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## Coalition governments and policy reform with asymmetric information

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# **Darmstadt Discussion Papers in Economics**

**Coalition Governments and Policy Reform with Asymmetric Information**

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# Coalition Governments and Policy Reform with Asymmetric Information

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## Abstract

With ideological parties being better informed about the state of the world than voters, the true motivation of policy proposals is hard to judge for the electorate. However, if reform proposals have to be agreed upon by coalition parties, it may become possible for the government to signal to the voters its private information about the necessity of reforms. Therefore, in coalition governments reforms will be more in line with policy requirements than in single-party governments. This is usually beneficial for the coalition parties as well as for the voter.

*Keywords:* asymmetric information, coalition governments, policy reform

*JEL-Classification:* D72, D78, D82

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# 1 Introduction

Participating parties of a coalition government often differ in their policy preferences so that they have to find an agreement on policy reforms. It is generally argued this makes the implementation of reforms more difficult in coalition rather than single-party governments (see, e.g., Tsebelis, 2002). We argue that the opposite may be the case if the parties in power have private information about policy shocks. In this case, the fact that a proposed policy has been agreed to by all coalition parties despite their different preferences provides valuable information to the voters about the need for the reform.

Crucial to our argument is the asymmetric information between policy-makers and voters which seems to be an almost systemic feature of democracies. Insight into the facts is very often better for the government making the policy proposals than for the voter who has to vote on the policy. Typically governments have large administrations with specialists working for them, resources can be spent on obtaining external expertise, and in some instances such as security issues governments have access to documents that are not disseminated to the public.

When policymakers are motivated ideologically, asymmetric information leads to a moral hazard problem. They may offer a distorted presentation of the available information so as to find approval for policies which conform to their own preferences, rather than those of the voters. Accordingly, when the voter is confronted with a reform proposal he is unsure about how to assess it. Does it merely reflect the policymakers' ideological position on a policy, or is it also beneficial to the voter? Confronted with this uncertainty, he may vote down reform proposals and adhere to the status quo, even if he would have agreed to the policy change had he known the true state of the world.

In a coalition government that includes parties with heterogeneous preferences this problem may be less severe. When each of the parties effectively has a veto right, proposals that are overly biased towards the particular interests of an individual party will not find approval of the coalition partners. Therefore, approval of a reform proposal by heterogeneous coalition partners can be an informative signal for the voter.

For an illustrative example consider the Israeli peace policy. In the national elections for the Knesset in May 1999, the Labor Party and its partners won 26 seats followed by the Likud party with 19 seats, and the ultra-orthodox Schas party with 17 seats. The newly elected prime minister Ehud Barak formed a coalition government including the ultra-orthodox party. In September 1999 Barak and Arafat signed a schedule for the implementation of the Wye agreement ("Wye 2") which codified the restitution of land con-

trolled by Israel to the Palestinians, and the release of Palestinian prisoners. It was sought to overcome the stagnation in the implementation of “Wye 1” and give a new momentum to the peace process. Arguably, the fact that the ultra-orthodox Schas approved such a policy had increased the governments credibility that this reform was actually in the national interest.

In the paper we focus on the example of a leftist party. Due to the moral hazard problem mentioned above, it cannot credibly transmit information that support a leftist policy reform. Now suppose that there is a second, centrist party whose policy preferences lie further to the right. With the centrist coalition partner the leftist party gains in credibility when proposing a leftist policy because the centrist party would veto such a proposal unless it is actually supported by the available information. Hence, a coalition government may find it easier to get public support, especially for those reforms that are also in the interest of the voters. This is beneficial not only for the voters and the coalition-joining partner, but usually also for the party which in the original situation had a majority on its own.

Our contribution distinguishes itself from most existing studies on policy reforms by stressing the informative role of coalition governments when voters are typically less well informed about the necessity of a policy change.<sup>1</sup> Thus, it is related to earlier work by Lupia (1992, 1994), who shows how badly-informed voters may infer information from agenda-setters when contesting an election is costly or when a policy can be endorsed by third parties. While we look into the interplay between a coalition government and the electorate, a similar setup can be found in the seminal contribution by Gilligan and Krehbiel (1989). They analyzed policy outcomes when legislatures delegate certain tasks to a better informed and heterogenous committee comparing open, modified and closed procedural rules with respect to the policy outcomes.

While not focussing on the role of coalitions, signalling, as in our approach, is also central for policy reforms in the contribution by Cukierman and Tommasi (1998). Here it is argued that an incumbent government which makes a policy proposal contrary to its ideological stance has a strikingly higher chance of getting it approved by the electorate than an incumbent who would propose a policy close to its ideological position. From the incongruence of the proposal with the political leaning of the proposer the voter may derive valuable information on the true necessity of the reform. Accordingly, Cukierman and Tommasi (1998) show how a leftist party may be more

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<sup>1</sup>In addition to excellent surveys on the political economy of reform provided by Roland (2002) or Drazen (2000), a collection of highly recommendable articles on the political economy of reforms may be found in Sturzenegger and Tommasi (1998).

able to signal the need for a rightist policy, while we show how a coalition may make it easier for a leftist party to signal the need for a leftist policy.

Conveying information to voters via heterogeneous preferences of policy-makers also plays a central role in a range of models on electoral competition (see, e.g., Roemer, 1994; Schultz, 1996; Martinelli, 2001). In all these examples, akin to our model, the actions of one player who has a different policy stance than the voters or the other political actors convey information about the true state of the world.

We proceed by describing our model (section 2). Then, the equilibrium policy proposals for a single-party government and for a coalition government are analyzed (sections 3 and 4). By comparison we show that a coalition often facilitates implementation of a policy reform and improves the payoffs of both parties and of the voters (section 5). In the concluding section 6 we summarize the main findings.

## 2 The model

We study the outcome of a game between a government that proposes a policy change and the voters ( $V$ ) who may approve or vote down the policy proposal in a referendum. In the first case that we consider there are two parties: a leftist ( $L$ ) and a rightist ( $R$ ) one. In the second case, there is also a third, centrist ( $C$ ) party.

For all players  $i = L, C, R, V$  their payoff  $u_i$  decreases quadratically in the distance between their bliss point,  $\gamma + a_i$ , and the policy  $x \in \mathbb{R}$ :

$$u_i = -[x - (\gamma + a_i)]^2. \quad (1)$$

The actors' bliss points depend on their individual policy preferences  $a_i \in \mathbb{R}$  and a common, exogenous policy shock  $\gamma$ . While all actors observe whether a shock has occurred, the political parties have private information over its realization and, therefore, over the optimal policy response. For example, while the voters observe the phenomenon of globalization, they are unsure whether the optimal policy response is one of protectionism (a "leftist" policy) or of liberalization (a "rightist" policy). Similarly, the voters may observe an increased level of unemployment but be unsure whether the best response is a tightening or a loosening of employment protection laws.

We capture this idea by assuming that  $\gamma$  is a random variable of which only the prior distribution (which is common knowledge) is known by the voters:

$$\gamma = \begin{cases} b & \text{with probability } \pi, \\ -b & \text{with probability } (1 - \pi). \end{cases} \quad (2)$$

By contrast, the political parties observe the true realization of  $\gamma$  for the reasons spelled out earlier – they have large administrations gathering information, costly external advice can be bought, and some documents typically cannot be disseminated to the public for security reasons.

We now impose some restrictions on the policy preferences of the political parties and of the voters. These are chosen with the aim of avoiding cumbersome case distinctions and to provide a simple example that leads to a coalition government for the case of three parties with fixed policy positions. Obviously, there are many other distributions than the one below that would lead to the same result.

**Assumptions:**

1.  $a_L < -2b$  and  $a_R > -a_L$ .
2.  $-2b < a_C < b$ .
3. The voters' individual policy preferences are distributed uniformly and symmetrically around 0 with maximum support  $\bar{a} \geq a_R$ .

Assumptions 1 and 3 assure that the leftist party holds a majority in the two-party system. This is the first case that we consider. According to assumption 2, the policy preferences of the centrist party lie in between those of the other parties. Nevertheless, it does not hold a majority in a three-party system, motivating the formation of a coalition government with party  $L$ .<sup>2</sup> This is the second case that we consider.

Figure 1 depicts the above assumptions as well as the payoff function of the median voter, indexed  $m$ , for the cases  $\gamma = -b$  and  $\gamma = b$ . Note that  $u_m(x_0)$  denotes the median voter's utility at the status quo policy, which we normalize to  $x_0 = 0$ .

We assume that the government proposes a policy  $x_p \in \mathbb{R}$  to the voters. Subsequently, the voters decide in the referendum whether to accept or reject the proposal. If it is rejected, then the status quo policy,  $x_0 = 0$ , will be implemented. Thus we model a situation where a government already exists but a certain policy which might not have been central to the pre-election phase needs approval by the voters.

Note that referenda are of increasing importance as a political decision mechanism (see, e.g., Butler and Ranney, 1994). Recently, the ratification of

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<sup>2</sup>Specifically, party  $C$  gets half of the voters with preferences in the interval  $[-a_L, a_C]$  and half of the voters with preferences in the interval  $[a_C, a_R]$ . Given our assumptions  $\bar{a} \geq a_R$  and  $a_R > -a_L$ , there will be some voters to the left of  $-a_L$  so that party  $C$  gets less than 50% of the votes.

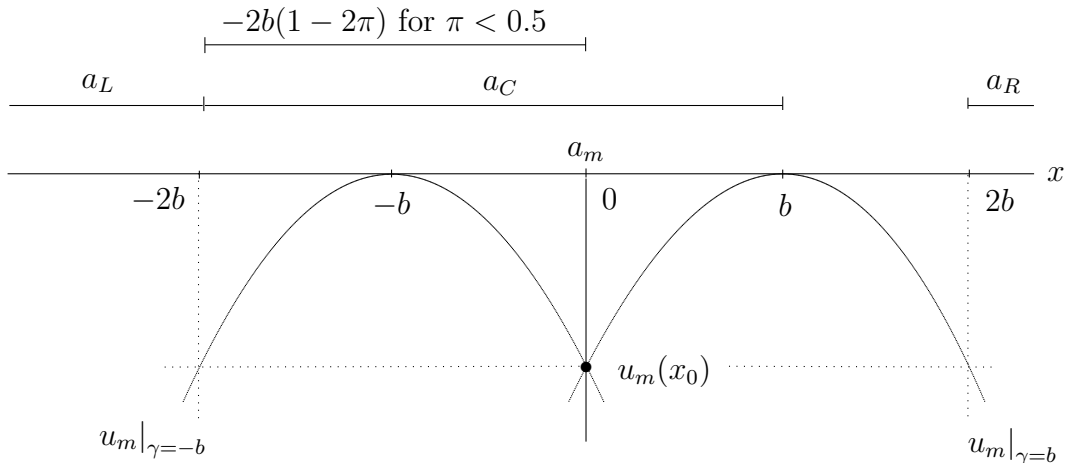


Figure 1: Preferences

international treaties in the European Union has been done through referenda in a range of member countries. They also play an important role in Central and Eastern European countries (Auer and Bützer, 2001). In a broader interpretation, the referendum may be seen as a modeling device to capture the idea that a government needs public support for its policies. If opposition is too strong, the government may not be able to implement specific policies even though it holds a majority in the legislature.

We are interested in whether a coalition government is better able than a single-party government to implement reform policies by signalling private information about a policy shock. For this purpose we first analyze the two-party case where the leftist party  $L$  has a majority so that it can determine the policy proposal which it puts on the agenda. Then, we go on by introducing a centrist party  $C$  and consider the three party case. Now, party  $L$  does no longer obtain a majority on its own and forms a coalition with  $C$ . We compare the policy outcomes for the two scenarios.

After the election of the government, the timing is as follows. In the regime where party  $L$  governs alone:

1. Nature draws type  $\gamma \in \{b, -b\}$  according to the probability distribution  $Pr[b] = \pi$  and  $Pr[-b] = 1 - \pi$ .
2. The political parties (but not the voters) observe the realization of  $\gamma$ .



3. Party  $L$  decides on the policy  $x_p$  that it presents to the voters in a referendum.
4. The voters decide whether to accept or to reject the policy proposal  $x_p$ , and payoffs are realized.

In the coalition regime, at stage 3 the coalition partners have to agree on the policy proposal. We will discuss this process further below. Otherwise, the timing is the same. We assume that political parties and the voters always accept a policy proposal if they are indifferent.

This is a dynamic game with incomplete information. In the next two sections, we identify Perfect Bayesian Equilibria (PBE) for the two regimes, thereby focusing on pure strategies.

### 3 Equilibrium with single-party government

A PBE is a set of strategies and beliefs such that, at any stage of the game, strategies are optimal given the beliefs, and the beliefs are obtained from equilibrium strategies and observed actions using Bayes' rule (Fudenberg and Tirole, 1991). As the preferences of the individual voters are single peaked (see eq. 1), the electorate can be represented by the median voter, whose policy preferences are  $a_m = 0$  (by assumption 3). Therefore, if party  $L$  governs alone, there are only two players: party  $L$  who suggests a policy  $x_p$ , and the median voter who decides whether to accept or reject the proposal. A PBE of this game consists of strategies for the party and the median voter as well as the median voter's beliefs over  $\gamma$  such that

- (i) The median voter's strategy is optimal given party  $L$ 's strategy and his beliefs.
- (ii) Party  $L$ 's strategy is optimal given the median voter's strategy and beliefs.
- (iii) Beliefs are derived from the party's strategy using Bayes' rule where possible.

#### 3.1 Analysis of separating equilibrium

We first consider a separating equilibrium and show, by contradiction, that it does not exist. In a separating equilibrium, party  $L$  makes different policy proposals depending on whether a leftist or a rightist shock has occurred, which is denoted  $x_l$  and  $x_r$  respectively (i.e.,  $x_l \equiv x_p(\gamma = -b)$  and  $x_r \equiv$

$x_p(\gamma = b)$ ). Upon receiving the signal  $x_l$ , the median voter then believes that a leftist policy is required. Given this belief, he accepts a policy proposal iff  $x_l \in [-2b, 0]$  because this would (weakly) improve his payoff relative to the status quo (see figure 1). Similarly, if he receives the signal  $x_r$ , he believes that a rightist policy is required and accepts a policy proposal iff  $x_r \in [0, 2b]$ .

Given the median voter's strategy and beliefs, the best response of party  $L$  is to propose  $x_l = x_r = -2b$ , i.e. to make the same proposal independent of the direction of the shock. To see this we have to consider two cases. If a leftist shock has occurred, party  $L$  prefers the policy  $x = -2b$  to any policy  $x > -2b$  (by assumption 1). Hence the best proposal that would be accepted by the median voter is  $x_p = -2b$ . If a rightist shock has occurred, party  $L$  prefers the policy  $x = -2b$  to any policy  $x > 0$  (by assumption 1). Furthermore, any proposal  $x_r \in (-2b, 0)$  would be rejected because this signals a rightist shock to the median voter. Accordingly, the best response of party  $L$  is to pretend that a leftist shock has occurred by sending the signal  $x_r = -2b$ , which the median voter would (erroneously) accept given his beliefs. Hence there cannot exist a separating equilibrium.

Intuitively, by assumption 1 party  $L$  prefers a leftist policy even in the case of a rightist shock. Therefore, it cannot credibly signal the type of the shock to the median voter, and no separating equilibrium exists.

### 3.2 Analysis of pooling equilibrium

In a pooling equilibrium party  $L$  makes the same policy proposal  $x_p$  independent of the direction of the shock (i.e.  $x_p(\gamma = -b) = x_p(\gamma = b)$ ). Therefore, along the equilibrium path the median voter's beliefs equal the priors, according to which a rightist shock occurs with probability  $\pi$  and a leftist shock with probability  $1 - \pi$ . In a PBE of a signalling game there are no restrictions on out-of-equilibrium beliefs. For parsimony, we assume that the median voter believes that a rightist shock has occurred with probability  $\pi$  whatever signal he receives.

Turning to the median voter's strategy, he will only accept a policy proposal  $x_p$  if it yields at least the same expected payoff as the status quo  $x_0 = 0$ . Given his beliefs, this is the case iff

$$-\pi(x_p - b)^2 - (1 - \pi)(x_p + b)^2 \geq -\pi b^2 - (1 - \pi)b^2 \quad (3)$$

$$\Leftrightarrow -\frac{2b(1 - 2\pi)}{x_p} \geq 1. \quad (4)$$

The range of policy proposals for which (4) is satisfied depends on whether the probability of a rightist shock,  $\pi$ , is larger than that of a leftist shock.

Specifically,

- if  $\pi \geq 0.5$ , the median voter accepts policy proposals  $x_p \in [0, -2b(1 - 2\pi)] \geq 0$ ;
- if  $\pi < 0.5$ , the median voter accepts policy proposals  $x_p \in [-2b(1 - 2\pi), 0] \leq 0$ .

Thus, if the probability of a rightist shock is larger than that of a leftist shock, the median voter only accepts proposals to the right of the status quo and vice versa.

Party  $L$  anticipates this behavior so that its strategy also depends on whether  $\pi$  is smaller or larger than 0.5. In the latter case, the median voter would only accept a rightist policy so that party  $L$  prefers the status quo. Hence it will propose either to maintain the status quo or a policy that the median voter then rejects, i.e.  $x_p \notin (0, -2b(1 - 2\pi)]$  independent of the direction of the shock. Turning to the case  $\pi < 0.5$ , the most leftist proposal that will be accepted by the median voter is  $x_p = -2b(1 - 2\pi)$ . Given this constraint, it is also the best policy that party  $L$  can implement in a pooling equilibrium.<sup>3</sup>

Intuitively, the bliss point of party  $L$  lies to the left of  $x_p = -2b(1 - 2\pi)$  in the case of a leftist shock. By contrast, its bliss point with a rightist shock,  $b + a_L$ , may lie to the right of  $-2b(1 - 2\pi)$  if  $a_L$  is sufficiently close to  $-2b$  and if  $\pi$  is small (see Figure 1). However, in its decision party  $L$  puts more weight on choosing its optimal implementable policy for the case of a leftist shock, because this is the more likely scenario with  $\pi < 0.5$ .

The findings of sections 3.1 and 3.2 are summarized in the following proposition.

**Proposition 1** *If party  $L$  governs alone, the following results obtain:*

- a) *There exists no separating equilibrium.*
- b) *If  $\pi \geq 0.5$ , then there exist an infinite number of pooling equilibria. In all of them the status quo persists.*
- c) *If  $\pi < 0.5$ , then there exists a pooling equilibrium in which party  $L$  proposes  $x_p = -2b(1 - 2\pi)$ , which the median voter accepts. There exists no other pooling equilibrium that party  $L$  prefers.*

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<sup>3</sup>See the appendix for a proof.

Accordingly, reforms depend on the ex-ante probabilities of a rightist or leftist shock, but not on the actual direction of the shock. Problems occur if these two are in conflict with each other. Specifically, from the perspective of the median voter reforms will often have the wrong direction, i.e. there is a leftist reform despite a rightist shock. This happens if a rightist shock occurs but its ex-ante probability is below 50%. Furthermore, a reform may not be implemented although it would improve the payoff of the median voter and of party  $L$ . This happens if a leftist shock occurs but its ex-ante probability is below 50%. We now analyze whether a coalition government may be more effective in signalling the occurrence of a shock, thereby improving the policy outcome.

## 4 Equilibrium with coalition government

In order to analyze coalitions we now turn to the case in which there is a third, centrist party, whose preferences lie in between those of the leftist and the rightist party. Given assumptions 1 to 3 on the actors' preferences, no single party will obtain a majority in the national general elections. Instead, the leftist and the centrist party will form a coalition government. In such a coalition, the credibility towards the voters when suggesting a leftist policy is increased because it has been approved by party  $C$ , whose policy preferences lie further to the right of the political spectrum.

We do not model the bargaining process within the coalition. This would be rather complex because one would have to account for the interaction of the parties' bargaining strategies with the beliefs and the behavior of the voters. Instead, we focus on the two extreme situations where either of the parties is the dominating coalition partner that can present policy proposals as a take-it-or-leave-it offer to the other coalition partner. In the following we show that in both cases a separating equilibrium now exists.

### 4.1 Party $L$ holds bargaining power

We first consider the case where party  $L$  holds all the bargaining power and claim that the following profile of strategies and beliefs then constitutes a PBE.<sup>4</sup>

(i) Strategy of party  $L$ :  $x_l = \max\{-2b, 2a_C - 2b\}$ ;  $x_r = 0$ .

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<sup>4</sup>As above, party  $L$ 's policy proposals in the case of a leftist and a rightist shock are denoted by  $x_l$  and  $x_r$ , respectively.

- (ii) Strategy of party  $C$ : Accept proposals  $x_l \in [2a_C - 2b, 0]$  and  $x_r \in [2a_C + 2b, 0]$ . Reject all other proposals.
- (iii) Beliefs of the median voter: If confronted with a policy proposal  $x_p < \min\{2a_C + 2b, 0\}$ , the median voter believes that a leftist shock has occurred with probability 1. If confronted with a policy proposal  $x_p \geq \min\{2a_C + 2b, 0\}$ , the median voter believes that a rightist shock has occurred with probability 1.
- (iv) Strategy of median voter: Accept proposals  $x_p \in [-2b, \min\{2a_C + 2b, 0\})$  and  $x_p \in [0, 2b]$ . Reject all other proposals.

According to (iii) the median voter aligns his belief with the anticipated behavior of party  $C$ . Specifically, a proposal  $x_p < \min\{2a_C + 2b, 0\}$  would never be accepted by party  $C$  in the case of a rightist shock; hence, the median voter believes that a leftist shock has occurred with probability 1. By contrast, if  $x_p \geq \min\{2a_C + 2b, 0\}$  the median voter believes that a rightist shock has occurred with probability 1. Observe that these beliefs of the median voter are consistent with the parties' strategies on the equilibrium path.

Turning to the median voter's strategy, he will accept a leftist policy if he believes that a leftist shock has occurred and if the suggested policy is sufficiently moderate, i.e. not smaller than  $-2b$ . By contrast, he will accept a rightist policy if he believes that a rightist shock has occurred, again provided that the policy is not further away from his bliss point than the status quo policy  $x_0 = 0$ .

Party  $C$ 's strategy is a best response by construction. It knows the direction of the shock and, therefore, accepts policies that are closer to its bliss point,  $a_C + \gamma$ , than the status quo policy.

Turning to Party  $L$ , it would always prefer a more leftist policy than  $x_l = \max\{-2b, 2a_C - 2b\}$ . However, proposals smaller than  $-2b$  will always be rejected by the median voter, and proposals smaller than  $2a_C - 2b$  will always be rejected by party  $C$ ; hence it cannot do better in case of a leftist shock.

Furthermore, in case of a rightist shock, the most leftist proposal that party  $C$  would accept is  $\min\{2a_C + 2b, 0\}$ . This implies that it would reject a proposal  $x_r = \max\{-2b, 2a_C - 2b\}$ . Hence, in contrast to the case of the single-party government,  $L$  no longer has an incentive to lie and pretend that a leftist shock has occurred if there was in fact a rightist shock. Put differently,  $x_l = \max\{-2b, 2a_C - 2b\}$  is a credible signal of a leftist shock because the coalition partner would veto this signal in the case of a rightist shock.

Given that signals are informative, in the case of a rightist shock the median voter would only accept proposals  $x_r \in [0, 2b]$ . For party  $L$  all such policies are worse than the status quo. Accordingly, a best response is to propose precisely this status quo; or any policy that would be rejected so that the status quo prevails.

## 4.2 Party $C$ holds bargaining power

Next, consider the case where party  $C$  has all the bargaining power. Following the same arguments as above, it is straightforward to show that in a PBE party  $C$  would successfully propose the policies  $x_l = \max\{-2b, a_C - b\}$ ;  $x_r = 0$ .

The intuition is as follows. In the case of a leftist shock  $a_C - b$  is party  $C$ 's bliss point. Given the median voter's beliefs that a leftist shock has occurred, he will accept such a proposal as long as it is larger or equal to  $-2b$ . Similarly, party  $L$  will not veto this proposal because  $a_C - b < 0$  by assumption 2, which it prefers to the status quo. In the case of a rightist shock, party  $L$  would veto any rightist policy. Similarly, in a separating equilibrium where signals are informative the median voter would veto any leftist policy proposal. Finally, party  $C$  has no incentive to lie and to pretend that a leftist shock has occurred by proposing  $x_l = \max\{-2b, a_C - b\}$ .<sup>5</sup>

**Proposition 2** *If party  $L$  is in a coalition with party  $C$ , then there exists a separating equilibrium which involves the following policies:*

- a) *If party  $L$  can present policies as a take-it-or-leave-it offer to party  $C$  and a leftist shock has occurred, then the equilibrium policy is  $x = \max\{-2b, 2a_C - 2b\}$ .*
- b) *If party  $C$  can present policies as a take-it-or-leave-it offer to party  $L$  and a leftist shock has occurred, then the equilibrium policy is  $x = \max\{-2b, a_C - b\}$ .*
- a) *If a rightist shock has occurred, the status quo prevails.*

As in the case where proposals of party  $L$  do not have to be approved by party  $C$ , there are only leftist reforms. This reflects the bias in the preferences of the governing parties. However, in the coalition case leftist reforms are only implemented if there has actually been a leftist shock because this can

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<sup>5</sup>Party  $C$ 's utility from truly signaling a rightist shock is  $-[0 - (b + a_C)]^2$ . Using assumption 2, this is always larger than its utility from lying, which is  $-\{\max\{-2b, a_C - b\} - (b + a_C)\}^2$ .

now be credibly signalled to the voters. Right shocks never spark a policy change. Furthermore, due to signalling the extent of the leftist reform does not depend on the ex-ante probability of a leftist shock, but on the parties' preferences and the allocation of bargaining power within the coalition. As expected, reforms are more extreme if bargaining power rests with the leftist party.

## 5 Comparing payoffs

### 5.1 Party $L$

For the above PBE we now compare the players' payoffs from an ex-ante perspective, i.e. before the realization of the shock. We start with party  $L$ . Denote the policies that obtain with a coalition government and a leftist shock by

$$y \equiv \max\{-2b, (1 + \mu)(a_C - b)\}, \quad \mu \in \{0, 1\}. \quad (5)$$

Accordingly,  $\mu = 1$  and  $\mu = 0$  represent the cases where party  $L$  or alternatively party  $C$  is the dominating coalition party which can make a take-it-or-leave-it offer. Using Proposition 2, party  $L$ 's expected payoff in a coalition government, indicated by superscript  $c$ , is

$$E[u_L^c] = -\pi(-b - a_L)^2 - (1 - \pi)(y + b - a_L)^2. \quad (6)$$

Turning to the case where party  $L$  governs alone, indicated by superscript  $s$ , one has to distinguish whether  $\pi \geq 0.5$  or not (see Proposition 1). This yields

$$E[u_L^s | \pi \geq 0.5] = -\pi(-b - a_L)^2 - (1 - \pi)(b - a_L)^2, \quad \text{and} \quad (7)$$

$$E[u_L^s | \pi < 0.5] = -\pi[-2b(1 - 2\pi) - b - a_L]^2 - (1 - \pi)[-2b(1 - 2\pi) + b - a_L]^2. \quad (8)$$

Comparing (6) and (7), party  $L$  (weakly) prefers the coalition government with  $C$  for  $\pi \geq 0.5$  iff

$$(y + b - a_L)^2 \leq (b - a_L)^2. \quad (9)$$

For  $\mu = 1$  we get  $y = -2b + \max\{2a_C, 0\}$ . Upon substitution, thereby noting that both terms in brackets are positive, (9) can be stated equivalently as

$$-b + \max\{2a_C, 0\} - a_L \leq b - a_L. \quad (10)$$

Similarly, for  $\mu = 0$  we get  $y = -2b + \max\{a_C + b, 0\}$  and (9) becomes

$$-b + \max\{a_C + b, 0\} - a_L \leq b - a_L. \quad (11)$$

Both expressions are always satisfied by assumption 1. Turning to the case  $\pi < 0.5$ , we have to compare (6) and (8). For  $\mu = 1$ , after rearranging terms we obtain that party  $L$  (weakly) prefers the coalition government with  $C$  for  $\pi < 0.5$  iff

$$(1 - \pi) y(\max\{a_C, 0\}) \leq 2a_L [(1 - \pi)(\max\{a_C, 0\}) - \pi b]. \quad (12)$$

For  $\max\{a_C, 0\} = 0$ , i.e. if  $a_C \leq 0$ , this is always satisfied because the l.h.s. is then equal to 0 and the r.h.s. is positive. For  $\max\{a_C, 0\} = a_C > 0$  we obtain

$$(1 - \pi)(a_C - b)a_C \leq a_L [(1 - \pi)a_C - \pi b]. \quad (13)$$

The l.h.s. is clearly negative. Therefore, a sufficient condition so that party  $L$  prefers the coalition is  $(1 - \pi)a_C < \pi b$ , where  $a_C < b$  by assumption 1. Accordingly, party  $L$  is more likely to prefer the coalition with  $C$  if the preferences of the centrist party are not too far to the right and if the probability of a rightist shock is not too low.

Intuitively, as  $a_C$  increases the most leftist policy that party  $C$  accepts in the case of a leftist shock moves to the right. This makes the coalition less attractive for party  $L$ . Similarly, as the probability of a rightist shock increases, the solution in a pooling equilibrium approaches the status quo so that party  $L$  prefers the coalition government, where it can implement a leftist policy at least if a leftist shock had occurred.

Turning again to the other case  $\mu = 0$ , party  $L$  (weakly) prefers the coalition government for  $\pi < 0.5$  iff

$$(1 - \pi) y(\max\{a_C + b, 0\}) \leq 2a_L [(1 - \pi)(\max\{a_C + b, 0\}) - 2\pi b]. \quad (14)$$

For  $\max\{a_C + b, 0\} = 0$ , i.e. if  $a_C \leq -b$ , this is always satisfied because then the l.h.s. is equal to 0 and the r.h.s. is positive. For  $\max\{a_C + b, 0\} = a_C + b > 0$  we obtain

$$(1 - \pi)(a_C - b)(a_C + b) \leq 2a_L [(1 - \pi)(a_C + b) - 2\pi b], \quad (15)$$

for which the l.h.s. is again clearly negative. A sufficient condition so that party  $L$  prefers the coalition is now  $(1 - \pi)(a_C + b) < 2\pi b$ . Comparing the conditions such that party  $L$  prefers the coalition to the single-party government for  $\mu = 1$  and  $\mu = 0$ , we find that this is less often the case if



$C$  is the dominating coalition partner.<sup>6</sup> Intuitively, in this case the policy outcome is less biased towards the preferences of party  $L$ .

## 5.2 Party $C$

We now turn to the effects of the coalition government on party  $C$ . First, consider again the case  $\mu = 1$  where party  $L$  can make a take-it-or-leave-it offer. Intuitively, because party  $C$  has a veto right in the coalition it could always enforce the status quo. Therefore, if  $\pi \geq 0.5$  party  $C$  must be at least as well off in a coalition than if party  $L$  governs alone since the latter case would lead to the status quo (see proposition 1). It remains to analyze the case  $\pi < 0.5$ . Given the symmetry of payoffs as defined in (1) and focusing first on  $\mu = 1$ , we only have to replace  $a_L$  by  $a_C$  in (12). There are again two cases. For  $a_C \leq 0$ , party  $C$  always prefers the coalition because condition (12) is clearly satisfied. For  $a_C > 0$ , replacing  $a_L$  by  $a_C$  in (13) and rearranging yields that party  $C$  prefers the coalition iff

$$(1 - \pi)b \geq \pi b, \quad (16)$$

which is always the case for  $\pi < 0.5$ . The interpretation of this result is straightforward. By joining the coalition party  $C$  benefits from gaining the right to veto any policy proposal of party  $L$ .

Turning to the second case where  $C$  can make a take-it-or-leave-it offer, it could propose the same policy that  $L$  had chosen in the above case. Accordingly, now that  $C$  is the dominating coalition partner its utility will be at least as large as in the previous case and, therefore, higher than if  $L$  governs alone. We can now state our main result which shows that parties are often better off in a coalition than if one of them governs alone.

**Proposition 3** *Comparison of coalition government with the single-party government of  $L$ :*

- a) *Party  $C$  is always better off in the coalition government.*
- b) *Party  $L$  is always better off in the coalition government if the rightist shock is ex-ante more likely, i.e.  $\pi \geq 0.5$ .*
- c) *If the leftist shock is ex-ante more likely, party  $L$  is better off in the coalition if the policy preferences of  $C$  are sufficiently leftist and if the ex-ante probability of a rightist shock is not too small. Specifically, a sufficient condition for this is  $(1 - \pi)a_C < \pi b$  if  $L$  holds all bargaining*

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<sup>6</sup>In order to see this, rewrite the above condition as  $(1 - \pi)a_C < \pi b + b(2\pi - 1)$  and note that  $2\pi - 1 < 0$  for  $\pi < 0.5$ .

power in the coalition, and  $(1 - \pi)(a_C + b) < 2\pi b$  if party  $C$  holds all bargaining power.

### 5.3 Voters

Now we examine whether the voters also benefit from the coalition government. There is some prospect for this because party  $L$  is joined by a party whose preferences are closer to those of the median voter. Furthermore, in the coalition a leftist reform takes place only if there is indeed a leftist shock. By contrast, if party  $L$  governs alone there may be no reform despite a policy shock ( $\pi \geq 0.5$ ), or a leftist reform is implemented although there is a rightist shock ( $\pi < 0.5$ ). However, in the case of a leftist shock the coalition government often undertakes a more leftist reform than party  $L$  could implement if it governed alone which reduces its attractiveness for the voter.

Applying a utilitarian welfare function and given assumption 3 that voters' policy preferences are equally distributed on the interval  $[\underline{a}, \bar{a}]$  with  $\bar{a} + \underline{a} = 0$ , welfare of the voters is given as

$$W = \frac{1}{\bar{a} - \underline{a}} \int_{\underline{a}}^{\bar{a}} -(x_p - (\gamma + \tilde{a}_i))^2 d\tilde{a}_i, \quad (17)$$

where  $(\gamma + \tilde{a}_i)$  is the bliss point of a voter  $i$ . Integrating out yields

$$W = -(x_p - \gamma)^2 - \frac{1}{3}\bar{a}^2. \quad (18)$$

Accordingly, the welfare function is a monotonic transformation of the median voter's utility function, where the former is simply reduced by  $1/3\bar{a}^2$ .<sup>7</sup> Therefore, welfare maximization is equivalent to maximizing the median voter's utility.

Given the symmetry of payoff functions, the median voter's incentives can be analyzed by replacing  $a_L$  with  $a_m = 0$  in section 5.1. For  $\pi \geq 0.5$  we then obtain from (10) and (11) that the voter always prefers the coalition. Similarly, from (12) and (14) it follows that for  $\pi < 0.5$  the voter prefers the coalition government iff

$$y(\max\{2a_C, 0\}) \leq 0 \quad \text{for } \mu = 1, \quad (19)$$

$$y(\max\{a_C + b, 0\}) \leq 0 \quad \text{for } \mu = 0. \quad (20)$$

Noting that  $y = \max\{-2b, (1 + \mu)(a_C - b)\} < 0$  this is always satisfied and

<sup>7</sup>Welfare declines the larger the support because the distance between the implemented policy and the individual voters' bliss points then increases.

we obtain our last result.

**Proposition 4** *Welfare of the voters is always higher if party L does not govern alone but in a coalition government with party C.*

## 6 Conclusions

We developed an argument stressing asymmetric information between policymakers and voters in order to explain the impact of coalitions on policy reforms. Our focus was on the example of a coalition between a leftist and a centrist party. We showed that the parties' heterogeneous preferences enable the coalition to overcome the government's credibility problem. The reason is that the centrist party controls the leftist party's desire to implement a leftist policy unless it is actually supported by a policy shock in this direction. Accordingly, by approving a policy the coalition partner signals the necessity of a policy reform to the voter.

The policies as a response to exogenous shocks are strikingly different in a coalition government as opposed to the case where the leftist party governs alone. If there is no coalition partner that approves a policy proposal by the more leftist party, only pooling equilibria exist. In this case reforms depend on the ex-ante probability of a shock but not on its actual realization. As a result, we may have a leftist reform despite a rightist shock. Similarly, a leftist reform may fail although it would have been approved by the voters if the party had been able to credibly signal the occurrence of a leftist shock. These problems do not arise in a coalition government because the parties can credibly signal their private information about policy shocks. As a consequence, reforms only occur if they are supported by a policy shock that points in the same direction as the reform.

Although the leftist party has less decision power in a coalition government, it is often better off due to the gained ability to credibly signal a leftist shock to the voter. The centrist party and the voter are always better off with a coalition government. In conclusion, coalition governments are often criticized because the decision process is hampered by the need to find a compromise satisfying the heterogeneous preferences of the coalition partners. We show that this reliance on a compromise can actually be beneficial because it makes the resulting policy proposals more credible to the voters.

## Appendix

*Proof of statement (c) in Proposition 1 (mentioned in footnote 3)*

Maximizing the expected payoff of party  $L$  subject to  $x_p \geq -2b(1-2\pi)$  yields

$$\max_{x_p} -\pi(x_p - b - a_L)^2 - (1 - \pi)(x_p + b - a_L)^2 \quad \text{s.t.} \quad x_p \geq -2b(1 - 2\pi). \quad (21)$$

The corresponding Lagrangian is

$$\mathfrak{L} = -\pi(x_p - b - a_L)^2 - (1 - \pi)(x_p + b - a_L)^2 + \lambda[x_p + 2b(1 - 2\pi)], \quad (22)$$

with first-order condition

$$-2\pi(x_p - b - a_L) - (2 - 2\pi)(x_p + b - a_L) + \lambda = 0. \quad (23)$$

Rearranging yields

$$x_p = 2\pi b - b + a_L + 0.5\lambda. \quad (24)$$

Suppose  $\lambda = 0$ . Then

$$x_p = -b(1 - 2\pi) + a_L < -2b(1 - 2\pi) \quad (25)$$

for all values  $\pi < 0.5$  since  $a_L < -2b$  by assumption 1. Accordingly, the constraint binds by complementary slackness.

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