IDEOLOGICAL DIVIDE WITHIN THE CABINET AND PUBLIC SPENDING

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Abstract. A budget, i.e., spending by category, is prepared by the cabinet of (three key) ministers. The finance minister wants to minimize total spending, while the rest have single-peaked preferences over budgets and each views his own spending as relatively more important. The goal is to understand effects of polarization in spending priorities, — or divergence of the ideal points, — on the budget under two typical budgeting procedures. If the procedure is 'fragmented', i.e., the finance minister just passively compiles spending requests, then the divergence of the ideal budgets increases total spending. If the procedure is more centralized, i.e., challenging the initial proposal of the finance minister is costly, and it also requires support of another minister, then polarization *may* lead to a tighter budget, as it enlarges the set of the unchallenged proposals, provided the ideals of the spending ministers are sufficiently far apart.

1. Introduction

A way to understand patterns of public spending is to analyze the process of budget creation.[1] In many parliamentary democracies the key role in this process is played by the cabinet of ministers. A budgeting institution determines the procedures that the ministers have to follow as they compose and modify the plans for public spending. The main idea of the paper is to demonstrate that larger differences in spending priorities among the ministers might either aggravate the 'shared-lunch' problem in the cabinet or decrease the overall spending, depending on the role of the finance minister and her institutional power.[2]

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[1]Persson and Tabellini (2002), *inter alia*, have emphasized the role of institutions in shaping the patterns of public spending.

[2]The role of the "finance minister" is played by the Minister of Treasury, Budget, and Economic Planning in Italy, the Chancellor of the Exchequer in United Kingdom, the

The set up is simple: there are three politicians, a finance minister and two spending ministers, who oversee two crucial departments, say, agriculture and industrial affairs. They have to choose a budget, specifying the public expenditure by category.[3] It is natural to assume that each of the two ministers is predominantly interested in receiving more public funds for his own department. However, each also has to admit the importance of the other spending, possibly, to avoid contradicting the position of his party.[4] Further, the presence of electoral pressures (or the cost of imposing additional taxes) is likely to make a politician's payoff decreasing in any expenditure over a certain amount. So, in this model a spending minister has single-peaked preferences, with the 'ideal' budget reflecting the bias towards his department. As for the finance minster, she seeks to minimize total spending, it is assumed, given her success in reality is often associated with the fiscal performance.

There are different ways to think about polarization in such a cabinet: the two spending ministers might disagree about spending priorities as well as about total spending. The central question of the paper is whether disagreement about *composition of spending* has an effect on the *size* of the final budget prepared by the cabinet under different budgeting institutions. To identify this relation, let us keep the relative disagreement about the size of the budget fixed and focus on *polarization in spending priorities*, or the diversion of the ideal budgets of the spending ministers away from each other.[5]

It is instructive to start with an extremely fragmented procedure, described in section 2, where each cabinet member requests a funding for his ministry, while the finance minister, being weak, just passively compiles the requests into the budget. However grotesque, this mode of creating a budget resembles the procedures practiced in Europe in the past.[6] With

Budget Minister in Spain and Belgium, in the latter case, including also an independent group of experts (High Council of Finance), whom the minister consults.

[3]Clearly, some of the expenditures are predetermined, however, ministers have control over non-mandatory expenditures on a yearly basis.

[4]See Bowler, Farrell, and Katz (1999) for an account of the 'party discipline' in parliamentary democracies. Also, according to Budge, Klingemann, Volkens, and Bara (2001), spending priorities are at the heart of any party manifesto (electoral platform).

[5]A related approach has been adopted in the veto-player models, see Tsebelis (1999) for an overview and empirical analysis, Braüninger (2005) for an alternative empirical investigation. They link the composition of the cabinet (number and positions of the parties) with the policy changes (the number and distribution of significant laws): coalitions with wider spectrum of ideological positions are more likely to preserve the status-quo, as opposed to smaller coalitions with more aligned views, in which an agreement is easier to reach. Here the focus is just on the public expenditure flow.

[6]See Hallerberg (2004) for the description of what he calls 'fiefdom' governments, e.g., Italy in the early 1990s (where "spending ministers enjoyed a remarkable level of independence and autonomy."[p. 163]), Ireland [p. 177] and Greece in the 1980s [p. 97].

this 'bottom-up' budgeting, polarization exacerbates the common-pool-of-resources problem and the ministers overspend, even from their joint perspective.

One way to centralize the budgeting is to 'force' the ministers to negotiate before making their proposals and to allow them to 'costly commit' to the targets they agree upon during the negotiation.[7]

One could suggest that in practice ministers' ability to effectively negotiate might be hindered by asymmetric information (access). However, spending ministers rarely become experts in the field pertaining to the department they oversee, and any information available to public servants is commonly shared by all members of the government. That is not to claim that informational problems never arise in these negotiations. Nevertheless let us remain within the "full information" framework to understand basic implications of shifting the power within a cabinet. Importantly, such changes were at the heart of the reforms initiated, in part, by the Maastricht treaty (Article 3).[8]

The budgeting process can be further centralized by vesting additional powers to the finance minister. Currently, in most European countries, for example, it is the finance minister who proposes the budget to the cabinet. Hallerberg, Strauch, and von Hagen (2001), who compare the budget preparation stage in the 15 parliamentary democracies, suggest that "the real differences among states" are embedded in what happens after the proposal is introduced; the authors then develop an index reflecting the relative strength of the finance minister (from the weakest in Portugal to the most powerful one in Austria).

Following this approach, in the second, 'centralized', budgeting procedure, analyzed in section 3, the "institutional" power of the finance minister, is one-dimensional, interpreted as the cost of making a counter-proposal. Indeed, going against the finance minister requires political capital, involves spending time to formulate the amendment and gather the support, besides, in some cases it might incorporate the risk of loosing one's portfolio in case of failure.[9] The higher is this cost, naturally, the less worthwhile it is for a given spending minister to initiate his counter-proposal, thus, the higher is the *de jure* (institutional) power of the finance minister. Her *de facto* power in this model is associated with the set of feasible initial proposals that the finance minister can offer without being challenged by the rest of the cabinet.

[7]In Sweden, for example, after a two-day conference in March, the government prepares the Spring Fiscal Policy Bill, containing budget guidelines for several years. In April this bill is proposed by the finance minister for vote in the parliament (The Riksdag), and once acted upon (in June), imposes constraints on the Budget Bill, which is presented to the Riksdag in September. The budget guidelines thus receive the status of a 'law', acting as a commitment device for the ministers.

[8]Ibid., see also Hallerberg (2004), Stienlet (2000), Molander (2000).

[9]See Hallerberg (2004).

Clearly, a more powerful finance minister can impose a tighter fiscal discipline, (and this is also reflected in the data, see, e.g., Hallerberg, Strauch, and von Hagen (2007)). More surprisingly (as is shown in proposition 2), if the cost of challenge is not too high, her *de facto* power increases with polarization in spending priorities.

Finally, section 4, contains the discussion of the results and additional references, proofs are in the appendix.

2. Polarization in a Fragmented Government

In a fragmented government the role of a finance minister is reduced to a "book-keeping," i.e., compiling spending requests from the other ministers, so she plays no strategic role.

Consider a game between two ministers, whose preferences are defined over the set of possible budgets containing the two spending categories they oversee.

$$u^i : \mathbb{R}^2_+ \to \mathbb{R}, \quad u^i(x) = -\rho(x, p^{i*}), \quad \rho(z, y) \stackrel{\text{def}}{=} \sqrt{(z_1 - y_1)^2 + (z_2 - y_2)^2}$$

Each minister (as a bureaucrat) views his own type of spending as deserving more funds than the other minister thinks it should have:

Assumption 1. $p_i^{j*} < p_i^{i*}$ for $i \neq j$.

Definition 1. An equilibrium budget under a fragmented government is a Nash equilibrium of the simultaneous move game in which each minister announces an amount of spending for his own department, $(x_1, x_2) \in \mathbb{R}^2$.

In an equilibrium, each minister chooses the dominant strategy, i.e., requests the ideal amount of spending for his own ministry, $x_i = p_i^{i*}$; and hence the resulting budget in this case is (p_1^{1*}, p_2^{2*}). This is, clearly, wasteful, as both ministers strictly prefer a budget located between their ideal points, i.e., in segment

$$S(p^{1*}, p^{2*}) = \left\{ x \in \mathbb{R}^2_+ | \exists \alpha \in [0, 1] \quad x = \alpha p^{1*} + (1 - \alpha) p^{2*} \right\}$$

Thus, the ministers overspend even from a joint perspective, which is due to the externality embedded in the specification of preferences.[10] As discussed in the introduction, one possible interpretation of this externality stems from the presence of the common tax revenues that the ministers share coupled with the differences in their spending priorities. Next step is to show that the diversion of interests in the cabinet exacerbates the problem.

Definition 2. Let a cabinet, $A \in \mathbb{R}^4_+$, be associated with a pair of ideal points of spending ministers. Cabinet A is *more polarized in spending priorities* than cabinet B if the convex hull of ideal points A is larger than that of B, i.e., $S(A) \supset S(B)$.

[10]Note the similarity to the Cournot duopoly problem.

The distance between the ideal points, $\delta \stackrel{\text{def}}{=} \rho\left(p^{1*}, p^{2*}\right)$, in a more polarized cabinet is bigger, thus, corresponding to a wider 'ideological divide.'

Note the definition allows the ministers in both A and B to completely agree on the size of the budget, i.e., $(p_2^{2*}-p_2^{1*})/(p_1^{1*}-p_1^{2*}) = 1$, while their spending priorities diverge. In general, according to the definition, cabinets A and B are compared keeping the *relative disagreement about the size of the budget*, $(p_2^{2*}-p_2^{1*})/(p_1^{1*}-p_1^{2*})$, constant. It allows to focus the analysis on the effects of the disagreement about *composition* on the *size* of the resulting budget. Besides, it reduces the disagreement to a single dimension, and along that dimension the distance between the ideal points, δ, is a traditional measure of polarization, as in Esteban and Ray (1994). Note that not all cabinets are comparable in this case.[11]

Proposition 1. *Let cabinet A be more polarized in spending priorities than cabinet B. Then the size of the budget under fragmented government is higher in A.*

It is also easy to see that the distance between the equilibrium budget and the set of jointly preferred budgets, S, grows with polarization in spending priorities, thus increasing inefficiency of this budgeting procedure,[12] an illustration follows.

Example 1. Let $p^{1*} = (1, 0)$ and $p^{2*} = (0, 1)$, see fig. 1. The budget is $(1, 1)$ although the *total spending* the two ministers would have preferred to commit to is unity. Note that as the ideal points of the two ministers get closer in S, the budget approaches S.

Fragmented governments generate inflated budgets, whenever some disagreement is present. It is in the interests of the ministers themselves, let alone their constituents, to be able to formulate spending ceilings and commit to them. Not surprisingly then, the recent reforms in Sweden, Ireland and Belgium[13] were focused on this aspect of budgeting. Arguably, these reforms contributed (possibly along with the economic upturn) to a substantial decrease in the debt to GDP ratio in these countries in the past decade, see fig. 5.

[11] A change in relative disagreement with respect to the total amount of spending can be interpreted graphically as 'tilting' the segment $S(p^{1*}, p^{2*})$. In this case the lower is the boundary of the half-space it belongs to, i.e., the level k of the 'isocost' line, $x_1 + x_2 = k$ such that $p_i^{1*} + p_i^{2*} \leq k$, the lower is the budget. Similar is the effect of parallel shifts of the segment, i.e., comparing a more conservative to a more 'pro-spending' cabinet.

[12] The efficiency criterion is based on the preferences of the three ministers, e.g., an equilibrium budget in a fragmented government is Pareto dominated by any budget in S.

[13] See Hallerberg (2004) for an overview of each, and also Stienlet (2000) and Molander (2000).

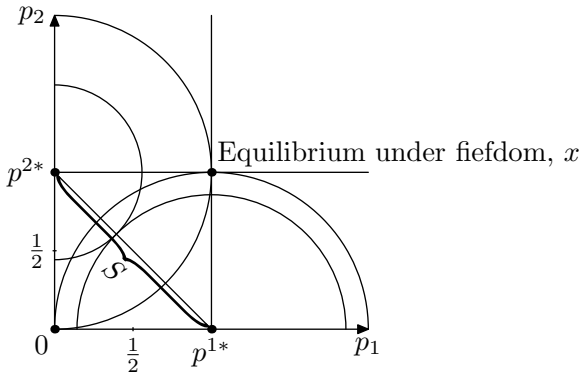

FIGURE 1. Both spending ministers prefer a budget in S to the equilibrium, $(1, 1)$.

3. Polarization in a "Centralized" Government

In addition to the two spending ministers in the previous game, a finance minister, F, now plays an active role,[14] being vested with the power of making the initial proposal and the 'institutional power' reflected in the cost (c) of challenging this proposal by any of the spending ministers. Her objective is to minimize total spending, so $u^F(x) = -(x_1 + x_2)$.

The budgeting procedure under centralization is a sequential game:

1. The finance minister introduces her proposal, $p^f \in \mathbb{R}^2_+$.
2. Spending ministers decide whether to offer a counter-proposal.
   a. If none of the spending ministers wants to challenge, p^f becomes the final budget, and the game ends.
   b. If spending minister i decides to challenge, he proposes a new budget, $\tilde{p}$, and looses $c > 0$.
   c. If both decide to challenge, the challenger is chosen randomly with equal chance given to each.
3. If both spending ministers prefer the counter-proposal it becomes the final budget, otherwise the initial proposal prevails. The game ends.

The budget under centralization is an outcome of a subgame perfect Nash equilibrium of this game.

Given the finance minister commits to her initial proposal in this game, the amendments that can be offered here involve only an increase in overall spending: the proposer can ask for a bigger allocation for his own department and, to assure the support in the cabinet, offer some additional spending for the other minister. The finance minister then should be looking for the

[14]In some cases it is safe to assume that the interests of the prime minister are mirrored by the finance minister and so the former is not active in this model.

set of initial proposals immune to such 'collusion' between the spending ministers.[15]

Lemma 1. *If an initial proposal is challenged in cabinet A, the counter-proposal should belong to the segment between the two ideal points, $S(A)$. None of the proposals in $S(A)$ will be challenged for any cost $c \geq 0$.*

Let $D(c, A)$ be the set of unchallenged proposals in cabinet A, provided the cost of counter-proposing is $c \geq 0$. It follows from lemma 1 that $D(c, A)$ contains $S(A)$ for any $c \geq 0$. Therefore, no matter what is the initial proposal of the finance minister, an equilibrium budget should belong to $D(c, A)$.

There are two different costs that are associated with making a proposal: first, the direct cost of challenging, c, and second, the cost of getting support of the other minister. So, one way to avoid a challenge is to choose an initial proposal closer than c to both ideals, i.e., $D(c, A)$ should include the intersection of two balls around the ideal points of the ministers with radius c each, $K(c, A) \stackrel{\text{def}}{=} B_c^1 \cap B_c^2$. Another way to assure no challenger emerges is to exploit the disagreement within the cabinet: the next statement shows $D(c, A)$ also includes a compact region $E(c, A) \stackrel{\text{def}}{=} \left\{x \in \mathbb{R}^2 | \rho(p^{1*}, x) + \rho(x, p^{2*}) \leq c + \delta\right\}$ delimited by an ellipse with foci p^{1*} and p^{2*}, $\delta = \rho\left(p^{1*}, p^{2*}\right)$.

Lemma 2. *Given cabinet A with the distance between the ideal points of the two spending ministers, $\delta > 0$, and a cost of challenging the proposal of the finance minister, $c \geq 0$, the set of unchallenged proposals, $D(c, A)$, can be described as follows:*

(1) If $0 \leq c < \delta$, then $D(c, A) = E(c, A)$;
(2) If $\delta \leq c < 2\delta$, then $D(c, A) = E(c, A) \cup K(c, A)$;
(3) If $2\delta \leq c$, then $D(c, A) = K(c, A)$.

$D(c, A)$ is the 'feasible set' the finance minister has to choose from, and, as was just established, it is compact. Her objective, recall, is to minimize total spending, $x_1 + x_2$, so an equilibrium of the game is well-defined.

Corollary 1. *An equilibrium budget belongs to the boundary of $D(c, A)$, and if $c > 0$, it is not in $S(A)$; it is proposed by the finance minister and remains unchallenged by the rest of the cabinet.*

[15]One could construct a more general negotiation procedure allowing for any possible amendment, including a decrease in overall budget with a 'modest' increase in just one type of spending that would look more attractive than the initial proposal in the eyes of the finance minister herself. However, if the negotiation proceeds, accepting such a proposal is dangerous for the finance minister, as it can lead to a further challenge from the other spending minister offering a deal to the first one, resulting in a substantial increase in the budget. Besides, such a game might have no equilibria, corresponding to 'an endless negotiation'. Arguably, the set up in this paper with the finance minister standing behind (committing to) the initial proposal might be a good description of the observed and provides a stepping stone in understanding more complex negotiations.

Remark. Clearly, by construction, the sets $K(c, A)$ and $E(c, A)$, both increase with c and so does $D(c, A)$ by lemma 2. One can consider institutions where the benefits of a counter-proposal are shared by the spending ministers, and the cost is imposed on a single person, but then the set of unchallenged proposals will be a strict superset of $D(c, A)$. Indeed, reducing benefits accruing to a proposer is equivalent to increasing the cost, c. Therefore, $D(c, A)$ can be thought of as the set of unchallenged proposals under *any* benefit-sharing agreement among the ministers.

Now it is easy to state the main result, which follows from lemma 2, definition 2 and the objective of the finance minister.

Proposition 2. *Fix the cost of challenging the finance minister, $c > 0$. Let cabinet A (with the distance between the ideals δ_A) be more polarized in spending priorities than cabinet B (with the distance δ_B), so that $\delta_A > \delta_B$.*

(1) If $\delta_B > c$, then $D(c, A) = E(c, A) \supset E(c, B) = D(c, B)$; and therefore, the equilibrium budget in A is smaller than that in B.

(2) If $c > 2\delta_A$, then $D(c, A) = K(c, A) \subset K(c, B) = D(c, B)$ and so, the equilibrium budget in A is higher.

The first assertion refers to 'sufficiently divided' cabinets, A and B, in which the disutility of accepting the ideal budget of the other spending minister is higher than the cost of the challenge, or in both cabinets the *de jure* power of the finance minister, c, is relatively small. In this case a challenger has to take into account the interests of the other member of the cabinet, and this compromise is costlier for him the further the ideal policy of the other minister. So the set of unchallenged proposals in A is bigger than that in B. Polarization in spending priorities becomes a 'substitute' for the cost of challenge c, as increasing either of them enlarges the choice set of the finance minister, see fig. 2.

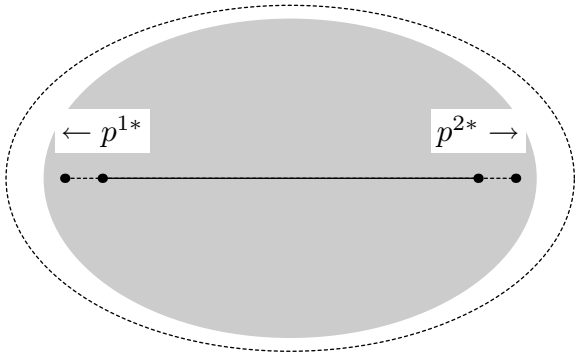

FIGURE 2. As ideal points diverge, i.e., the cabinet becomes more polarized in spending priorities, the set of unchallenged proposals increases — from the grey area to the one enclosed by the dashed line, — if $c < \delta$ in both cabinets.

In the second case described in proposition 2 the cost of challenging is dominant, so to discourage a challenge, the finance minister has to offer the initial proposal close enough to *both* ideals. Hence divergence of interests in the cabinet diminishes the set of such proposals, see fig. 3.

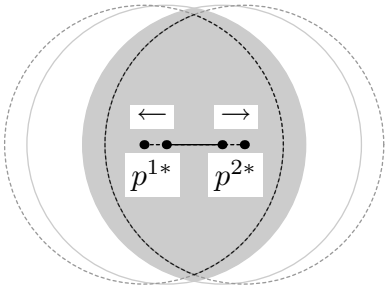

FIGURE 3. Positions of the ministers are closely aligned, the set of unchallenged proposals decreases with polarization in spending priorities to the one enclosed by the black dashed line, if $c > 2\delta$ in both cabinets.

When the cost of challenge is in the intermediate range in both cabinets, $2\delta \geq c \geq \delta$, neither of inclusion results of proposition 2 hold, as can be seen from fig. 4. In this case, the effect of polarization on the size of the budget depends on the nature of disagreement in the cabinet. If, for example, the two ministers completely agree on the size of the overall spending, their disagreement being solely its composition, then the initial proposal is on the boundary of $D\backslash E$, i.e., on the boundary of K, so case 2 of proposition 2 applies, hence diverging of the ideals leads to a smaller set of unchallenged proposals and thus to a more generous initial offer of the finance minister.

If the spending ministers also disagree about the ideal size of the budget in both cabinets,[16] then more polarization in spending priorities might have the opposite effect, as the initial proposal then might lie on the boundary of $D\backslash K$ that expands.

4. CONCLUSIONS

It is important to stress that the approach adopted here is purely positive. There is no intention to label budget institutions that generate smaller budget, say, as more or less desirable, unless it is possible to rank them Pareto based on the interests of the parties involved. The focus, instead, is on analyzing possible consequences of changing common budget-making procedures in the presence of disagreement among the ministers with respect to the spending priorities.

[16]This means that in both cabinets the ratio $\frac{p_2^{2*}-p_2^{1*}}{p_1^{1*}-p_1^{2*}}$ is substantially different from unity.

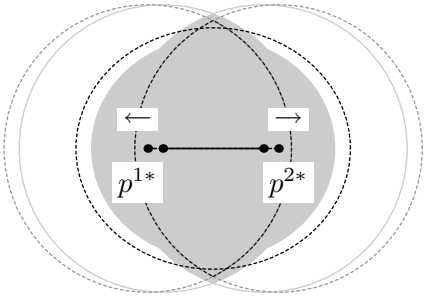

FIGURE 4. Effect of polarization in spending priorities when $2\delta > c > \delta$: D changes from the grey area to the union of the two sets inside the black dashed line.

Recall, all the results are formulated for a cabinet consisting of a finance minister negotiating public spending by category with two ministers who have 'Euclidean' preferences over possible budgets and each of whom heads an important department.

First, if the procedure is fragmented, then a cabinet is prone to wasteful spending, i.e., both spending ministers would be better-off committing to lower allocations of funds to their departments. Interestingly, the inefficiency persists unless the interests of the ministers *exactly* coincide, thus, generalizing the conclusions from the standard common-pool-of-resources problem, see Inman and Fitts (1990) *inter alia*.

Second, polarization in spending priorities has different effects on the budget size. It is important to remember that the relative disagreement about the size of spending is kept constant in these cases. In particular, both spending ministers might completely agree on total spending, with their ideals belonging to the same 'isocost' line, $p_1^{i*} + p_2^{i*} = k$, however, more disagreement about *how to spend* public funds changes the resulting size of the budget. If the budgeting procedure is fragmented (or 'bottom-up'), the polarization always leads to higher spending. This is no longer true when the process is more centralized (or 'top-down'). Finance minister, whose initial proposal is then costly to challenge, can use the disagreements within the cabinet to her advantage, if the ideal budgets of the spending ministers are sufficiently far apart. In this case both *de jure* power of the central player (cost of opposing her proposal) and polarization help prevent a challenge for a wider range of initial proposals. When the finance minister faces a more monolithic government, however, divergence of ideal positions limits her choice and hence her *de facto* power.

Note that in contrast with the fragmented budgeting, the amount of total spending under centralization can never exceed the jointly beneficial budget for the two spending ministers. In this sense it is a "leap" from the previous procedure, and one could, if needed, find a "smother way" to strengthen

the finance minister's position. For example, Hallerberg (2004), [p. 177], describes practices in Ireland in the 1980's, where, after compiling the requests of the spending ministers, the finance minister could suggest a list of cuts that was to be approved by the cabinet. However, given the objective of the paper is to demonstrate that the effects of polarization differ depending on the budgeting procedure, it was sufficient to focus on the two 'extreme' modes of budgeting.

One might wonder how informative is the decision of the cabinet about the actual public spending. Hallerberg, Strauch, and von Hagen (2001) identify several stages of budget creation: (1) planning; (2) budget preparation; (3) parliamentary stage and (4) implementation. Budget guidelines are set at the first stage, with both the level of itemization and the time of creation of the plan varying by country. Next, the yearly budget is drafted and discussed in the cabinet, or the government. This draft is subsequently offered for consideration of the parliament members. Finally, each country has rules imposing constraints on changes that the executives can introduce at the last, implementation, stage.

To the extent the discretion of the executives is limited (and it, again, varies by country) the budget produced by the legislative branch should still adequately reflect public spending. Furthermore, in the presence of a strong party discipline, so prevalent in parliamentary democracies,[17] the degree of control that a parliament as a whole can exhibit over the government is limited,[18] which is especially evident for majority governments.[19] This leaves the first two stages as natural candidates for the analysis of budget formation.

Laver and Shepsle (1996), for example, go even further by suggesting that one should be most concerned with an earlier, coalition-formation stage, at which the government is formed. Indeed, in some countries coalition agreements contain explicit budget guidelines, as in Belgium, Finland, Ireland, Luxembourg, and the Netherlands. Although in these cases the guidelines do not constitute a formal law (and they are not always followed), they may serve as good predictors of the actual size of spending.[20] One could argue that the coalition agreements describe an "equilibrium outcome" under a-priori known rules governing budget formation. Hence, one has to understand the role played by these rules, thus the focus on the *budget preparation by the cabinet* in this paper.

[17] See Bowler, Farrell, and Katz (1999).

[18] See, in addition Hallerberg, Strauch, and von Hagen (2007) for the account of recent reforms in the EU countries further restricting the amendments to the cabinet proposal that can be suggested by the parliament.

[19] "A legislature makes and breaks governments, to be sure, but it does not, in our view, rule the country." Laver and Shepsle (1996, p. 13).

[20] See Hallerberg, Strauch, and von Hagen (2001).

Finally, it is tempting to link one well-documented observation[21] with the findings. Countries with more homogeneous cabinets tend to have more powerful finance ministers (like UK), while it not unusual for somewhat more divided governments to delegate less authority to the finance minister (Sweden). It is conceivable that in the latter case the finance minister can successfully 'divide-and-rule', but further increase in her *de jure* power might be viewed as undesirable, potentially leading to biases towards her (or her party's) preferred composition of spending. This hypothesis, however, is to be considered within a normative model (focusing on institutional design), thus, stretching beyond the scope of the current paper.

Appendix A. Proofs

Proof of proposition 1. As both $S(A)$ and $S(B)$ are segments in $\mathbb{R}^2$, and $S(A) \supset S(B)$, the ideal points A have to belong to the same line (hyperplane) as the pair of points B. Assumption 1, $S(A) \supsetneqq S(B)$, and the definition of the equilibrium imply the equilibrium with cabinet A is coordinate-wise higher than that with cabinet B, and so the size of total spending for both categories is higher in A. □

Proof of lemma 1. Given any initial proposal, p^f, challenger i is choosing a policy p that maximizes his utility, $u^i(p)$, subject to the 'support' constraint ensuring that the other minister will vote for the counter-proposal: $u^j(p) \geq u^j(p^f)$. In case the constraint does not bind, i.e., the other minster, j, is happier with the ideal of the challenger, $u^j\left(p^f\right) \leq u^j\left(p^{i*}\right)$, the counter-proposal should be p^{i*}. Otherwise, if a counter-proposal p is not in $S(A)$, i.e., the sum of the distances $\rho\left(p^{j*}, p\right) + \rho\left(p^{i*}, p\right)$ exceeds $\delta = \rho\left(p^{i*}, p^{j*}\right)$, then i can choose a point $\tilde{p} \in S(A)$ closer to his ideal, such that the constraint is still satisfied, $\rho(p^{j*}, \tilde{p}) = \rho(p^{j*}, p^f)$. $\tilde{p}$ is then uniquely determined and, clearly, can not be improved upon. The latter implies none of the proposals in $S(A)$ will ever be challenged even if $c = 0$. □

Proof of lemma 2. Minister i will challenge only if the gain, $\rho\left(p^{i*}, p^f\right) - \rho\left(p^{i*}, \tilde{p}\right)$, from proposing $\tilde{p}$ is strictly above c. Several scenarios are possible depending on the location of the initial proposal.

Case 1. $\rho\left(p^{j*}, p^f\right) \geq \delta$ for any j. Either minister can propose his ideal policy and get support of the other minister. Let i make a counterproposal, his gain is $\rho\left(p^{i*}, p^f\right)$, which implies that p^f has to be at least c away from the ideal point of minister i. So, if p_f is further than δ from both ideal points and closer than c to both, it is unbeatable:

$$X(c, A) = B^1_c \cap B^2_c \setminus \left(B^1_\delta \cup B^2_\delta\right) \subset D(c, A), \text{ where}$$
$$B^i_v = \{x \in \mathbb{R}^2 \mid \rho(p^{i*}, x) \leq v\}$$

Note, $X(c, A)$ is empty iff $c < \delta$.

[21] see Hallerberg (2004).

Case 2. $\rho\left(p^{j*}, p^f\right) < \delta$ for any j. Neither minister proposes his ideal policy in this case. By lemma 1 a counterproposal of, say, minister i, $\tilde{p}$ belongs to the segment S, so $\rho\left(\tilde{p}, p^{i*}\right) = \delta - \rho\left(p^{j*}, p^f\right)$. To prevent a counterproposal the finance minister has to choose p^f to satisfy $\rho\left(p^{i*}, p^f\right) - \rho\left(p^{i*}, \tilde{p}\right) \leq c$. The two conditions combined yield

$$\rho\left(p^{1*}, p^f\right) + \rho\left(p^{2*}, p^f\right) \leq c + \delta \tag{A.1}$$

Thus if the initial proposal is closer than δ to each of the ideal points and satisfies (A.1), it is unbeatable,

$$Y(c, A) = B_\delta^1 \cap B_\delta^2 \cap E(c, A) \subset D(c, A)$$

Note that intersection $B_\delta^1 \cap B_\delta^2$ is never empty by construction. Moreover, if $c \geq \delta$ then $Y(c, A) = B_\delta^1 \cap B_\delta^2$.

Case 3. $\rho\left(p^{j*}, p^f\right) \geq \delta$, but $\rho\left(p^{i*}, p^f\right) < \delta$. Only one minister, i, can propose his ideal policy and get support of the other, j, while j has to counter-propose a policy strictly in the interior of S. Thus, an unbeatable point has to be closer than c to p^{i*} and it has to satisfy condition (A.1),

$$Z_i(c, A) = B_\delta^i \backslash B_\delta^j \cap B_c^i \cap E(c, A) \subset D(c, A)$$

Note that if $c < \delta$ then $B_c^i \subset B_\delta^i$, so $Z_i(c, A) = B_c^i \backslash B_\delta^j \cap E(c, A)$.

Thus, the unbeatable points in this case, should belong to[22]

$$Z(c, A) = Z_1(c, A) \cup Z_2(c, A) = \begin{cases} E(c, A) \setminus \left(B_\delta^1 \cap B_\delta^2\right), & c < \delta \\ E(c, A) \cap \left(B_\delta^1 \triangle B_\delta^2\right), & 2\delta \geq c \geq \delta \\ B_\delta^1 \triangle B_\delta^2, \text{ otherwise} \end{cases}$$

By construction, $D(c, A) = X(c, A) \cup Y(c, A) \cup Z(c, A)$.

If $c > 2\delta$ then $D(c, A) = K(c, A) \setminus \left(B_\delta^1 \cup B_\delta^2\right) \cup \left(B_\delta^1 \cap B_\delta^2\right) \cup \left(B_\delta^1 \triangle B_\delta^2\right) = K(c, A)$, where $K(c, A) = B_c^1 \cap B_c^2$.

If $2\delta \geq c \geq \delta$ then $B_\delta^1 \cap B_\delta^2 \subset E(c, A)$. So $Z(c, A) \cup Y(c, A) = E(c, A) \cap (B_\delta^1 \cup B_\delta^2)$. Hence the conclusion.

If $c < \delta$ then $D(c, A) = Y(c, A) \cup Z(c, A) = E(c, A)$. □

[22] $H \triangle G$ is a symmetric difference of the two sets, H and G.

Appendix B. Fiscal Performance

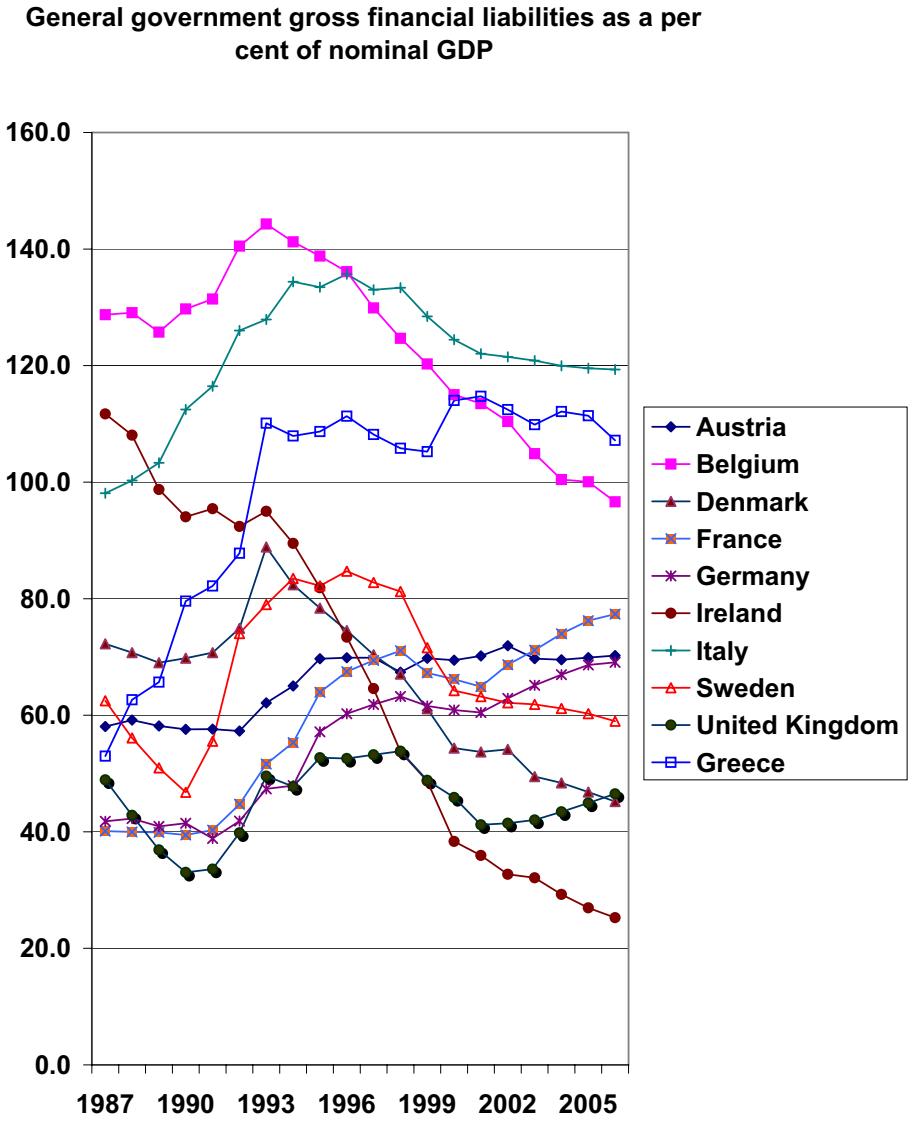

Figure 5. *Source*: OECD Economic Outlook 76 Database. *Note*: Gross debt data are not always comparable across countries due to different definitions or treatment of debt components.

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