \partial V(Y) > 0$, $\partial q_r(s_r) / \partial s_r > 0$ and $\partial s_r / \partial \sigma^2 > 0$ are true by the assumptions of $\Gamma_B$ and $\partial \tau_l / \partial V < 0$ and $\partial \tau_r / \partial V > 0$ from the plausible solutions to the implicit quadratic equations in 4. Putting these signed derivatives together with $\partial V / \partial q_p < 0$ completes the proof. ■
Appendix 2


Right ideology partisanship. Mean expert placement of political parties. Data from the 1999, 2002 and 2006 Chapel Hill surveys. Placement scale is 0-10.

Right fiscal partisanship. Mean expert placement of political parties. Data from the 1999, 2002 and 2006 Chapel Hill surveys is merged, and the placement scale is 0-10.


Majoritarian. Dummy variable coded 1 where a country operates a majoritarian system. France and the UK are all coded as majoritarian systems. All others are coded 0.

Incumbency. Dummy variable for being part of the government. All political parties that are part of the governing coalition, and thus receive cabinet portfolios, are coded 1.


Closeness. Defined as the difference in vote share between parties. For the largest party, this variable is defined as the absolute value of the difference in vote share between itself and the second-placed party. For the second and third largest parties this is defined as the absolute value of the difference between itself and the largest party.

Years. Number of years until the next election to the lower house of the legislature. When an election took place in the year a survey was conducted this variable was coded 0.

Table 2: Variable summary statistics

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<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
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<td>Fiscal ambiguity</td>
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