

UC San Diego

UC San Diego Previously Published Works

Title

The Logic of Gamson's Law: Pre-election Coalitions and Portfolio Allocations

Permalink

<https://escholarship.org/uc/item/085128ff>

Journal

American Journal of Political Science, Vol. 51(2)

ISSN

0092-5853

Authors

Carroll, Royce
Cox, Gary W.

Publication Date

2007-04-01

Peer reviewed

The Logic of Gamson's Law: Pre-election Coalitions and Portfolio Allocations

by

Royce Carroll
Department of Political Science
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0521
rcarroll@ucsd.edu

Gary W. Cox
Department of Political Science
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0521
gcox@ucsd.edu

October 1, 2004
Revised November 2, 2006

We thank the NSF for support under grant SES-0518192. We thank the participants in NYU's law and politics seminar (October 2004) and the University of Chicago's political economy seminar (February 2005). We also thank James Druckman, Orit Kedar, Michael Laver, Massimo Morelli, Paul Warwick, as well as the anonymous reviewers, for their comments; and Kristen Kao and Pooja Nair for research assistance. Finally, we thank Paul Warwick and James Druckman for their data on portfolio allocations in Western Europe.

Abstract:
**The Logic of Gamson's Law:
Pre-election Coalitions and Portfolio Allocations**

Gamson's Law—the proposition that coalition governments will distribute portfolios in proportion to each member party's contribution of seats to the coalition—has been one of the most prominent landmarks in coalitional studies since the 1970s. However, standard bargaining models of government formation argue that Gamson's Law should *not* hold, once one controls for relevant indicators of bargaining power. In this paper, we extend these bargaining models by allowing parties to form pre-election pacts. We argue that campaign investments by pact signatories depend on how they anticipate portfolios will be distributed and, thus, signatories have an incentive to pre-commit to portfolio allocation rules. We show that pacts will sometimes agree to allocate portfolios partly or wholly in proportion to members' contributions of seats to the coalition; this increases each signatory's investment in the campaign, thereby conferring external benefits (in the form of a larger probability of an alliance majority) on other coalition members. Empirical tests support the model's predictions.

The Logic of Gamson's Law: Pre-election Coalitions and Portfolio Allocations

Political parties, when forming coalition governments in parliamentary democracies, are centrally concerned with how many (and which) cabinet portfolios they will get. The allocation of portfolios affects not just the office benefits enjoyed by party leaders but also the policies undertaken by the government—and has thus long been viewed as central to coalition formation.

In the extensive scholarly literature on portfolio allocation (on which see Laver 1998; Laver and Schofield 1990), the most prominent landmark is *Gamson's Law*. Gamson (1961, 376) argued that parties forming a coalition government would each get a share of portfolios proportional to the seats that each contributed to the coalition. Early work by Browne and Franklin (1973) strongly supported a modified version of this hypothesis and was later corroborated by Browne and Frenreis (1980), Schofield and Laver (1985), Warwick and Druckman (2001), and Druckman and Roberts (2003), among others. Indeed, as Laver (1998, 7) notes, Gamson's Law boasts "one of the highest non-trivial R-squared figures in political science."

Its high R-squared figure notwithstanding, Gamson's Law conflicts with standard bargaining theories (e.g., Schofield 1976; Baron and Ferejohn 1989; Morelli 1999; Snyder, Ting and Ansolabehere 2005), in which a party's ability to pivot between alternative minimal winning coalitions and its ability to propose governments determine its portfolio payoff. Snyder, Ting and Ansolabehere (2005, p. 982) view Gamson's Law as suffering from a "critical weakness," in that "it focuses on the effects of *seat shares* [when] the theoretically relevant concept is *shares of voting weights*" (italics in original). Warwick and Druckman (2006, p. 660) opine that Gamson's

Law “is an empirical relationship still deserving of its law-like status—but in acute need of a firm theoretical foundation.”

In this paper, we begin to provide such a foundation. We develop a formal model in which parties can make *binding* pre-election pacts with one another, advancing three main arguments about such pacts.¹ First, parties have a substantial incentive to make pre-election pacts, if they can, because such pacts can help coordinate on one of the many possible outcomes in the bargaining game that will ensue after the election is held. Second, if some parties do form a pact, their anticipations of how the coalition will allocate cabinet posts, should it win a majority, will affect how much effort they invest in the election campaign. Third, if some parties do form a pact, each member party’s investment in the electoral campaign produces not just more seats for that particular party (a private good) but also an increased probability of a coalitional majority (a public good). Because members will discount the benefits their investment confers on their partners, sub-optimal provision of the public good (majority status) is to be expected. By agreeing *ex ante* to a more Gamsonian division of office spoils *ex post*, the coalition can motivate its members to campaign harder, thus conferring external benefits on all.

Our model generates a novel prediction—that portfolio allocations should be more Gamsonian in governments based on pre-election pacts than in other governments. We provide statistical evidence—from a broad cross section of parliamentary governments 1997-2003 and from a narrower time series of West European governments 1945-2000—that strongly supports this and other predictions of the model.

¹. Pre-election pacts have recently been studied by, among others, Powell (2000), Strøm and Müller (2000), Martin and Stevenson (2001), and Golder (2006). Unlike most in the previous literature, we focus on publicly announced pacts that commit their signatories to enter government together.

Forming governments *after* the election

A natural criticism of Gamson's prediction (that governing parties' portfolio shares will equal their seat contributions to the governing coalition) is based on the notion of voting weight. A party's voting weight—on the computation of which see Strauss (2003)—depends on the number of alternative minimal winning coalitions to whose formation that party would be crucial. Intuitively, voting weights measure “pivotalness.”

To see how voting weights and seat contributions differ, consider an assembly with three parties—A, B and C—holding 44%, 34% and 22% of the seats, respectively. Were the coalition AC to form, Gamson's Law would predict that A would take $2/3$ of the portfolios, as it contributes $2/3$ of the AC coalition's total seats. One might argue, however, that the real resource each party brings to the table is not “seats,” but the “ability to form a majority coalition.” After all, any majority coalition can command all the portfolios; the precise seat share above 50% is irrelevant to the coalition's overall payoff (in portfolios). Because each party can form a majority with any other single party, they are equal in terms of their “ability to form a majority coalition” and standard bargaining models accordingly conclude that their (expected) payoffs should also be equal (see e.g., Schofield 1976; Laver and Schofield 1985; Morelli 1999; Snyder, Ting and Ansolabehere 2005). Put another way, all modern bargaining models predict that Gamson's Law should *not* hold, once one controls for pivotalness (and perhaps formateur status).² This conclusion is mostly supported in laboratory experiments that directly pit

². Another kind of bargaining power, widely recognized in the literature but not incorporated in the pure office-seeking models, depends on each party's ideological location relative to its potential partners in government (cf. Laver and Schofield 1990). We do not have much to say

Gamson's Law against the Baron-Ferejohn and Morelli models (cf. Fréchette, Kagel and Morelli 2005; Diermeier and Morton 2004).

Forming governments *before* the election

As an alternative to the purely post-electoral bargaining envisioned by standard models, we entertain the possibility that parties can begin jockeying for position in the government formation game prior to the election campaign. Portugal's "Democratic Action" coalition, which formed before the 1979 and 1980 elections, provides an example. These Portuguese allies publicly announced that they intended to campaign together and then to govern together, if the election gave them a majority. Presumably the allies also agreed, prior to the election, on a principle that would guide the division of spoils, were they to win the election. In any event, *after* the election revealed an AD majority, the allies publicly announced that they intended to divide portfolios in proportion to each partner's contribution of seats to the coalition total—and they followed this Gamsonian precept in practice (Magone 2000:549).

In the next section, we describe a formal model in which parties can form pre-election pacts similar to this example. We believe it significant that *real-world pacts are announced, not the day before the election is held, but rather before the election campaign begins*. This timing, which we incorporate into the model, suggests that pacts are intended to affect some aspect of the election campaign. In our model, the to-be-affected aspect is how much effort allies invest in the campaign.

Office-hungry parties bear opportunity costs: effort and resources that they invest in a particular campaign are not available for other purposes. Because the return to their investment about policy-based models here, other than to note that they provide no rationale for Gamson's Law either.

depends largely on whether they get into government, any changes in their prospects of doing so will affect their investments. We investigate how pre-election pacts can affect both their signatories' chances of getting into government and their signatories' willingness to invest in the campaign.

Although we focus here on how pre-election pacts affect the *level* of campaign investment, we believe that they also affect the *nature* of such investments. In particular, pacts often seek to defuse their members' disagreements with each other and highlight their members' disagreements with other parties—e.g., by publishing joint platforms and agreeing to organize the campaign around that document. They thus effectively fashion “truces” along what might otherwise have been competitive borders with each other, thereby freeing up resources for attacks on other parties (or for mobilizational activities) that benefit the whole alliance. To the extent that pacts succeed in restricting their members' campaign activities to those that have positive externalities within the alliance, they exacerbate the free riding issues that we highlight below.

Our formal model serves a narrow purpose: to show that it is possible in equilibrium that a coalition will (a) decide to form a pact; (b) agree to divide the spoils of office at least partly in proportion to seat contributions; (c) subsequently win a majority in the election; and (d) allocate portfolios after the election as agreed before the election. This result suffices to justify an important modification in the econometric specification used to test bargaining models.

To explain this “important modification,” consider Warwick and Druckman's (2006) finding that a party's seat contribution is the primary determinant of its portfolio share, even when one controls for the party's voting weight. They interpret this as showing the robustness of Gamson's Law as an empirical generalization. Bargaining theorists worry that—absent the articulation of a clear theoretical mechanism specifying how and why seat contributions should

influence portfolio shares—including this variable in empirical analyses is perilous, because it is correlated with the theoretically justified variable (voting weight). Our work justifies the Warwick-Druckman regression, by specifying a theoretical reason why portfolios should be handed out in proportion to seat contributions (viz., this promotes higher investment in the campaign by the allies).

The main assumption that one must buy, in our line of argument, is that some parties can make binding commitments (“promises”) to one another. Other scholars, such as Riddell (1981), have used the same assumption in formal models of bargaining under uncertainty and we view it as tenable in the study of coalition governments. The parties in a given polity have multiple opportunities to exchange votes—we’ll vote for X if you vote for Y—both in the electoral and legislative arenas. The gains from such trade are substantial and so parties should guard their reputations for keeping their promises. A promise to enter government together and to allocate portfolios according to a given principle is simply another vote trade, one involving a promise to deliver at a future date the legislative votes needed (e.g., in a motion to invest or a motion of confidence) to support a given government. Parties will not renege on such promises because they would thereby disrupt an entire trading relationship and sacrifice future gains from trade.

This line of argument can be formalized by iterating the game that we describe in the next section. We consider such a move after dealing with the one-shot version of the game.

A model of government formation in which parties can form pre-election pacts

Suppose a set of parties, denoted $N = \{1, \dots, n\}$, is competing in a given polity. The “expanded” government formation game unfolds in four stages: (1) Parties choose to form pre-election pacts or not. (2) Parties choose levels of campaign investment. (3) The election is held

and the parties' seat totals are realized. (4) Parties form governing coalitions and allocate portfolios. Let's consider each of these stages in more detail.

(1) Parties choose to form pre-election pacts or not

In Stage 1, Nature chooses an order r in which the parties can propose coalitions; $r(j) = 1$ if party j proposes first, $r(j) = 2$ if party j proposes second, and so on. When a party's turn comes, it states a coalition $a_j \in N_j = \{C \subseteq N: j \in C\}$ with which it wishes to form a pact, along with a (closed and bounded) set of acceptable portfolio allocation parameters, $\bar{\alpha}_j \subseteq [0,1]$. If j wishes to avoid forming a pre-election pact, then it can state $a_j = \{j\}$ and $\bar{\alpha}_j = \emptyset$. Otherwise, if j wishes to form a pact, it states some $a_j \in N_j$, $a_j \neq \{j\}$ and some $\bar{\alpha}_j \subseteq [0,1]$, $\bar{\alpha}_j \neq \emptyset$.

Given all the parties' proposed coalitions, $a = (a_1, \dots, a_n)$, and sets of acceptable parameters, $\bar{\alpha} = (\bar{\alpha}_1, \dots, \bar{\alpha}_n)$, if there exists a coalition C such that $a_j = C$ for all $j \in C$ and

$\prod_{j \in C} \bar{\alpha}_j \neq \emptyset$, then C forms a pact with the minimum mutually acceptable allocation parameter, α_C

$= \min \prod_{j \in C} \bar{\alpha}_j$.³ If there is no such coalition, then no pact forms. Note that it is possible for more

than one pact to form. However, if C and D are two distinct pacts, then necessarily they are disjoint ($C \cap D = \emptyset$): no party can belong to more than one pact.

³ As our aim—on which more below—is to demonstrate that some pacts will choose *non-zero* allocation parameters in equilibrium, assuming that pact signatories always agree on the lowest mutually acceptable parameter stacks the deck against our main finding. Any other algorithmic selection from the set of mutually acceptable parameters will work *a fortiori*.

Once a pact has formed, either its signatories secure a majority of seats in the ensuing election or they do not. If the latter, then we assume the pact is a dead letter and does not constrain its signatories' post-electoral bargaining. If the former, then the coalition's portfolio allocation parameter, α_C , determines which *portfolio allocation rule* the coalition will use. An allocation rule is a function that maps the parties' realized seat totals from Stage (3), $s = (s_1, \dots, s_n)$, into an allocation of portfolio shares in Stage (4). We shall examine the family of rules $p(\bullet; C, \alpha_C)$, where

$$p_j(s; C, \alpha_C) = \begin{cases} \alpha_C \frac{s_j}{s_C} + (1 - \alpha_C) \gamma_j(s|C) & \text{if } j \in C \\ 0 & \text{if } j \notin C \end{cases}$$

Here, $\gamma_j(s|C)$ denotes the expected share of portfolios that party j would get under the default post-electoral bargaining game, $\Gamma(s)$, described in Stage 4 below, given that the coalition C forms the government. The parameter α_C determines how Gamsonian the pact's allocation rule is. If $\alpha_C = 0$, then C envisions allocating portfolios according to each member's relative bargaining power in the default bargaining game. If $\alpha_C = 1$, then C envisions allocating portfolios according to each member's contribution of seats to the coalition.

(2) Parties choose levels of campaign effort.

Party j 's objective at Stage (2) is to choose a level of investment, e_j , that maximizes the expected value of the offices (i.e., seats and portfolios) that j wins, less the cost of investment. Before the election, the parties' seat totals are jointly distributed random variables, $S = (S_1, \dots, S_n)$, and their portfolio shares are jointly distributed random variables, $P = (P_1, \dots, P_n)$. Party j 's maximand is:

$$\max_{e_j} \quad \sigma E(S_j | e) + E(P_j | e) - c_j(e_j)$$

The first term represents the value of party j 's seats: j receives an expected seat total of $E(S_j|e)$ and each seat is worth σ . The second term represents the value of party j 's portfolios: j receives an expected portfolio share of $E(P_j|e)$ and a unit share of portfolios is normalized to have value 1. Finally, party j bears the cost $c_j(e_j)$. Several fairly standard technical assumptions (see appendix) ensure that a unique equilibrium to the Stage 2 sub-game exists.

(3) The election is held.

The parties' seat totals depend on their investment levels (e) and on stochastic popularity shocks. Let $h(s|e)$ be the probability that the seat vector s results from the election, given that the parties have chosen investment levels $e = (e_1, \dots, e_n)$. Thus, for example, $E(S_j|e) = \sum_s h(s|e) s_j$.

(4) Parties form governing coalitions and allocate portfolios.

Once an election has been held and a vector of seat totals, s , has been realized, a government formation subgame ensues. The nature of this subgame depends on whether, after the election, there exists a pact whose signatories have collectively secured a majority of seats—what we shall call a *majority-winning pact* in what follows. Because it is not possible for any party to join more than one pact, there is at most one majority-winning pact.

When no majority-winning pact exists...

If there exists *no* coalition which both formed a pact at stage (1) and secured a majority of seats at stage (3), then there is no pact that constrains the bargaining behavior of the parties. We denote this “unconstrained bargaining” subgame by $\Gamma(s)$. In one version of our model, $\Gamma(s)$

$= \Gamma_M(s)$, the game described by Morelli (1999). In another version, $\Gamma(s) = \Gamma_{BF}(s)$, the closed-rule version of the Baron-Ferejohn (1989) model.⁴

In both models, Nature begins by choosing a first-moving, or formateur, party. We let $F_j = 1$ if party j is chosen as the formateur. We denote party j 's expected portfolio share, given that the coalition C forms the government, as $\gamma_j(s|C)$. In both models, $\gamma_j(s|C) = 0$ if $j \notin C$. If $j \in C$ and $\Gamma(s)$ has a unique homogeneous representation, then $\gamma_j(s|C) = w_j(s)/w_C(s)$, in the Morelli

model, and $\gamma_j(s|C) = \left(1 - \zeta_C \frac{w_C(s)}{w_N(s)}\right) F_j + \left(\zeta_C \frac{w_C(s)}{w_N(s)}\right) \frac{w_j(s)}{w_C(s)}$, in the Baron-Ferejohn model (cf.

Morelli 1999; Ansolabehere et al. 2005, p. 553-554).⁵ Here, $w_j(s)$ is the voting weight of party j ,

⁴ We believe it would be possible to develop a model in which pact signatories are constrained to bargain as a unit after the election, regardless of whether they win a majority; and that this model would yield conclusions similar to those we derive below. However, the model is substantially simpler if pacts failing to secure a majority simply dissolve and we explore that simpler case here.

⁵ All games with fewer than five parties have unique homogeneous representations. When there are five or more parties, both homogeneous and non-homogeneous games are possible. Non-homogeneous games have more complex payoff structures and multiple equilibria but are not fundamentally different than their homogeneous neighbors (cf. Morelli 1999). If there exists a unique homogeneous representation of $\Gamma_{BF}(s)$, then Ansolabehere et al. (2005, p. 553) show that

the portfolio share of $j \in C$ is $\left(1 - \zeta_C \frac{w_N(s) + 1}{2w_N(s)}\right) F_j + \zeta_C \frac{w_j(s)}{w_N(s)}$, where ζ_C is the price per unit of

voting weight that a formateur must pay in order to induce another party to join the governing coalition C . Given that the game $\Gamma_{BF}(s)$ has a unique homogeneous representation, however,

given s ; $w_C(s) = \sum_{j \in C} w_j(s)$ for any $C \subseteq N$; and ζ_C is an unobservable “price” per unit of voting

weight that the formateur pays to its partners in order to induce them to join governing coalition C .

When one majority-winning pact exists...

If there exists a coalition C which both formed a binding pact at stage (1) and secured a majority of seats at stage (3), then stage (4) ends and each coalition member gets the payoffs implied by their agreement. That is, member $j \in C$ gets $p_j(s; C, \alpha_C)$.

Predicted portfolio shares

It is helpful to denote the stage 4 subgame by $\Lambda(s, \Gamma, D, \alpha_D)$, where s is the realized seat vector; $\Gamma \in \{\Gamma_M, \Gamma_{BF}\}$ is the default bargaining game; D denotes the signatories of the majority-winning pact, if one exists; and $\alpha_D \in [0, 1]$ denotes the portfolio allocation parameter chosen by D . We let $D = \emptyset$ and $\alpha_D = 0$ if there is no majority-winning pact and $\beta_D = 1$ if coalition D formed a pre-election pact in stage 1, $= 0$ otherwise. Then:

Proposition 1: Suppose that coalition C forms a government in an equilibrium of

$\Lambda(s, \Gamma, D, \alpha_D)$ and that $\Gamma(s)$ has a unique homogeneous representation. Then the portfolio

share for party $j \in C$ can be written in the form $\delta_0 + \delta_1 \frac{s_j}{s_C} + \delta_2 \frac{w_j(s)}{w_C(s)} + \delta_3 F_j$.

(a) For the Morelli model, $\delta_0 = 0$, $\delta_1 = \beta_C \alpha_C$, $\delta_2 = (1 - \beta_C \alpha_C)$, and $\delta_3 = 0$.

$w_C(s) = (w_N(s) + 1)/2$ for all minimal winning coalitions C . Thus, j 's portfolio share can be expressed as in the text.

(b) For the Baron-Ferejohn model, $\delta_0 = 0$, $\delta_1 = \beta_C \alpha_C$, $\delta_2 = (1 - \beta_C \alpha_C) \left(\zeta_C \frac{w_C(s)}{w_N(s)} \right)$, and

$$\delta_3 = (1 - \beta_C \alpha_C) \left(1 - \zeta_C \frac{w_C(s)}{w_N(s)} \right).$$

Proof: See appendix.

Proposition 1 has direct implications for empirical investigations of portfolio allocation. To test the original Morelli and Baron-Ferejohn models—in which parties have the opportunity to ally only *after* the election—one should simply regress each governing party’s portfolio share on that party’s contribution of voting weight to the governing coalition and (in the Baron-Ferejohn model) F_j . Ansolabehere et al. (2005) take this approach, for example. In contrast, assuming that one can show that pacts with $\alpha_C > 0$ do emerge in equilibrium, then one should also include each party’s contribution of seats to the governing coalition as a regressor, as Warwick and Druckman (2006) do.

Proposition 1 will be important only if we can show that, for at least some C , there is a positive probability that C will form a pact, choose $\alpha_C > 0$, win a majority and thus form a government with the portfolio allocation $p(s; C, \alpha_C)$. To show this, we first consider the case in which Stage 2 is omitted from the model—so that the election is a fixed lottery, not dependent on the parties’ investment levels. In this case, we state conditions under which pre-election pacts *always* form.

When campaign investment does not matter

Forming pre-election pacts can be beneficial to parties in two main ways: first, pacts help coordinate on one of the many possible outcomes to the bargaining game that will ensue after the election; second, pacts change parties’ incentives to exert effort during the campaign in ways that

benefit the pact-forming parties. In this section, we help clarify the first of these benefits, by examining a model in which parties' investment levels during the campaign have no effect on the electoral outcome.

When campaign investment does not matter, each party will set its investment level to zero (since investment is costly but confers no benefit). Thus, the election's outcome will be a fixed lottery in which $h(s|(0, \dots, 0))$ is the probability that the election will result in the outcome s . In this case, we have the following result:

Proposition 2: Suppose that all parties have positive expected voting weight after the election (formally, $\forall j(\exists s: h(s|(0, \dots, 0)) > 0 \ \& \ w_j(s) > 0)$); and that $\Gamma(s)$ has a unique homogeneous representation for all s . Then at least one pact forms in equilibrium.

Proof: See appendix.

Preferring a pact on offer to the government formation lottery that will result if the pact is turned down is like preferring a bird in hand to two in the bush. If a coalition C forms a binding pact, the signatories *guarantee* that they will get into government, if the coalition wins a majority. If C does not form a pact, the members of C have no such guarantee: even if they collectively win a majority, their coalition is simply one among several majority coalitions that might form a government. Thus, overall, forming a pact improves a party's chance of getting into government.⁶

⁶ Recall that, for simplicity, we assume that if C 's members do not secure a majority then the pact dissolves, so that its signatories get the same payoffs they would have had they not formed a pact.

Conditional on C forming a government, party $j \in C$ will receive $\gamma_j(s|C)$, if C had not pacted; and $p_j(s;C,0) = \gamma_j(s|C)$, if C had pacted. Thus, all members of C will prefer forming a pact with the allocation rule $p(\bullet;C,0)$ to eschewing a pact, because the pact improves the party's chance of getting into government and does not change its payoff, conditional on getting into government.

When campaign investment matters

When campaign investments affect the electoral outcome, parties may have an additional incentive to form pacts, because forming a pact can enhance the allies' investment levels, which in turn boosts the probability of an alliance majority and hence the probability of getting into government. Whether inducing higher investment results in higher equilibrium payoffs for all pact signatories depends, however, on how steeply costs of investment increase, how much investment affects election outcomes, and how greatly members' expected seat contributions differ from their expected voting weight contributions.

A three-party example

In this section we provide an example in which a pact with a positive portfolio allocation parameter forms in equilibrium. This shows that Propositions 1 and 2 apply for some parameter values and motivates empirical investigation.

Consider three parties that value seats only as vehicles to attain portfolios (σ is negligibly small) and face quadratic costs of investment ($c_j(e_j) = .5e_j^2$ for all j). Parties 1 and 2 are small, in the sense that the probability that either will win a majority of seats is negligible, for any feasible investment levels. The probability that party 3 will win a majority, for investment levels e , is $\Pr[S_3 > S_{\{1,2\}}|e] = \Phi[e_3 - e_{\{1,2\}}]$, where Φ is the standard cumulative normal distribution function. Thus, for example, if $e = (0,0,0)$, then the probability that party 3 wins a majority is .5.

Suppose that the coalition $\{1,2\}$ forms a pact with allocation parameter $\alpha_{\{1,2\}}$. How will the parties choose their investment levels in Stage 2? Note that, if party 3 wins a majority, then it wins all the portfolios. If party 3 does not win a majority, then no party wins a majority, in which case parties 1 and 2 will form a government and j will get a share of portfolios equal to $p_j(s; \{1,2\}, \alpha_{\{1,2\}})$. We assume that the two allies are symmetric, in the sense that party 1's expected share of the seats earned by the coalition $\{1,2\}$ is given by $\Phi(e_1 - e_2)$. In this case, the parties' maximands in Stage 2 are

$$\max_{e_1} (1 - \Phi[e_3 - e_{\{1,2\}}]) (\alpha_{\{1,2\}} \Phi(e_1 - e_2) + (1 - \alpha_{\{1,2\}}) .5) - .5e_1^2$$

$$\max_{e_2} (1 - \Phi[e_3 - e_{\{1,2\}}]) (\alpha_{\{1,2\}} \Phi(e_2 - e_1) + (1 - \alpha_{\{1,2\}}) .5) - .5e_2^2$$

$$\max_{e_3} \Phi[e_3 - e_{\{1,2\}}] - .5e_3^2$$

For each value of $\alpha_{\{1,2\}}$, one can solve the first-order conditions numerically. The results are displayed in Table 1.

[Table 1 about here.]

Several points emerge from investigating Table 1. First, as $\alpha_{\{1,2\}}$ increases, the investment of each ally increases and the investment of party 3 decreases, leading to an increase in the probability of an alliance majority. Indeed, the probability of an alliance majority rises from .5, when $\alpha_{\{1,2\}} = 0$, to .719, when $\alpha_{\{1,2\}} = 1$. Second, this beneficial effect (increasing the probability of an alliance majority) is eventually offset by increasing costs, so that the optimal value for $\alpha_{\{1,2\}}$ is approximately .9. This value is optimal in the sense that, were parties 1 and 2 to choose this value in Stage 1, their expected share of portfolios in the equilibrium of the Stage 2 subgame would be higher than with any other choice.

Now suppose that no pact at all forms. One can again state the parties' maximands and solve numerically for their equilibrium effort levels. As it turns out, in the no pact case the expected payoffs to parties 1 and 2 are well short of their payoffs when they form a pact with $\alpha_{\{1,2\}} = .9$. Thus, either 1 and 2 will form a pact with $\alpha_{\{1,2\}} = .9$, or one or the other of them will form a pact with party 3.

Suppose that the coalition $\{1,3\}$ forms a pact with allocation parameter $\alpha_{\{1,3\}} = 0$. In this case, the parties' maximands are

$$\max_{e_1} (1 - \Phi[e_3 - e_{\{1,2\}}]) \cdot .5 - .5e_1^2$$

$$\max_{e_2} -.5e_2^2$$

$$\max_{e_3} \Phi[e_3 - e_{\{1,2\}}] + (1 - \Phi[e_3 - e_{\{1,2\}}]) \cdot .5 - .5e_3^2$$

In this case, it is clear that $e_2^* = 0$. The first order conditions for 1 and 3 then become

$\varphi(e_3 - e_1) \cdot .5 = e_1$ and $\varphi(e_3 - e_1) \cdot .5 = e_3$, implying $e_1 = e_3 = .5\phi(0) \approx .2$. Party 1's payoff is roughly $.5 \times .5 - .5 \times (.2)^2 = .23$. Similarly, if the coalition $\{2,3\}$ were to form with $\alpha_{\{2,3\}} = 0$, party 2's payoff would be .23. As .23 is less than the payoff of .254 that 1 and 2 can get from an alliance with each other, the outcome of the first stage will either be that the coalition $\{1,2\}$ forms a pact with $\alpha_{\{1,2\}} = .9$, or that the coalition $\{j,3\}$ forms a pact with $\alpha_{\{j,3\}} > 0$. Either way, *a pact with a positive allocation parameter will form.*

If we assume that no pact with party 3 is as valuable as the $\{1,2\}$ pact with $\alpha_{\{1,2\}} = .9$, then whichever one of party 1 and 2 moves first will propose $\{1,2\}$ and $\alpha_{\{1,2\}} = .9$, and

whichever of them moves second will make the same proposal. That is, the unique equilibrium in Stage 1 will entail the formation of the pact $\{1,2\}$ with $\alpha_{\{1,2\}} = .9$.⁷

Revisiting assumptions

In the example just presented, the key assumption is that parties 1 and 2 can make binding commitments. This assumption can be endogenized, if one assumes that the parties play a repeated game. If parties 1 and 2 will face the same situation repeatedly, then their promises to abide by particular allocation rules carry weight for the usual reason: the shadow of future transactions—that would be lost by renegeing on a current commitment—suffices to make those commitments credible (e.g., Calvert 1995; Fox 2006).

Repeating the game would of course mean that a wide variety of other behavior could also be sustained in some equilibrium. However, the particular equilibrium highlighted here—in

⁷ When 1 moves first and 2 second, the argument is easiest to sketch. In this case, 1's strategy set is $N_1 \times [0,1]$, while 2's is a mapping from 1's action to a best response. Let 2's best-response to $(a_1, \bar{\alpha}_1)$ be denoted $g(a_1, \bar{\alpha}_1) \in N_2 \times [0,1]$. To see that $g(\{1,2\}, .9) = (\{1,2\}, .9)$, suppose that 1 has chosen $(\{1,2\}, .9)$. In this case, 2 does not wish to deviate to $a_2 = \{2\}$, as the $\{1,2\}$ pact yields a higher expected payoff than no pact; nor to $\{2,3\}$, as all versions of this pact yield lower expected payoffs by assumption; nor, it can be shown, to $\{1,2,3\}$. Also, 2 does not wish to deviate to $\bar{\alpha}_2 > .9$, as this does not change $\alpha_{\{1,2\}}$; nor to $\bar{\alpha}_2 < .9$, as this lowers $\alpha_{\{1,2\}}$ and, hence, lowers 2's expected payoff. Now consider 1's move. If 1 chooses $\{1\}$, then either no pact will arise, or a $\{2,3\}$ pact will arise. If 1 chooses $(\{1,2\}, .9)$, then the pact $\{1,2\}$ with $\alpha_{\{1,2\}} = .9$ will arise. The latter yields a higher payoff than either no pact or any $\{2,3\}$ pact (which gives 1 no portfolios). Moreover, $(\{1,2\}, .9)$ yields a weakly higher payoff than $(\{1,2\}, \bar{\alpha}_1)$ for any $\bar{\alpha}_1 \neq .9$. Thus, 1 will choose $(\{1,2\}, .9)$, and 2 will respond in kind.

which parties deepen their relationship by trading both electoral investment and votes in support of portfolio allocations—is a natural one that seems to tally with our central theories of what parties are.

It is worth remarking that the size of the gains from trade in our example are substantial. Indeed, parties 1 and 2 can expect to be in government 71.9% of the time by allying whereas they can expect to be in government (not necessarily with each other) 50% of the time, if they remain unallied. Perhaps the specific functional forms of our example exaggerate the payoffs to “deep” (electoral plus governmental) cooperation, relative to “shallow” (governmental only) cooperation.⁸ But portfolios are generally reckoned to be the biggest payoffs in national politics, so presumably much smaller increases in the probability of getting into government would motivate efforts to forge credible pre-election pacts.

⁸ A more general assumption about the probability that 3 wins a majority would be $\Pr[S_3 > S_{\{1,2\}}|e] = \Phi[e_3 - k_1e_1 - k_2e_2]$, where $k_1 \in (0,1]$ and $k_2 \in (0,1]$. This would allow in a more transparent way for the possibility that campaign investments by party 1 gain votes for party 1 partly at the expense of party 3 and partly at the expense of party 2. Smaller values of k_1 and k_2 would indicate that the allies’ campaign investments mostly take votes from one another. A still more general model would allow two distinct sorts of campaign investment for party 1—those that garner votes from 3 and those that garner votes from 2. In this more general model, another advantage of forming a pact is that it can (for some values of α_C) reduce the incentive of the allies to take votes from each other, relative to taking votes from party 3. Exploring these issues, however, is beyond the scope of the present paper.

Testing the Model

In this section, we adapt the regression specified in Proposition 1 to test our model. In operational form, this regression can be written:

$$Portfolio\ share_{jC} = \delta_0 + \delta_1 Seat_{jC} + \delta_2 Weight_{jC} + \delta_3 Formateur_{jC} + \varepsilon_{jC} \quad (1)$$

Here, $Portfolio\ share_{jC}$ is the percentage of portfolios held by the j th governing party in coalition C ; $Seat_{jC}$ is the number of government seats held by the j th governing party in coalition C , expressed as a percentage of the total; $Weight_{jC}$ is the voting weight⁹ held by the j th governing party in coalition C , also expressed as a percentage of the total; and $Formateur_{jC}$ is a dummy variable indicating whether party j proposed the government.¹⁰

As the dependent variable ($Portfolio\ share_{jC}$) sums to unity within each coalition C , the errors $\{\varepsilon_{jC}\}$ within each coalition are necessarily correlated. Thus, although all previous researchers have employed OLS, the standard assumptions of OLS are not satisfied. To address this, we follow Fréchette, Kagel and Morelli (2005) and report OLS results on a sub-sample obtained by dropping one observation from each coalition.¹¹ The more complete solutions

⁹ We used Strauss' (2003) algorithm in computing voting weights.

¹⁰ We use the Warwick-Druckman coding of formateur for our West European dataset. For our cross-sectional dataset, we found direct evidence concerning which party was the formateur for only a portion of the cases. For those cases without any direct evidence, we assumed that the party of the prime minister was the formateur. If our purpose was to demonstrate formateur effects, this coding protocol would be questionable. However, we include formateur status merely as a control and so use what appears to be the industry standard coding.

¹¹ We drop the one party at random from each coalition. Dropping the largest (or smallest) party in each coalition also produces similar results to those we report in Table 2. The OLS results on the full sample—with no observations dropped—are also similar to those we report.

suggested for compositional data problems in the literature on multiparty electoral data (e.g., Honaker, Katz and King 2002) are not applicable here, because the data within each coalition do not refer to the same set of parties, as do the data within each electoral district.

From Proposition 1, $\delta_1 = \alpha_C \beta_C$. Thus, we expect that $\delta_1 = 0$ (seat contributions should have no effect) in the sub-sample $G_0 = \{C: \beta_C = 0\}$, while we expect that $\delta_1 > 0$ (seat contributions should have a positive effect) in the sub-sample $G_1 = \{C: \beta_C = 1\}$.

Unfortunately, we cannot operationally partition our empirical samples (discussed further below) into precise analogs of G_0 and G_1 , because not all pre-election pacts are clearly announced so that analysts can reliably identify them. It is nevertheless possible to identify a subset X_1 of pacts that are “clearly” announced (more on this later) and a residual subset X_0 . These two subsets satisfy: $X_1 \subseteq G_1$ and $X_0 = G_0 \cup [G_1 \setminus X_1]$.

The coefficient on $Seat_{jC}$ should be higher in the sub-sample of clearly announced pacts (X_1) than in the residual sub-sample (X_0). Roughly, this is because $\delta_1 = \alpha_C \beta_C$ and $\beta_C = 1$ for all C in X_1 , while $\beta_C = 1$ for only some C in X_0 .¹² Similarly, the coefficients on voting weight (δ_2) and formateur status (δ_3) should be lower in the sub-sample of clear pacts than in the residual sub-sample (because, per Proposition 1, each includes the term $(1 - \alpha_C \beta_C)$, which should be smaller in X_1 than in X_0).

¹² More precisely, note that $E[\delta_1 | C \in X_1] = E[\alpha_C \beta_C | C \in X_1] = E[\alpha_C | C \in X_1]$. In contrast, $E[\delta_1 | C \in X_0] = \Pr[C \in G_1 \setminus X_1 | C \in X_0] E[\delta_1 | C \in G_1 \setminus X_1] = \Pr[C \in G_1 \setminus X_1 | C \in X_0] E[\alpha_C | C \in G_1 \setminus X_1]$.

Assuming that $E[\alpha_C | C \in G_1 \setminus X_1] \leq E[\alpha_C | C \in X_1]$ (i.e., pacts that are clearly announced have mean allocation parameters at least as large on average as those of pacts that are not clearly announced) and $\Pr[C \in G_1 \setminus X_1 | C \in X_0] < 1$ (there are at least some governments that are not based on pre-election pacts), it follows that $E[\delta_1 | C \in X_1] > E[\delta_1 | C \in X_0]$.

These new predictions about how the regression coefficients $\{\delta_j\}$ should shift between the samples X_1 and X_0 provide further ways to check our model's merit. Expressed in words, if the parties in a coalition government clearly announced a pact before the election, then portfolio allocations should be more Gamsonian and less heavily influenced by bargaining weight and formateur status. By contrast, portfolio allocations in the residual set of cases should be less Gamsonian and more heavily influenced by voting weight and formateur status. Seats may still matter in the residual sub-sample—since it may contain governments based on pre-election pacts that were not clearly announced—and thus one does not expect a perfect fit to the predictions of the post-electoral bargaining models.

In the remainder of the paper, we test the predictions just articulated by running the regression in equation (1), augmented with a full set of interactions that allow us to estimate separate coefficients for the two sub-samples X_1 and X_0 . The interactions are formed by multiplying a variable indicating the pre-electoral status of the government—*Alliance_C*, equal to 1 if the government in coalition C was based on a clearly announced pre-election pact—with the regressors in equation (1). That is, we add to equation (1) the following regressors: *Alliance_C*, *Alliance_C×Seat_{jC}*, *Alliance_C×Weight_{jC}*, and *Alliance_C×Formateur_{jC}*. Our coding criteria for the variable *Alliance_C* are based on Carroll (2007) and are described in the appendix.

Data

Our primary dataset is a new collection covering all parliamentary democracies circa 1997-2005. The theories we test are not specific to Western Europe and so the data need not be. As most of the previous literature has focused on Western Europe, however, we also run all our analyses on a dataset that covers fourteen West European democracies 1945-2000.

Our main dataset comprises 144 parties which participated in 47 majority coalition governments from 27 democratic countries—including 13 from Western Europe; 10 from Eastern Europe; 2 from Asia; Australia and Israel. Only countries deemed “free” by Freedom House during the relevant year and with a population greater than 200,000 were included. To preserve comparability with the previous literature, we excluded presidential regimes. We included data on all multiparty majority governments following any qualifying election that took place between 1997 and 2005.

Note that surplus majority governments can form under our model (whereas they cannot under standard bargaining models). To see how, suppose that a pact forms, its signatories win a majority, and one of them is superfluous. If the pact had agreed to $\alpha_C = 0$, then the superfluous party will get no portfolios. However, if the pact had agreed to $\alpha_C > 0$, then the superfluous party (assuming that it won at least one seat) will be given a positive share of portfolios. The other signatories will not expel the surplus party, for the same reason that they would not renege on any other vote trade they had agreed to—viz., in order to protect their ability to enter into such trades in the future. Thus, we include both minimal winning and surplus majority governments in our tests.¹³

¹³ The current version of our model does not yield any predictions about portfolio allocations within minority governments. Standard bargaining models predict that no minority governments will form. Thus, we focus here on majority governments and exclude minority governments from our empirical analyses. Our model could be adapted to introduce “associational costs” (per Strøm 1990) or to have a threshold lower than a majority that constitutes “winning” for some pacts—and either route would allow minority governments to form in our model. However, both changes introduce their own complications which we avoid here.

Our second dataset covers a longer time series of majority coalition governments in fourteen West European countries from 1945 to 2000, the set of cases on which most existing research on portfolio allocation has been conducted. The data on portfolios and seats were provided by Paul Warwick and James Druckman (see Warwick and Druckman 2001, 2006).

Of the 144 parties participating in majority governments in our cross-sectional data, 38 (26%) had engaged in public pre-election cooperation that succeeded in winning a majority. Formal pre-election coalitions are less prevalent within the West European data: we have observations on 683 parties that participated in majority governments, 40 based on pre-election agreements among all partners, these constituting 6% of all parties participating in majority governments in Western Europe during this period.

Results

We estimate equation (1)—interacting each term with our alliance variable and excluding one observation per coalition, as explained above—as an ordinary least squares regression. The results are presented in Table 2, for both the cross-sectional sample (model 1) and the West European sample (model 2).

[Table 2 about here.]

As can be seen, in governments that are based on a public pre-election coalition, each party's portfolio allocation is driven entirely by its seats, even when controlling for bargaining power. Indeed, the slope term for seats does not differ significantly from unity, the constant term does not differ significantly from zero, and neither voting weight nor formateur status has a statistically significant positive effect on portfolio allocations. In contrast, in the subset of all other governments – those with either a non-public pre-election commitment or no commitment at all – seats are substantively less important in driving portfolio allocations, voting weight has a

statistically significant effect, and formateur status is positive and significant in one sample and has the wrong sign in the other.

These results support our theory by showing that portfolio allocations are more heavily influenced by seat contributions in governments that are clearly based on pre-election pacts. Such an effect is predicted neither by standard bargaining theories nor by other explanations of Gamson's Law, such as the idea that a norm of fairness motivates proportional allocations.

Seats versus voting weights

Let's reconsider the argument that the seat contribution of each party ($Seat_{iC}$) should *not* be included as a predictor of portfolio shares, because there is no clear theoretical reason to include it and it is correlated with each party's voting weight. We have provided a theoretical reason to include seats. Moreover, from a purely econometric viewpoint, seats clearly belong in the analysis. First, the correlation between the two variables is not so high as to prevent reasonably precise estimates of their separate impacts. Second, the impact of seats is dominant in the X_I sub-sample, consistent with our model. Third, cross validation tests show our model to be superior to the pure post-electoral models. For example, we randomly split the cross-sectional dataset into two halves; estimated both our model and the Baron-Ferejohn model on the first half; and then used the estimated coefficients to predict portfolio shares in the second half. Performing this random split 1000 times, and retaining the root mean squared error from each model for each iteration, we found the average root mean squared error for our model was about 39% smaller than for the Baron-Ferejohn model (.069 versus .096).¹⁴ Comparison of out-of-sample prediction success is considered the gold standard for comparing model performance, as

¹⁴ The difference in the average root mean squared errors was about four times the standard deviation of the root mean squared errors across the 1000 iterations.

a model that better predicts “new” data necessarily captures the underlying structure better (cf. Hastie, Tibshirani and Friedman 2001).

The residual sub-sample, X_0

As noted above, we believe our residual sub-sample contains cases in which governing coalitions had discussed entering government together before the election, but had not clearly announced an agreement to the public.¹⁵ Consistent with this assumption, we find that both seat contributions and voting weights have significant effects on portfolio allocations in the residual sub-sample.

As some readers may have noted, our model suggests that the coefficients $\{\delta_j\}$ should vary in the sub-sample X_0 . For example, $\delta_1 = \beta_C \alpha_C$ in both the Morelli and the Baron-Ferejohn models. But $\beta_C = 0$ for coalitions $C \in G_0 \subseteq X_0$ and $\beta_C = 1$ for coalitions $C \in G_1 \setminus X_1 \subseteq X_0$. Thus, the coefficient δ_1 should vary across coalitions, as long as $\alpha_C > 0$ for some $C \in G_1 \setminus X_1$.

When we re-estimated the model in Table 2, allowing all parameters to vary, we found the following.¹⁶ First, in the X_1 sub-sample, the coefficients do not vary significantly across governing coalitions and the estimates are nearly identical to the OLS estimates. Second, in the X_0 sub-sample, the coefficients vary significantly across governing coalitions—consistent with

¹⁵ Our formal model does not distinguish between publicized and non-publicized pacts: this distinction arises as an operational matter in identifying pacts.

¹⁶ We used the GLLAMM procedure in Stata to estimate the model on the cross-sectional dataset. Programming details are available from the authors on request.

the idea that this sub-sample is a mixture of cases involving no pact at all and cases involving a non-publicized pact.¹⁷

Single-country tests

The tests we have presented thus far rely on cross-sectional comparisons. One might wonder whether our results are spurious, with both pre-election coalitions and Gamsonian allocations caused by some third factor that our cross-sectional regressions do not control, such as the electoral system. We can address this worry by examining variation over time in alliance structure and portfolio allocation within single countries.

Only three countries in our cross-temporal dataset have observations of parties in both pre-electoral and post-electoral governments and have over 20 usable observations in total after dropping one from each government: France V (35 observations), Germany (29 observations), and Italy (97 observations). Running our regression for each of these three countries alone, we can report the following.¹⁸ (a) *No coefficient that was significant and right-signed in the overall regression reported in Table 2 reverses sign in any of the country-specific regressions.* (b) Alliance-based governments in all three cases allocate portfolios more in proportion to seats; the effect is significant at the .05 level in France and Germany and at the .08 level in Italy. (c) Alliance-based governments in all cases allocate portfolios less in proportion to voting weight; the effect is significant at the .05 level in Italy, at the .10 level in Germany, and at the .16 level in France. Thus, pre-election coalitions increase the importance of seats and decrease the importance of voting weight in portfolio allocations, even controlling for country-specific effects.

¹⁷ The estimated average effects (and standard errors) in the X_0 sub-sample were .508 (.05) for $Seat_{jC}$, .513 (.05) for $Weight_{jC}$, and -.048 (.02) for $Formateur_{jC}$.

¹⁸ Full results are available on request from the authors.

Conclusion

Gamson's Law—the proposition that coalition governments will distribute portfolios in proportion to each member party's contribution of seats to the coalition—has been strongly supported by a long line of empirical analysis, yet rejected (as anything other than a statistical artifact of seats correlating with voting weight) by now-standard bargaining models of government formation. In this paper, we extend the standard bargaining models, by allowing parties to form pre-election pacts.

Pre-election pacts can be viewed as attempts to pre-negotiate portfolio allocations. Rather than wait for Nature to declare the election's outcome, and then begin bargaining, ambitious politicians can start negotiating before the election. When bargaining does begin before the election, however, parties necessarily form electoral-and-legislative, rather than merely legislative, coalitions. As such, they need to “pay” one another not just for contributions in the legislative arena (voting weight, formateur status) but also for contributions in the electoral arena (seats).

More specifically, we argue that campaign investments by pact members produce not just more seats for that particular party (a private good) but also an increased probability of a coalitional majority (a public good). Because members discount the benefits their investments confer on their partners, the public good (majority status) will be under-supplied. By agreeing before the election to allocate portfolios partly or wholly in proportion to seats, should the coalition win a majority, coalition members can motivate each other to invest more in the campaign, thus conferring external benefits on all.

Pre-election pacts that commit their signatories to enter government together thus potentially introduce a strong Gamsonian element into portfolio allocations. Empirically, the analyses in Table 2 (covering the subset of governments based on pre-election pacts) are the first

to find a “perfect” fit to Gamson’s Law (in which the constant term is nil and the slope term on seats is unity).

Besides providing an explanation for Gamson’s Law, our model predicts that governments based on publicly announced pre-election pacts will allocate portfolios *more* in proportion to seat contributions, than will other governments. This prediction—unexplored in the previous literature—is strongly supported in our cross-sectional dataset (from all democracies 1997-2005), our time series dataset (from Western Europe 1945-2000), and in three country-specific datasets (from France, Germany and Italy).

Appendix

Technical notes regarding Stage 2

We assume (a) $\sigma > 0$; (b) at $e_j = 0$, party j has a positive expected seat share for all e_{-j} ; and (c)

$$c_j(e_j) \geq \sigma E(S_j | e) + E(P_j | e) \rightarrow \frac{\partial^2 c_j(e_j)}{\partial e_j^2} > \frac{\partial^2 (\sigma E(S_j | e) + E(P_j | e))}{\partial e_j^2}. \text{ The first two conditions}$$

assure that each party has a positive “profit” when it invests nothing. The third condition assures that the cost curve crosses the benefit curve only once. Together, these conditions assure the existence of a unique and positive best-response investment level for each j . Continuity of the best-response functions, along with a closed and bounded choice set (assume there is some maximal possible investment level), ensure that an equilibrium to the game exists.

Proof of Proposition 1

Proposition 1 follows directly from the following lemma.

Lemma 1: Suppose that coalition C forms a government in an equilibrium of $\Lambda(s, \Gamma, D, \alpha_D)$. Then

the portfolio share for party $j \in C$ is $(1 - \beta_C) \gamma_j(s | C) + \beta_C (\alpha_C \frac{s_j}{s_C} + (1 - \alpha_C) \gamma_j(s | C)) = (1 -$

$$\beta_C \alpha_C) \gamma_j(s | C) + \beta_C \alpha_C \frac{s_j}{s_C}.$$

Proof: Suppose C forms a government in an equilibrium of the game $\Lambda(s, \Gamma, D, \alpha_D)$. Either C had not formed a pact previously ($D = \emptyset$) or it had ($C = D$ and $\alpha_C = \alpha_D \in [0, 1]$). Suppose $D = \emptyset$. In this case, $\beta_C = 0$ and $j \in C$ gets a share of the portfolios equal to $\gamma_j(s | C)$. Suppose $C = D$ and $\alpha_C = \alpha_D \in [0, 1]$. In this case, $\beta_C = 1$ and $j \in C$ gets a share of the portfolios $p_j(s; C, \alpha_C) =$

$$\alpha_C \frac{s_j}{s_C} + (1 - \alpha_C) \gamma_j(s | C) . \text{ QED.}$$

Proof of Proposition 2

When investment has no effect on the outcome of the election, party j will always choose $e_j = 0$ (to economize on costs), so the second stage can be ignored. Let $h(s) \equiv h(s|(0, \dots, 0))$ denote the probability that the outcome of the election will be s , given investment levels $(0, \dots, 0)$.

Let $u_j(a; \bar{\alpha})$ denote the utility to party j of the action combinations a and $\bar{\alpha}$. Let the actions taken *prior to* party j 's turn be denoted a_{-j} and $\bar{\alpha}_{-j}$. Let $\gamma_j(s)$ denote the expected share of portfolios that party j gets in the game $\Gamma(s)$.

Lemma 2: If $n \leq 5$ and $\Gamma = \Gamma_M$, then $\gamma_j(s) = \frac{w_j(s)}{w_N(s)}$, $\gamma_j(s|C) = \frac{w_j(s)}{w_C(s)}$ for all minimal winning coalitions C , and $w_D(s) = w_C(s)$ for all minimal winning coalitions D, C .

Proof: If $n \leq 5$, then the game $\Gamma(s)$ has a unique homogeneous representation for all possible s . Morelli (1999) shows that the lemma follows for all games $\Gamma_M(s)$ with a unique homogeneous representation. QED.

When $\Gamma = \Gamma_{BF}$, and one calculates values prior to the selection of the formateur, with each party's probability of being chosen as formateur proportional to its voting weight, the same result follows. The next lemma shows that the last-moving party will always prefer to form a pact with the coalition C and the parameter $\alpha_C = 0$, if it can, rather than remain pactless.

Lemma 3: Let $n \leq 5$ and $\Gamma = \Gamma_M$. For any ranking r , let j be the last mover (i.e., such that $r(j) = n$). Let the pacts that are *completable* by j during his turn be denoted by $Z_j(a_{-j}, \bar{\alpha}_{-j}) = \{C \subseteq N: j$

$\in C \& C \setminus \{j\} \neq \emptyset \& (a_k = C \forall k \in C \setminus \{j\}) \& \prod_{k \in C \setminus \{j\}} \bar{\alpha}_k \neq \emptyset$. Suppose that $D \in Z_j(a_{-j}, \bar{\alpha}_{-j})$, that D

excludes at least one party with a positive expected voting weight (equivalently, $\exists s: h(s) > 0 \&$

$w_{N \setminus D}(s) > 0$), and that $0 \in \prod_{k \in D \setminus \{j\}} \bar{\alpha}_k$. Then $u_j(a_{-j}, D; \bar{\alpha}_{-j}, \{0\}) > u_j(a_{-j}, \{j\}; \bar{\alpha}_{-j}, \emptyset)$.

Proof: Let the pacts *completed* prior to j's move be denoted $Z_j = \{C \subseteq N: j \notin C \& C \neq \emptyset \& (a_k$

$= C \forall k \in C) \& \prod_{k \in C} \bar{\alpha}_k \neq \emptyset\}$. Note that

$$u_j(a_{-j}, \{j\}; \bar{\alpha}_{-j}, \emptyset) = \sigma \sum_s h(s) s_j + \sum_s h(s) \gamma_j(s) - \sum_{C \in Z_{-j}} \sum_{s: s_C > s_{N \setminus C}} h(s) [0 - \gamma_j(s)].$$

The first term represents j's expected portfolio share from the default bargaining game.

If some coalition that formed a pact (excluding j) wins a majority, then j will get a nil share of portfolios, rather than $\gamma_j(s)$; the second term corrects for this. Next note that

$$u_j(a_{-j}, D; \bar{\alpha}_{-j}, \{0\}) = u_j(a_{-j}, \{j\}; \bar{\alpha}_{-j}, \emptyset) + \sum_{s: s_D > s_{N \setminus D}} h(s) [p_j(s; D, 0) - \gamma_j(s)].$$

If D does not win a majority, then the payoffs with $a_j = D$ are identical to those with $a_j = \{j\}$. The second term corrects for the fact that, if D wins a majority, then j will get a share of portfolios equal to $p_j(s; D, 0)$, rather than $\gamma_j(s)$.

Thus, $u_j(a_{-j}, D; \bar{\alpha}_{-j}, \{0\}) > u_j(a_{-j}, \{j\}; \bar{\alpha}_{-j}, \emptyset)$ if and only if $\sum_{s: s_D > s_{N \setminus D}} h(s) [p_j(s; D, 0) - \gamma_j(s)]$

> 0 . This inequality holds if $p_j(s; D, 0) \geq \gamma_j(s)$ for all s & $p_j(s; D, 0) > \gamma_j(s)$ for some s such that

$h(s) > 0$. However, $p_j(s; D, 0) = \frac{w_j(s)}{w_D(s)}$ and $\gamma_j(s) = \frac{w_j(s)}{w_N(s)}$ by Lemma 2. Thus, $u_j(a_{-j}, D;$

$\bar{\alpha}_{-j}, \{0\} > u_j(a_{-j}, \{j\}; \bar{\alpha}_{-j}, \emptyset)$ if and only if $w_N(s) \geq w_D(s)$ for all s & $w_N(s) > w_D(s)$ for some s such that $h(s) > 0$, which is true since $\exists s: h(s) > 0$ & $w_{N,D}(s) > 0$. QED.

Proof of Proposition 2: For any ranking r , let j be the penultimate mover (i.e., such that $r(j) = n - 1$) and k be the last mover (i.e., such that $r(k) = n$). Suppose that no pact forms in an equilibrium $(a^*, \bar{\alpha}^*)$ of the game. In this case, $u_m(a^*, \bar{\alpha}^*) = \sigma \sum_s h(s) s_m + \sum_s h(s) \gamma_m(s)$ for all $m \in N$.

Suppose j deviates from the equilibrium when its turn arises, by announcing $a_j = \{j, k\}$ and $\bar{\alpha}_j = \{0\}$. By Lemma 3, k will accept the offered pact, choosing $a_k = \{j, k\}$ and $\bar{\alpha}_k = \{0\}$.

Thus, j 's expected payoff from the deviation is $u_j(a^*, \bar{\alpha}^*) + \sum_{s: s_{\{j,k\}} > s_{N \setminus \{j,k\}}} h(s) [p_j(s; \{j, k\}, 0) - \gamma_j(s)]$.

A line of argument similar to that given in Lemma 3 shows that

$\sum_{s: s_{\{j,k\}} > s_{N \setminus \{j,k\}}} h(s) [p_j(s; \{j, k\}, 0) - \gamma_j(s)] > 0$, contradicting the assumption that $(a^*, \bar{\alpha}^*)$ is an

equilibrium. QED.

Coding the Alliance variable

We coded the *Alliance_C* variable following Carroll (2007) as follows. First, if the governing parties in coalition C had publicly announced their intention to enter government together prior to the election, then we coded *Alliance_C* = 1. An example is the agreement signed on September 2, 1999, by the leaders of the ‘‘Opposition Six’’ in Croatia before the 2000 elections (see ‘‘Croatian Opposition Parties Sign Electoral Cooperation Agreement,’’ BBC Monitoring Europe, September 3, 1999). If the governing parties had publicly announced that they *would not necessarily* enter government together, or *would refuse* to enter government together, then we coded *Alliance_C* = 0. If the governing parties had not made a public statement

prior to the election specifically committing themselves to jointly govern, then we relied on three other criteria consistent with explicit pacts. If the governing parties had either (a) promulgated a *comprehensive* joint platform; or (b) issued a joint policy statement and ran a joint list; or (c) issued a joint policy statement and agreed on a comprehensive set of mutual withdrawals of candidacies, then we coded $Alliance_C = 1$. All other cases are coded $Alliance_C = 0$.

To clarify some of the terms used above, note that, by a “joint list” we mean either a joint national list or a comprehensive series of joint district lists. We consider the transfer agreements between Fine Gael and Labour in Ireland, for example, to be extensive enough in some years to qualify as a “comprehensive series of joint district lists.” Examples of pre-election coalitions based on “comprehensive negotiations of mutual withdrawals” include the *Polo* in Italy and the coalition of right-of-center parties in France. Note that, merely because a government is *identifiable* (cf. Powell 2000), does not qualify it as a pre-election coalition by the criteria just given.

Given our coding procedures, we have a low probability of incorrectly identifying a government as based on a pre-electoral pact, when in fact it was not; but a higher probability of incorrectly identifying a government as post-electoral, when in fact it had a pre-electoral agreement. Indeed, as we note in the text, the likely existence of some governments based on pacts in our “residual” sample is an important point to keep in mind when interpreting our results.

We have run our analyses using several other, less strict, thresholds to codify electoral pacts. We can report that, in all versions of this coding, the results remain similar to those in Table 2. We would note in particular that Golder (2006) has identified pre-electoral coalitions in her recent study using somewhat less strict criteria than we do. If we adopt her coding, we obtain results similar to those in Table 2.

References

- Ansolabehere, Stephen, James Snyder, Aaron Strauss and Michael Ting. 2005. "Voting weights and formateur advantages in the formation of coalition governments." *American Journal of Political Science* 49(3):550-563.
- Baron, David, and John Ferejohn. 1989. "Bargaining in Legislatures." *American Political Science Review* 83(December): 1181-1206.
- Browne, Eric C., and Mark N. Franklin. 1973. "Aspects of Coalition Payoffs in European Parliamentary Democracies." *American Political Science Review* 67(June): 453-469.
- Browne, Eric C., and John P. Frenreis. 1980. "Allocating Coalition Payoffs by Conventional Norm: An Assessment of the Evidence from Cabinet Coalition Situations." *American Journal of Political Science* 24(4): 753-768.
- Carroll, Royce. 2007. "The Electoral Origins of Governing Coalitions." Ph.D. dissertation. University of California, San Diego.
- Calvert, Randall L. 1995. "Rational Actors, Equilibrium, and Social Institutions." In *Explaining Social Institutions*, ed. Jack Knight and Itai Sened. Ann Arbor: University of Michigan Press.
- Diermeier, Daniel, and Rebecca Morton. 2004. "Proportionality versus perfectness: experiments in majoritarian bargaining." In *Social Choice and Strategic Behavior: Essays in Honor of Jeffrey S. Banks*, ed. David Austen-Smith and John Duggan. Berlin: Springer.
- Druckman, James, and Andrew Roberts. 2003. "Coalition Governance in Eastern Europe: How Portfolio Allocation Differs in Eastern and Western Europe." Presented at the annual meeting of the American Political Science Association, Philadelphia.

- Fox, Justin. 2006. "Legislative cooperation among impatient legislators." *Journal of Theoretical Politics* 18(1):68-97.
- Frechette, Guillaume, John Kagel and Massimo Morelli. 2005. "Gamson's Law versus non-cooperative bargaining theory." *Games and Economic Behavior* 51(2):365-90.
- Gamson, William A. 1961. "A Theory of Coalition Formation." *American Sociological Review* 26(3): 373-382.
- Golder, Sona Nadenichek. 2006. *The Logic of Pre-electoral Coalition Formation*. Columbus: Ohio State University Press.
- Hastie, Trevor, Robert Tibshirani, and J.H. Friedman. 2001. *The Elements of Statistical Learning: Data Mining, Inference, and Prediction*. Berlin: Springer.
- Honaker, James, Jonathan Katz and Gary King. 2002. "A fast, easy and efficient estimator for multiparty electoral data." *Political Analysis* 10(1):84-100.
- Laver, Michael. 1998. "Models of Government Formation." *Annual Review of Political Science* 1:1-25.
- Laver, Michael, and Norman Schofield. 1990. *Multiparty Government: The Politics of Coalition in Europe*. Oxford: Oxford University Press.
- Laver, Michael, and Kenneth Shepsle. 1996. *Making and Breaking Governments*. New York: Cambridge University Press.
- Martin, Lanny W., and Randolph T. Stevenson. 2001. "Government Formation in Parliamentary Democracies." *American Journal of Political Science* 45(1):33-50.
- Mershon, Carol. 2001. "Contending Models of Portfolio Allocation and Office Payoffs to Party Factions: Italy, 1963-79." *American Journal of Political Science* 45(2): 277-293.

- Morelli, Massimo. 1999. "Demand Competition and Policy Compromise in Legislative Bargaining." *American Political Science Review* 93(4): 809-820.
- Powell, G. Bingham. 2000. *Elections as Instruments of Democracy*. New Haven: Yale University Press.
- Riddell, W Craig, 1981. "Bargaining under Uncertainty," *American Economic Review*, 71(4) 579
- Schofield, Norman. 1976. "The kernel and payoffs in European government coalitions." *Public Choice* 26(Summer):29-49.
- Schofield, Norman, and Michael Laver. 1985. "Bargaining Theory and Portfolio Payoffs in European Coalition Governments 1945-83." *British Journal of Political Science* 15(2): 143-164.
- Snyder, James, Michael Ting, and Steven Ansolabehere. 2005. "Legislative bargaining under weighted voting." *American Economic Review* 95(4): 981-1004.
- Strauss, Aaron B. 2003. "Applying Integer Programming Techniques to Find Minimum Integer Weights of Voting Games." Masters of Science Thesis, Massachusetts Institute of Technology.
- Strøm, Kaare. 1990. *Minority Government and Majority Rule*. Cambridge: Cambridge University Press.
- Strøm, Kaare, and Wolfgang Müller. 2000. "The keys to togetherness: Coalition agreements in parliamentary democracies." In *The Uneasy Relationship Between Parliamentary Members and Leaders*, ed. L.D. Longley and R.Y. Hazen. London: Frank Cass.
- Warwick, Paul V., and James N. Druckman. 2001. "Portfolio Saliency and the Proportionality of Payoffs in Coalition Governments." *British Journal of Political Science* 31(4): 627-649.

Warwick, Paul V., and James N. Druckman. 2006. "The Portfolio Allocation Paradox: An Investigation into the Nature of a Very Strong but Puzzling Relationship." *European Journal of Political Research* 45(4): 635-665.

Table 1: Numerically estimated results for three-party example

$\alpha_{\{1,2\}}$	Investment level of each ally	Investment level of party 3	Probability of alliance majority	Payoff to each ally
0.00	.199	.398	.5	.230
0.05	.209	.398	.507	.232
0.10	.219	.398	.515	.233
0.15	.229	.398	.523	.235
0.20	.238	.397	.531	.237
0.25	.248	.396	.539	.239
0.30	.267	.395	.555	.242
0.35	.276	.393	.563	.243
0.40	.286	.392	.571	.244
0.45	.295	.391	.579	.245
0.50	.313	.387	.594	.248
0.55	.322	.385	.602	.249
0.60	.340	.381	.617	.250
0.65	.349	.379	.625	.251
0.70	.366	.373	.640	.252
0.75	.384	.368	.655	.253
0.80	.392	.365	.662	.254
0.85	.409	.358	.677	.254
0.90	.426	.352	.691	.254
0.95	.442	.344	.705	.254
1.00	.458	.337	.719	.254

Table 2: Portfolio shares as a function of seat contributions, voting weights and formateur status, with and without pre-election alliances, parliamentary democracies

	All Parliamentary Democracies Majority Governments 1997-2005	West European Parliamentary Majority Governments 1945-2000
	1	2
<i>Seat_{jc}</i>	0.494 (0.083)***	0.635 (0.032)***
<i>Alliance_c</i>	0.006 (0.024)	-0.042 (0.024)
<i>Seat_{jc} × Alliance_c</i>	0.469 (0.170)**	0.530 (0.150)***
<i>Weight_{jc}</i>	0.383 (0.084)***	0.250 (0.034)***
<i>Weight_{jc} × Alliance_c</i>	-0.358 (0.131)**	-0.407 (0.150)**
<i>Formateur_{jc}</i>	0.059 (0.022)**	-0.028 (0.009)**
<i>Formateur_{jc} × Alliance_c</i>	-0.088 (0.062)	0.011 (0.033)
<i>Constant</i>	0.016 (0.013)	0.045 (0.005)***
R²	0.94	0.90
N	98	459

Method of estimation: Ordinary least squares regression.

Notes: Standard errors are reported in parentheses. We remove one observation per coalition, as explained in the text.

*** significant at .001 level; ** significant at .01 level; * significant at .05 level.