

# Kosher Pork\*

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## Abstract

There are two common views of pork barrel spending. One view, reflecting most conventional wisdom, as well as some leading academic research, is that pork barrel spending reduces general welfare at the expense of narrow interests, thus antithetical to responsible policymaking, especially in times of crisis. An alternative view is that pork “greases the legislative wheels” making possible the enactment of socially beneficial legislation that would otherwise not pass. In this paper we reexamine both arguments and show that they depend on the nature of heterogeneity of interests across legislators. Under full information, but with heterogeneous ideology across legislators, policy compromise may be sufficient to pass beneficial legislation, with pork only lowering social welfare. In contrast, when agents are heterogeneous in both their ideology and in their information, allocation of pork may be crucial to passage of legislation appropriate to the situation. However, it does so not simply by bribing legislators to accept legislation they view as harmful, but also by conveying information about the necessity of policy change, where it may be impossible to convey such information in the absence of pork. Moreover, pork will be observed when the public good is most valuable precisely because it is valuable and the informed agenda setter wants to convey this information.

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“... trading of that sort [i.e., pork to pass bills] has characterized the fight for almost every major, controversial measure of domestic legislation in the last half century ...

Frederick Lawton ... who had been for decades a career official at the Office of Management and Budget (as it now is called), once told me of a summons to Franklin Roosevelt’s office in 1938, when the last big piece of New Deal legislation ever passed, the Fair Labor Standards Act, was teetering before the House of Representatives. “Fred,” President Roosevelt said, as I heard the story, “I want you to go across the street [to the State Department building] find a vacant office with a desk, two chairs and a telephone, take a copy of the Budget Document with you, call me and give me the room number and then wait there all day. From time to time. members of Congress, sent by me, one by one, will knock on your door. And when they do, Fred, let them in, shut the door, open the Budget, and give them whatever they ask.”

Presidential scholar Richard Neustadt (as quoted in Evans, 2004)

## 1 Introduction

A major complaint of observers of Congress is the prevalence of pork barrel spending, that is, of projects benefitting specific groups or districts at public expense. Conventional wisdom is that legislators take advantage of their opportunity to pad legislation with pork to the point where it harms the general interest. The common association of pork with “politics as usual” is contrasted in the public eye with responsible policy making, in which legislators put aside their love of pork and concentrate on socially beneficial legislation. This view supports proposals to ban or limit pork or “earmarks” with the aim of improving social welfare.

An alternative view (as embodied in the above quotation) is that pork is the “grease” that makes the legislative process work. In order to get the votes to pass legislation, it is necessary to build legislative coalitions. Legislators are brought into coalitions not only by the nature of the legislation on the table, but also by the favors they get conditional on delivering their votes. Under this view, pork barrel spending is a necessary evil in order to adopt socially beneficial legislation. It does *not* disappear when high-priority legislative initiatives are adopted, but in fact may be critical to the passage of such legislation—witness the failure of the 2008 Troubled Asset Relief Program legislation to pass in the House of Representatives on September 29th and its subsequent passage merely four days later when pork was added; or, the passage of major health care legislation in the U.S.<sup>1</sup> This more “pragmatic conventional wisdom” takes account of the realities of the legislative process and

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<sup>1</sup>See <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/10/03/MNR813AHDN.DTL> and <http://www.lasvegassun.com/news/2009/dec/20/reid-compromise-gives-sweet-medicaid-deal-nebraska>

the role of pork in “greasing the wheels” so that important legislation may be passed.<sup>2</sup>

However, so much pork may be put into a bill that legislation meant to be socially beneficial might actually lower social welfare. Coalition members are compensated (that is, “bought off”) if they prefer the status quo to the adopted policy, but districts outside the coalition are not. Hence, an equilibrium that requires the distribution of pork may be one where social welfare is lower rather than higher. Rather than the ends justifying the means, the means corrupt the ends.

The purpose of this paper is to examine carefully both the simple conventional wisdom that distribution of pork lowers social welfare and the “pragmatic” conventional wisdom that pork may be welfare-increasing because it allows formation of coalitions to pass socially beneficial legislation. Our general conclusion is that pork may indeed be welfare-improving, but the circumstances under which we find this to be the case are quite different than what is generally considered in discussions of “greasing the legislative wheels”. Moreover, we argue that what allows pork to be a welfare-improving tool is precisely what is widely condemned, namely, the benefit given to specific groups at public expense.

We show that while pork may lead to socially beneficial outcomes under full information, the case for the pragmatic conventional wisdom becomes strongest when one moves away from a perfect information world. Buying votes with pork to enable the passage of legislation is then only part of the story. The extent to which an agenda setter is willing to distribute pork (“give them whatever they ask”) may reveal information about the importance of legislation. Crucially, differing views of the importance of legislation may reflect not simply differences in ideology or in information about the state of the world, but in understanding about the consequences of a specific legislative initiative. Given the both the

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<sup>2</sup>Another example is possible use of pork by Abraham Lincoln in 1865 to secure passage of the Thirteenth Amendment. According to Goodwin (2005, p.687):

He assigned two of his allies in the House to deliver the votes of two wavering members. When they asked how to proceed, he said, “I am President of the United States, clothed with great power. The abolition of slavery by constitutional provision settles the fate, for all coming time, not only of the millions now in bondage, but of unborn millions to come—a measure of such importance that those two votes must be procured. I leave it to you to determine how it shall be done; but remember that I am President of the United States, clothed with immense power, and I expect you to procure those votes.” It was clear to emissaries that his powers extended to plum assignments, pardons, campaign contributions, and government jobs for relatives and friends of faithful members.

complexity of legislation, but also the impossibility of spelling out all contingencies even for complex legislation, some legislators, such as committee chairs, may have superior information about the (social welfare) effects of legislation that cannot be conveyed simply by its contents. The possibility of information revelation of this sort will affect the nature of the legislative bargains that allow legislation to pass, perhaps significantly so, as well as the welfare implications of allowing versus restricting pork. Hence, the pragmatic view that pork is necessary to “lubricate” the legislative process is incomplete without considering how incomplete information affects the use of pork.

In existing models of pork under complete information (for example Battaglini and Coate [2008]), pork will be distributed to coalition members when the value of public goods and/or pre-existing fiscal obligations is low, but legislators will forgo pork when the value of public goods and/or pre-existing obligations is high. In sharp contrast, under incomplete information, pork may be higher when the public good is *most* valuable, not when it is least valuable. That is, pork is not antithetical to “responsible policy making” but in fact part of the response of policy to a high valuation of the public good. We also find that pork may be given out (and improve welfare) even when the government budget constraint is very tight. That is, pork barrel spending is not strictly decreasing in debt or other public obligations.

The nature of legislative bargaining means that we cannot view policy choice under imperfect information as simply signaling the importance of legislation. The combination of the desire to signal and to build a coalition requires aiding and hurting different legislators – and in different states of nature – differentially. This determines the distribution of pork consistent with passing legislation. The need for differential benefits implies that coalition building requires policies that in themselves may benefit specific constituencies at the general expense. To the extent that this characteristic defines pork, then pork is the quintessential policy that underlies the pragmatic conventional wisdom. Outlawing pork – that is outlawing policies with this characteristic – will be shown to make responses to situations calling for higher expenditure on vital public goods impossible, and hence may be welfare reducing. We should stress that we do not claim that information transmission is the primary motivation for pork barrel spending. Rather, the extent to which pork barrel spending is used to build a legislative majority, as well as its distribution, reveals information about the importance the proposer puts on legislation. When the proposer is, in addition, better informed about the legislation’s content and its potential effects, this information is valuable and may play

an important role in coalition building and in the passing of socially-beneficial legislation.

The plan of the paper is as follows. In the next section we review some existing models of pork barrel spending. In section 3 we set out the basic model and the legislative process. In section 4 we derive the political equilibrium and its normative properties under full information. Section 5 presents the general characterization of an asymmetric information equilibrium, including some discussion of asymmetrically informed legislators in the real world, and shows that when pork is restricted to be zero under asymmetric information there is no signaling of relevant information. In section 6, we consider coalition building under asymmetric information. In section 7 we discuss the possible welfare-enhancing role of pork under different legislative protocols. Section 8 presents conclusions. Proofs of the propositions and additional derivations can be found in the appendices [to be added].

## 2 Existing Models of Pork in Legislatures

There are a number of papers that consider the allocation of pork barrel spending in a legislative setting, though generally without investigating its dependence on variation in either economic circumstances or the social value of other legislation.

Buchanan and Tullock (1962) introduced focus on the decision making process within the legislature where the extent of pork barrel spending reflected vote-trading between legislators over projects. Early formal modeling by Shepsle and Weingast (1981, 1984) and Weingast, Shepsle, and Johnsen (1981) argued that it is the political benefits of geographically concentrated projects – in addition to their economic benefits – that explain their widespread use. Projects generate employment and income in the districts in which they are built, which is a political benefit to the legislator representing the district. In these studies, and in most subsequent literature, there was no discussion either of using pork to pass legislation or of how its social cost may vary depending on economic circumstances.

Baron and Diermeier (2001) consider a model of legislative bargaining where the agenda setter uses transfers to legislators to build legislative coalitions to pass policy measures. There is heterogeneity of legislators' preferences over policy, but agreement across legislators about the state of the world, which is common knowledge. Hence, though the allocation of transfers will depend, as in our model, on the suitability of the status quo to the state of the world, the assumption of full information means there is no need for the agenda setter to transmit information.

Evans (2004) presents a detailed study of the use of pork as “greasing the wheels” of the legislative process. There are however, at least to our knowledge, no formal models of this phenomenon looking at its welfare implications.

Battaglini and Coate (2008) present a model capturing the dependence of policy-making regimes on the state of the world, by extending the Baron and Ferejohn (1989) legislative bargaining framework to a dynamic setting. Depending on the social value of public goods and on the level of outstanding debt, which determines pre-existing claims on revenues, the economy may be in either of two “regimes”. In BAU (“business as usual”), the agenda setter distributes pork to members of the (minimum winning) coalition. In contrast, in RPM (“responsible policy making”), when the social value of public spending is high and/or debt is high, no pork is distributed to reflect the combination of high value of public good spending and low “discretionary” revenue.

RPM is not surprising if there is general agreement on the high social value of public goods, that is, general agreement on the existence and magnitude of a “crisis”. Similarly, general agreement on public goods expenditure in a time of acknowledged crisis is possible when legislators are homogeneous in their preferences over spending. That is, all agree there is a crisis, on its depth, and on what should be done. This is the assumption of Battaglini and Coate (2008): legislators are identical in their preferences, specifically having identical valuation of public goods expenditures in different states of nature; and they are equally informed and hence in agreement about the state of nature. Politics is entirely distributive, that is, determines who receives pork when there is agreement on politics as usual. Alternation of who has the spending power, combined with the possibility of adopting policy measures with less than unanimous legislative consent, leads to pork barrel spending in non-crisis times, but no pork in crises when spending on public goods is highly valued.<sup>3</sup>

As indicated in the introduction, we do not see such a simple dichotomy, where pork disappears in times when certain types of spending are agreed to have a high social value. This is no doubt due in part to such agreement being less common than the above paragraph suggests. Even considering a single economic policy, legislators differ in their beliefs about what the economic situation is, as well as which policies they consider optimal in specific

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<sup>3</sup>The central role of “minimum winning coalitions” in this line of research is sometimes contrasted with “universalism” in the provision of pork (see, for example, Weingast [1979]). We follow much of the literature in assuming MWCs in a legislative equilibrium and not addressing the phenomenon of super-majority coalitions.

situations.<sup>4</sup> In fact, as we will argue, the assumption of homogeneous legislators – both in their information and in their ideological preferences – is crucial for this dichotomy where pork is observed only when there is not “important” legislation to be passed. We will argue that once the useful but unrealistic assumption of identical legislators is dropped, the opposite is in fact true: pork or other distributive measures may be positively (rather than negatively) correlated with the social value of non-pork spending, as the quote from Neustadt suggests.

Our paper is related to the role of information in legislative organization, as in Gilligan and Krehbiel (1987) and Krehbiel (1991, 2004). This literature explores how existing legislative institutions and procedure may assist or hamper the transmission of information within a legislature, when certain legislators (such as committee members) are better informed. Our paper follows their assumption that agenda setters may be better informed than other legislators. Moreover, we show how legislative procedure (that leads to a distribution of bargaining power) affects both positive predictions and normative assessments of the role of pork barrel spending.

Finally, our paper is also related to Cukierman and Tommasi (1998a,1998b), in which the known ideological bias of the agenda setter, combined with asymmetric information, makes it impossible to adopt policy appropriate to the state of nature, if it coincides with the agenda-setter’s bias. We show that the addition of pork to the policy menu may make it possible to adopt such policy in this situation, that is, when an agenda setter is known to favor a policy independent of the state of nature. We return to this below. In this paper we explore the possibility that there are uses for pork other than bribing in which the agenda setter can transfer information by giving pork to other legislators and forgoing it herself. We hope that our theoretical work will inform future empirical explorations of the of role pork barrel spending as a communication device in legislatures.

## 3 Model

### 3.1 Set-up

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<sup>4</sup>Of course, this point is more general, since the “representative agent” assumption is an approximation. For many questions, this assumption, though not strictly true, can be justified because the basic results are not changed by adding the complication of heterogeneity.

Consider a legislature consisting of  $n$  districts. Each district  $i$  consists of a measure-one continuum of identical households with the following preferences over the consumption of private and public goods, and leisure:

$$u(c^i, l, g) = c^i - \frac{l^{\frac{1}{\varepsilon}+1}}{\varepsilon + 1} + (a^i + z) v(g),$$

where  $c^i$  and  $g$  are consumption of private and public goods, respectively, by an individual in district  $i$ ,  $l$  is the supply of labor,  $z + \alpha^i$  is a parameter that affects the marginal value of the public good to households and includes a term  $z$  that is identical across districts and another term  $\alpha^i$  that is idiosyncratic to the specific district. Districts may have one of three valuations for the public good,  $\alpha^i \in \{-\alpha, 0, \alpha\}$ , with  $\alpha > 0$ , representing right-leaning, centrist and left-leaning districts (where here “left” is defined as having a stronger preference towards the provision of public goods.) We discuss  $z$  in the next subsection.

Heterogeneity of legislator interests, due either to ideology or information about the implications of specific legislation, is crucial to the possible welfare-enhancing role of pork. As already indicated in section 2, when all legislators are identical in these respects, there is no need for pork to enable socially beneficial legislation to be passed. It can only be welfare reducing. However, it is not heterogeneity of legislator interests per se which leads pork to be welfare-improving by allowing legislation to be passed. When legislators have full information about the social welfare consequences of pork, we will show that “greasing the wheels” improves welfare only in very specific cases. Pork is often unnecessary to adopt beneficial legislation and its use often reduces welfare, consistent with simple conventional wisdom. In contrast, under asymmetric information about the effects of legislation, pork may be crucial for socially beneficial legislation to pass.

The household in district  $i$  maximizes utility over the following budget constraint:

$$c^i = (1 - \tau) l + s^i,$$

where  $\tau$  are labor taxes, the pre-tax wage is equal to unity, and  $s^i$  are transfers from the central government (pork). The households’ first order conditions give

$$l(\tau) = [\varepsilon(1 - \tau)]^\varepsilon, \tag{1}$$

which reflects the fact that distortionary taxes affect the supply of labor. (Though  $\varepsilon$  is literally the elasticity of labor supply, it primarily governs the extent to which taxes are distortionary, and could be interpreted more generally as the inefficiency inherent in the tax system.) Thus households' indirect utility over taxes, public consumption, and transfers is:

$$U(s^i, \tau, g; \alpha^i, z) = \frac{\varepsilon^\varepsilon [(1 - \tau)]^{\varepsilon+1}}{\varepsilon + 1} + \zeta^i v(g) + s^i.$$

The first term is a combination of households' utility from consumption *net* of  $s^i$  (that is, from after-tax labor income) and from the disutility of labor  $l$ . Note that this is only a function of  $\tau$  and is identical across all individuals. We may write this indirect utility function as

$$U(s^i, \tau, g; \alpha^i, z) = \hat{u}(\tau) + \zeta^i v(g) + s^i, \quad (2)$$

where  $\hat{u}(\tau) (\equiv \frac{\varepsilon^\varepsilon (1-\tau)^{\varepsilon+1}}{\varepsilon+1})$  denotes the utility from leisure and labor-financed consumption.

Fiscal policy satisfies a balanced-budget constraint

$$R(\tau) = g + X + \sum_i s^i \quad (3)$$

where  $R(\tau)$  is government revenue as a function of  $\tau$  defined by

$$R(\tau) \equiv n\tau\varepsilon^\varepsilon (1 - \tau)^\varepsilon,$$

from  $R(\tau) = n\tau l(\tau)$  and  $l(\tau)$  given by (1).

$X$  represents pre-existing fiscal commitments which must be met (for example, debt service or non-discretionary public spending) and  $s^i \geq 0$ . We naturally assume that  $X < R(\tau^{\max})$ , where  $\tau^{\max} = \frac{1}{\varepsilon+1}$  is the revenue-maximizing tax rate. Any prior obligations exceeding this level would not be serviceable, and in a richer dynamic model, with non-defaultable debt, such levels of debt would violate the government's transversality condition.

For concreteness, we consider the case of three legislators ( $n = 3$ ) who differ in their preferences for public goods.<sup>5</sup> We consider in subsection sources of these differences, which will be crucial to assessing the welfare implications of pork in a legislative setting.

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<sup>5</sup>When there are more than three legislators, the basic arguments are the same, as long as no type of legislator is in the absolute majority and hence can pass legislation without forming a coalition with legislators having different preferences over the public good.

## 3.2 Information structure

We will explore two information structures, reflecting possible differences across legislators in their understanding about the consequences of specific legislation. First, we explore the case in which all legislators have complete information about the effect of legislation on all districts. This may be represented by assuming that the values of  $\alpha^i$  for all  $i$  and  $z$  are common knowledge.

We then turn to asymmetric information, where, consistent with the discussion in the introduction, the agenda setter has information or expertise that allows her to better understand the social welfare consequences of legislation in a state of the world. For tractability we represent this simply by assuming that while  $\alpha^i$  is common knowledge,  $z$  is known only to the proposer of legislation, the coalition “formateur”.<sup>6</sup>

More formally, we assume that  $z$  can take on one of two values  $z \in \{\underline{z}, \bar{z}\}$ . Under asymmetric information, legislators other than the coalition formateur have expectations based on a prior distribution, assigning probabilities  $p$  and  $1 - p$  respectively to the states  $\bar{z}$  and  $\underline{z}$ . We denote by  $z^e \equiv p\bar{z} + (1 - p)\underline{z}$  the expected value of  $z$  prior to the legislative round.

We further assume that  $\alpha > \bar{z} - \underline{z}$  to represent the problem faced by an agenda setter whose known ideological bias makes it difficult pass socially beneficial legislation. That is,  $\alpha + \underline{z} > \bar{z}$  (implying  $\tau^*(\underline{z} + \alpha, X) > \tau^*(\bar{z}, X)$ ), the formateur’s ideology is such that she prefers higher spending when the common value of public goods is low ( $z = \underline{z}$ ) than the centrist does even when the common value of public goods is high ( $z = \bar{z}$ ). Hence, if the centrist does not know the state of nature  $z$ , he doesn’t know whether the formateur’s proposed increase in taxes reflects a high social value of public goods or simply the formateur’s taste for public goods. The formateur can gain the centrist’s agreement to raise taxes above the status quo  $\tau^q$  if she can convince him the state is  $\bar{z}$  rather than  $\underline{z}$ , but her ideological preference for high spending presents her with a cheap talk problem.<sup>7</sup> It is this case that we want to study in

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<sup>6</sup>A more general formulation where the values of  $\alpha^i$  are also private information is also solvable, but provides no additional insights. The added complication in this case is that the coalition partner faces a signal extraction problem on observing the agenda setter’s legislative proposal. Using pork does not aid in resolving the signal-extraction problem, but does still allow signalling of the need for certain legislation.

<sup>7</sup>This is the Cukierman and Tommasi (1998) environment. There the ideological bias of (for example) a left-wing policymaker implied she wanted to change policy in her desired direction even if there was no change in the state of the world. She has no way of signalling that the changed state of the world calls for a leftward policy shift, so that she is unable to enact socially optimal policy. This is exactly the problem here where no pork is available. However, the addition of pork (or an additional policy dimension) may enable

considering the possible signaling role of pork.

To be clear, we are not arguing that agenda setters always have superior information about the consequences of legislation, nor that their motivation for passing legislation always reflects social welfare concerns rather than ideological bias. What we are saying is that when an agenda setter may face difficulties passing legislation she believes is socially optimal because of her perceived ideological bias, distribution of pork may be crucial to the passage of legislation in a way not present under full information. If in fact her perception of the social welfare consequences are correct, pork can be welfare-improving because it conveys such information. And, it is welfare-improving precisely for the reason that pork is condemned, namely, that it is a particularist benefit at the general expense.

### 3.3 Preferred no-pork policies and the status quo

Using (2) and (3) in the case of  $n = 3$ , we may denote the most preferred policy of any legislator in the *absence* of pork as

We may denote the most preferred policy of any legislator in the absence of pork as

$$\tau^*(\zeta, X) = \arg \max_{\tau} \{ \hat{u}(\tau) + \zeta v(R(\tau) - X) \}. \quad (4)$$

$\tau^*(\zeta, X)$  is the tax rate (which implies a level of public good provision) that would be chosen by a legislator with public-good preferences  $\zeta$ , who faces pre-existing fiscal obligations of  $X$  and is prohibited from distributing pork. We note that  $\tau^*(\zeta, X)$  is increasing in both  $\zeta$  and  $X$ .<sup>8</sup> This equation may be solved for

$$\zeta v_g(R(\tau^*(\zeta, X)) - X) = \mu(\tau^*(\zeta, X)). \quad (5)$$

That is, a legislator with preferences  $\zeta$  and who is constrained not to distribute pork will equate her marginal value of the public good  $\zeta v_g(g)$  to the marginal cost of raising a unit of tax revenues  $\mu(\tau)$ . This marginal cost (per legislator) is given by

$$\mu(\tau) \equiv -\frac{\hat{u}_{\tau}(\tau)}{R_{\tau}(\tau)} = \frac{1 - \tau}{3(1 - \tau - \varepsilon\tau)}.$$

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the left-winger to signal and enact optimal policy.

<sup>8</sup> $\tau^*(\zeta, X)$  solves  $v'(R(\tau^*(\zeta, X)) - X) \frac{1 - \tau^*(\zeta, X) - \varepsilon\tau^*(\zeta, X)}{1 - \tau^*(\zeta, X)} = \frac{1}{3\zeta}$ , which implies the above derivatives.

We further assume that the status quo policy is between those that would be socially optimal in states  $\bar{z}$  and  $\underline{z}$  in the absence of pork. That is, using (4), the status quo policy  $\tau^q$  satisfies

$$\tau^*(\bar{z}, X) > \tau^q > \tau^*(\underline{z}, X), \quad (6)$$

that is, it is between what a centrist (with  $\alpha^i = 0$ ) would prefer in states  $\bar{z}$  and  $\underline{z}$ .

Combining these results, the ranking of preferred policies in the *absence* of pork is

$$\tau^*(\bar{z} + \alpha, X) > \tau^*(\underline{z} + \alpha, X) > \tau^*(\bar{z}, X) > \tau^q > \tau^*(\underline{z}, X). \quad (7)$$

We further assume that  $X$  is sufficiently high that  $\mu(\tau^q) > \frac{1}{3}$ . We make this assumption because if  $\mu(\tau^q) < \frac{1}{3}$ , a social planner would increase the tax rate and distribute pork to some combination of the three districts.<sup>9</sup> Hence this assumption ensures that pork is not socially beneficial per se, that is, it ensures that pork is used only due to its political, coalition-building, or informational value.

### 3.4 Legislative Procedure

We assume an open-amendment procedure, where the coalition formateur, to use Baron and Ferejohn's (1998) term, induces one other legislator to form a proto-coalition. In what we will call the "*proposal round*", the formateur proposes legislation, which faces an up or down vote on the floor (among all legislators). If at least one other legislator votes in favor of the proposal, it is enacted into law and implemented. If the legislation does not pass, it moves to the "*amendment round*" in which the other member of the proto-coalition may propose any number of amended versions of the legislation. Each of these amended versions is simply a new proposal of tax, public good, and pork allocations, which is put up to a vote in the legislature. It passes if two or more legislators votes in favor, in which case the legislation is implemented.<sup>10</sup> If none of the amended proposals obtains the support of two legislators, a status quo policy is enacted. There is no discounting between the initial proposal and the amended counterproposal.

This bargaining protocol reflects an extreme of the distribution of bargaining power. The proposer of the amended legislation has the maximum bargaining power, subject to

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<sup>9</sup>The actual distribution is indeterminate due to the transferability of utility through pork.

<sup>10</sup>The order in which multiple counter-proposals are offered is immaterial to equilibrium outcomes in this model.

informational constraints. In an earlier version of this paper—available upon request—we solved for a closed-amendment procedure, reflecting the opposite extreme where the coalition formateur, as agenda setter, has the maximum bargaining power. The model delivered similar insights, but was less tractable, and the results were less stark than in this model.

### 3.5 Political equilibrium

Since we are especially interested in the problem faced by an agenda setter whose known ideological bias may make it difficult pass legislation she believes is socially beneficial (as discussed in subsection ?? above), we consider the case of a coalition formateur on one side of the ideological spectrum.<sup>11</sup> With three legislators, we assume without loss of generality, that the formateur is the most left-wing (the highest  $\zeta^i$ ). It is obvious that it is “cheapest” for a coalition formateur to build a proto-coalition with the legislator closest to her, that is, with the next highest  $\zeta^i$ , whom we call the “centrist”.<sup>12</sup> The coalition formateur therefore proposes a policy  $\{g, \tau, s^C, s^F\}$ , where  $s^C$  and  $s^F$  denote pork to the centrist and the leftist districts, respectively, satisfying

$$g + s^C + s^F \leq R(\tau) - X. \quad (8)$$

The model is solved via backward induction. If the centrist rejects the formateur’s initial proposal, we arrive at the amendment round, where the centrist makes a take-it-or-leave-it offer to the formateur. If the formateur rejects this counterproposal, the status-quo policy is implemented. Equilibrium in the amendment subgame is a feasible policy (one that satisfies (8)) that maximizes the centrist’s utility, while satisfying a participation constraint for the formateur ((10a) below) that ensures that she is no worse off in equilibrium than under the status quo. Formally,

$$U_{amend}^C \equiv \max_{g, \tau, s^F, s^C} \hat{u}(\tau) + zv(g) + s^C, \quad \text{subject to} \quad (9)$$

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<sup>11</sup>For ease of exposition, the formateur will be female, the independent legislator male.

<sup>12</sup>We do not model how the coalition formateur is chosen. She could be randomly chosen, with our analysis focusing on the information transmission problems when the formateur has a partisan bias. Studying a partisan formateur or agenda setter is of particular interest. When the formateur is a centrist, no informational problem exists, as her choice of coalition partner fully reveals the value of  $z$ .

$$\hat{u}(\tau) + (\alpha + z)v(g) + s^F \geq \hat{u}(\tau^q) + (\alpha + z)v(g^q), \quad (10a)$$

$$g + s^C + s^F \leq R(\tau) - X, \quad (10b)$$

$$s^C \geq 0, \quad (10c)$$

$$s^F \geq 0. \quad (10d)$$

The last two equations are non-negativity constraints on pork to the centrist and the formateur.  $\{\tau^q, g^q\}$  denotes the status quo policy, and we assume that the status quo allocates no pork to any legislator (i.e.,  $s^C = s^F = 0$  with  $g^q$  given by  $g^q = R(\tau^q) - X$ ). As the solution to this maximization problem is unique, the centrist has no reason to put more than one amended bill to a vote.

Anticipating the outcome of the amendment round, in the proposal round, the formateur makes the centrist a feasible offer that maximizes her utility and ensures the centrist's acquiescence. It is easy to see that the best the formateur can achieve in the proposal round is to propose the exact outcome that would obtain in the amendment round. She faces the same constraints faced by the centrist in the amendment round, in addition to the need to make the centrist no worse off than in the amendment round. The maximization problem in both cases maximizes joint surplus, and the participation constraint (10a) ensures that this surplus is split in the same way in both cases. Equilibrium is thus the outcome of the amendment subgame. The formateur is indifferent between proceeding to the amendment round, where she accepts this proposal, and making the proposal herself in the proposal round. In either case, equilibrium is characterized by the solution to equations (9) to (10d).

Denoting by  $\lambda$ ,  $\phi^F$ ,  $\xi^C$ , and  $\xi^F$  the multipliers on conditions (10a), (10b), (10c), and (10d) respectively, the first-order conditions may be written

$$[z + \phi^F(z + \alpha)]v_g(g) = \lambda \quad (11a)$$

$$(1 + \phi^F)\mu(\tau) = \lambda \quad (11b)$$

$$1 + \xi^C = \lambda \quad (11c)$$

$$\phi^F + \xi^F = \lambda. \quad (11d)$$

These specific conditions will be useful in understanding possible regimes in terms of which constraints

## 4 Full Information

We begin with the case of full information about the value that every legislator places on public goods. Does pork allow formation of coalitions to pass welfare-improving legislation that would not be possible in the absence of pork? This is the essence of the pragmatic conventional wisdom.

### 4.1 Policy when $z=\bar{z}$

#### 4.1.1 Political Equilibrium

When  $z = \bar{z}$ , both coalition members favor higher taxes to finance higher public expenditures. That is, the assumption that  $\tau^q$  lies below  $\tau^*(\bar{z}, X)$  implies the ranking

$$\mu(\tau^q) < \bar{z}v_g(R(\tau^q) - X) < (\bar{z} + \alpha)v_g(R(\tau^q) - X), \quad (12)$$

so that for both legislators, the marginal cost of taxation is lower than the marginal value of the public good, though more so for the formateur than the centrist. Hence, the two coalition members agree on the direction of change, but differ on how far they would increase taxes and spending.

There are three possible types of equilibria:

**RPM** ( $s^C = s^F = 0 \Rightarrow \xi^C, \xi^F > 0$ ) – For high enough levels of  $X$  (and hence few available revenues) all available tax revenues go to  $g$  with no pork being allocated. The tax rate is the centrist’s most preferred no-pork tax rate in state  $\bar{z}$ , namely  $\tau^*(\bar{z}, X)$  as defined by (4) for  $\zeta = \bar{z}$ , and public goods expenditure is  $R(\tau^*(\bar{z}, X)) - X$ . This policy leaves the formateur’s participation constraint (10a) slack (since  $\alpha > 0$ ), that is, he strictly prefers this allocation to the status quo. The marginal value of public spending (equal to the marginal cost of taxation) to the centrist is greater 1– his value of pork – so he chooses to forgo it. The lower is  $X$  in this region, the lower is  $\tau^*(\bar{z}, X)$  (and hence  $\mu(\tau^*(\bar{z}, X))$ ), while the higher is  $g$ .

**PBAU-C** ( $s^C > 0 \Rightarrow \xi^C = 0, s^F > 0$ ) – There is a level  $X^{PB}(\bar{z})$  such that

$$\bar{z}v_g(R(\tau^*(\bar{z}, X^{PB}(\bar{z}))) - X) = \mu(\tau^*(\bar{z}, X^{PB}(\bar{z}))) = 1,$$

so that the centrist would be indifferent between and pork, while the participation constraint of the formateur, who has a higher value of pork, is still slack. Denote by  $\tau^{PB}(\bar{z}) \equiv \tau^*(\bar{z}, X^{PB}(\bar{z}))$  this level of taxes.

For  $X < X^{PB}(\bar{z})$ , the centrist strictly prefers pork to  $g$ . As long as  $F$ 's participation constraint (10a) is slack,  $\tau = \tau^{PB}(\bar{z})$  and  $g = g^{PB}(\bar{z}) \equiv R(\tau^{PB}(\bar{z})) - X^{PB}(\bar{z})$  in this region, the difference being pork to the centrist, namely  $R(\tau^{PB}(\bar{z})) - g^{PB}(\bar{z}) - X = X^{PB}(\bar{z}) - X$ .

However, lower values of  $X$  imply lower values of  $\tau^q (= \tau^*(z, X))$ , so that for some  $X^{PB'}(\bar{z}) < X^{PB}(\bar{z})$ ,  $F$ 's participation constraint (10a) will bind. Initially, it will be satisfied by increases in  $g$  (which benefits both coalition members) and decreases in  $\tau$  (and hence  $\mu(\tau)$ ) rather than giving  $s^F$ .

**CBAU** ( $s^C, s^F > 0 \Rightarrow \xi^C = \xi^F = 0$ ) – There is an  $X^{CB}(\bar{z}) < X^{PB'}(\bar{z})$  such that  $(2z + \alpha)v_g(g) = 1$  and consistent with  $\phi^F = 1$ . (implying  $\mu(\tau) = \frac{1}{2}$ ) For values  $X \leq X^{CB}(\bar{z})$ ,  $g$  and  $\tau$  are given by

$$(2z + \alpha)v_g(g^{CB}(\bar{z})) = 1 \tag{13a}$$

$$2\mu(\tau^{CB}(\bar{z})) = 1 \tag{13b}$$

that is the marginal benefit of  $g$  to the coalition as a whole equals the marginal benefit of a unit of pork to the coalition and the marginal cost of taxes to the coalition as a whole equals the marginal benefit.

Note that as  $X$  falls,  $g$  rises and  $\tau$  falls weakly monotonically, i.e., there are parts of region 2 and all of region 3 where  $g$  and  $\tau$  are constant. A formal characterization of the equilibrium under the open-amendment procedure are given in the Appendix.

The possible equilibria may be illustrated graphically. The solid line in Figure 1 shows equilibrium  $\tau$  for different values of  $X$ . The dotted line shows  $\tau^*(\bar{z}, X)$  for values of  $X$  also below  $X^{PB}$ , that is when the political equilibrium includes pork. Figure shows the analogous values of  $g$ ,  $s^C$ , and  $s^F$  in the different regimes.

#### 4.1.2 Welfare

Figure 1: Taxes  $\tau$  when  $z = \bar{z}$

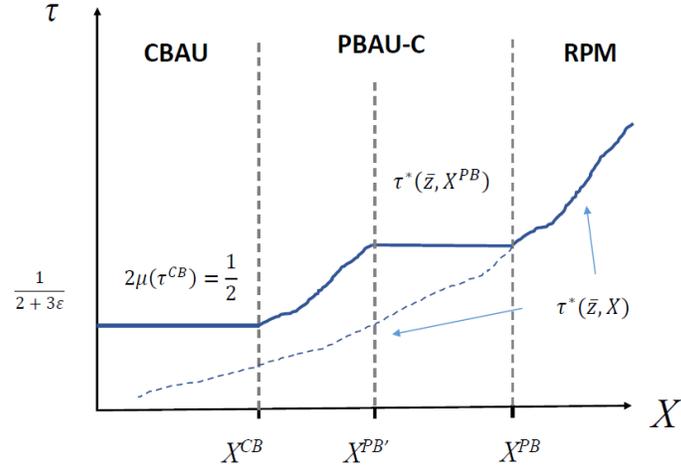
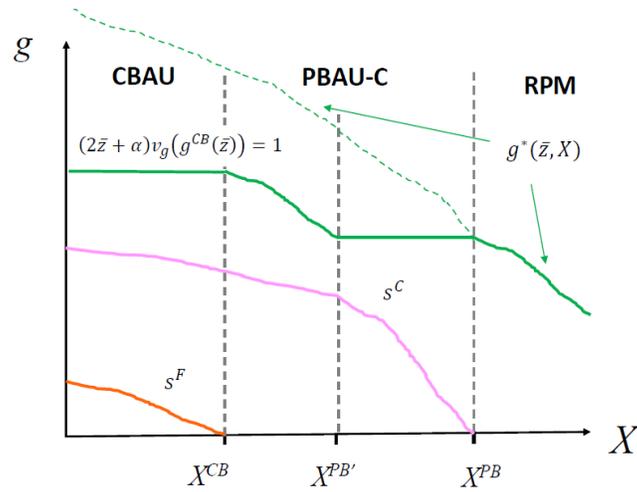


Figure 2: Public goods  $g$  and pork  $s^i$  when  $z = \bar{z}$



Since utility is transferable in  $s^i$ , the effect of allocation of pork depends on the effect on  $\tau$  and  $g$  in the political equilibrium. When  $z = \bar{z}$ , that is, when social welfare maximization requires an increase in  $\tau$  and  $g$  relative to the status quo, the availability of pork unambiguously lowers welfare. This may be seen simply as follows. If pork could not be distributed, the proposed policy would be that preferred by the centrist, namely,  $\tau^*(\bar{z}, X)$ , which would be accepted as it improves the welfare of both coalition members relative to the status quo  $g^q$ . This is the social optimum in state  $\bar{z}$ . When pork is available, this is the policy only if  $X$  is high enough so that legislators forgo pork. Otherwise, when pork is part of the legislative package,  $\tau$  will *not* equal  $\tau^*(\bar{z}, X)$ , so that social welfare will be unambiguously lower, as seen in Figure 1 where  $\tau^*(\bar{z}, X) < \tau$  for regimes other than RPM. Hence, pork is not only not needed to build a coalition, but actually worsens the response to the increase in the value of public goods.

## 4.2 Policy when $z=\underline{z}$

### 4.2.1 Political equilibrium

When  $z = \underline{z}$  and  $\alpha > 0$ , the formateur's preferred policy and the centrist's preferred policy – which is the socially optimal policy – are on opposite sides of the status quo policy. The formateur would prefer to raise  $\tau$  while the centrist prefers lowering  $\tau$ , consistent with the known  $\underline{z}$ . That is,

$$(\underline{z} + \alpha) v_g(R(\tau^q) - X) > \mu(\tau^q) > \underline{z} v_g(R(\tau^q) - X), \quad (14)$$

the first inequality reflecting the key assumption that  $\underline{z} + \alpha > \bar{z}$  combined with  $\tau^q$  being between  $\tau^*(\underline{z}, X)$  and  $\tau^*(\bar{z}, X)$ . If pork were restricted to be zero, the equilibrium would be no change in policy away from the status quo, as no policy other than  $\tau^q$  could be agreed upon by both legislators.

As in the  $\bar{z}$  case, there are three possible regimes, depending on the value of  $X$ . Two correspond to the regimes in section ?? (albeit with different critical values of  $X$  separating the regions). For high enough  $X$ , the equilibrium will be RPM, with all available revenues going to  $g$  and none to pork.

For low enough  $X$ , the equilibrium is CBAU with both coalition members receiving pork. Pork to the formateur is determined to satisfy her participation constraint (10a) and pork

to the centrist being the remainder of the budget (10b). The tax rate  $\tau^{CB}(\underline{z})$  is given by (13b) and public goods  $g^{CB}(\underline{z})$  by (13a) for  $z = \underline{z}$ . Combining these we may write

$$(2z + \alpha) v_g(g^{CB}(\underline{z})) = 2\mu(\tau^{CB}(\underline{z})),$$

or, using the condition (5) for preferred tax rates

$$\tau^{CB}(\underline{z}) = \tau^*\left(\underline{z} + \frac{\alpha}{2}, X\right)$$

For intermediate values of  $X$  only one of the coalition members gets pork (i.e., the regime is PBAU) as in section ??, but where it may be either centrist who gets pork ( $s^C > 0, s^F = 0 \Rightarrow \xi^C = 0, \xi^F > 0$ ) or formateur ( $s^C = 0, s^F > 0 \Rightarrow \xi^C > 0, \xi^F = 0$ ). Which regime obtains depends on the value of  $\tau^q$ . This value will also determine the welfare implications of allowing or restricting pork.

More specifically, consider  $\tau^*(\underline{z} + \frac{\alpha}{2}, X)$ . If  $\tau^q < \tau^*(\underline{z} + \frac{\alpha}{2}, X)$  it is only the centrist who receives pork and the first-order conditions (11) then imply that the cut-off value of  $X$  is defined implicitly by

$$\frac{(\underline{z} + \alpha) v_g(R(\tau^q) - X)}{1 - \underline{z} v_g(R(\tau^q) - X)} = \frac{\mu(\tau^q)}{1 - \mu(\tau^q)}. \quad (15)$$

This condition determines whether the opportunity cost of pork is low enough for policy compromise to arise, or whether RPM is equilibrium. That is, it indicates whether pork is valuable enough (relative to tax cuts and public good increases) to compensate the loser from the policy shift sufficiently to induce compromise.

Alternatively, if  $\tau^q > \tau^*(\underline{z} + \frac{\alpha}{2}, X)$ , it is only the formateur who receives pork and the first-order conditions (11) then imply that the cut-off value of  $X$  is defined implicitly by

$$\frac{\underline{z} v_g(g)}{1 - (\underline{z} + \alpha) v_g(g)} = \frac{\mu(\tau^q)}{1 - \mu(\tau^q)}, \quad (16)$$

with the interpretation the same as for (15) above.

Intuitively, if, for example,  $\tau^q < \tau^*(\underline{z} + \frac{\alpha}{2}, X)$ , – that is, the status quo is closer to the preferences of the centrist than those of the formateur – the coalition gains more surplus by shifting policy in favor of the formateur and compensating the centrist for this policy shift with pork. Conversely, if  $\tau^q > \tau^*(\underline{z} + \frac{\alpha}{2}, X)$ , so the status quo is closer to the preferences of

the centrist than those of the formateur, the opposite policy shift is optimal for the centrist.

A formal characterization of the equilibrium under the open-amendment procedure are given in the Appendix.

### 4.2.2 Welfare

As in the case where  $z = \bar{z}$ , welfare effects depend on how the availability of pork affects  $\tau$  (and hence  $g$ ) in political equilibrium. If pork were unavailable, no compromise can be reached and the political equilibrium policy would remain at  $\tau^q$ . Since the socially optimal policy is  $\tau^*(\underline{z}, X) < \tau^q$ , the social welfare question is therefore whether the availability of pork leads to a fall in  $\tau$ . Welfare is obviously unaffected by the availability of pork when the equilibrium is RPM, that is, when pork is not used.

In equilibria where pork is allocated, the discussion in the previous subsection makes clear that pork will increase welfare only when the political equilibrium policy  $\tau^*(\underline{z} + \frac{\alpha}{2}, X) < \tau^q$ . Hence, pork allows policy to move in the socially beneficial direction by “buying off” the formateur not to block the policy. The pragmatic conventional wisdom holds, but not because it allows the formateur to bring other legislators into the coalition, but because it allows other legislators “more in tune” with social welfare to bribe the formateur not to stand in the way.<sup>13</sup>

We summarize these results as

**Proposition 1** *With perfect information, availability of pork as a legislative instrument raises social welfare only if the agenda setter’s preferences and the socially optimal policy are on opposite sides of the status quo and, in that case, only if the status quo policy is closer to the formateur’s than the centrist’s preferences, that is, if  $\tau^q > \tau^*(\underline{z} + \frac{\alpha}{2}, X)$ .*

**Proof.** See Appendix. ■

Intuitively, if coalition members agree on the optimal direction of policy change under full information, pork is not needed to build a coalition to pass such legislation. If they disagree – for example if the formateur wants higher spending and the potential coalition member wants lower spending when the state is known – then pork is necessary to move away from the status quo policy. It allows a different policy to be adopted by compensating one the coalition partners to accept a policy towards the preferences of the other. This policy

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<sup>13</sup>The possibility of welfare-increasing pork under full information did not exist in Battaglini and Coate (2008) because all coalition members had the same preferences over  $g$ .

change will increase social welfare only if this movement is in the socially optimal direction. However, since coalition members choose policy to maximize their own district’s welfare, rather than social welfare, whether legislative agreement made possible by pork depends on the status quo policy. A change in policy is made possible by pork, but this need not be social welfare enhancing.

## 5 Asymmetric Information

We now ask whether the pragmatic conventional wisdom holds when there is asymmetric information about the value of legislation. Our key result is that pork may serve an important role in transmitting information about the value of legislation in given situations. By signaling the importance of legislation, the allocation of pork may therefore be more generally welfare improving.

For tractability we represent such asymmetric information by assuming that while  $\alpha^i$  is common knowledge,  $z$  is known only to the proposer of legislation, the coalition “formateur”.<sup>14</sup> More formally, we assume that  $z$  can take on one of two values  $z \in \{\underline{z}, \bar{z}\}$ . Under asymmetric information, legislators other than the coalition formateur have expectations based on a prior distribution, assigning probabilities  $p$  and  $1 - p$  respectively to the states  $\bar{z}$  and  $\underline{z}$ , where we assume that  $p < \frac{1}{2}$ . We denote by  $z^e \equiv p\bar{z} + (1 - p)\underline{z}$  the expected value of  $z$  prior to the legislative round.

As discussed in the introduction, we think of asymmetric information about the welfare value of legislation generally, referring not only to differences in information about the economic situation but also to differences in understanding of the what is optimal legislation in a given state. We begin with some examples of asymmetrically informed legislators. We note that observing pork in major legislative packages, such as TARP or health care as mentioned above, does not necessarily tell us whether it is being used to inform or to bribe legislators in order to get their support.

### 5.1 Empirical motivation

#### 5.1.1 Committee chairs

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<sup>14</sup>A more general formulation where the values of  $\alpha^i$  are also private information is also solvable, but provides no additional insights. The added complication in this case is that the coalition partner faces a signal extraction problem on observing the agenda setter’s legislative proposal. Using pork does not aid in resolving the signal-extraction problem, but does still allow signalling of the need for certain legislation.

A leading example of agenda setters being better informed about the effects of legislation is the case of standing committee chairs, for example in the U.S. House and Senate. Committee chairs (and to a lesser degree members) exhibit a higher level of expertise on topics covered by their committee due to self-selection into the committee, and through experience serving on the committee. The drafter of legislation probably gains additional information about the state of the economy relevant to the proposed bill in the process of drafting legislation. Moreover, committee chairs and other agenda setters are better informed about topics for which they propose legislation due to the increased intensity of lobbying by special interest groups (who themselves are well informed about the topics on which they lobby) towards these legislators.<sup>15</sup> The permanent committee system in the U.S. Senate means that “the committees assumed the prerogative of determining which substantive provisions the Senate should consider, and they became policy-making bodies instead of merely technical aids to the chamber. Whereas the Senate formerly set the agenda, the committees came to be, in effect the Senate’s “agenda-maker.”<sup>16</sup> The same is true, perhaps even more so, in the U.S. House of Representatives, since House committee members specialize more than those in the Senate. As Asher (1974) puts it, “congressmen accomplish their business largely by relying on the judgment of others.” See also Shepsle (1988) in this regard. In short, the organization and effective operation of Congress via the committee system means that those in positions of agenda-setting power on an issue are better informed and relied upon on that issue.

### 5.1.2 “Crises”

Although legislators may agree about the economy being in an extreme state, this doesn’t imply agreement about its legislative implications. Though there may be a common perception that there is a crisis which calls for a policy response, there will likely be disagreement among lawmakers about the causes, development, and magnitude of the crisis. Hence, in addition to any differences in preferred response due to ideological differences, lawmakers will likely disagree about the nature of the crisis and hence about the policy response. This was certainly the case for the 2008 financial crisis in the U.S. and the Bailout bill in September and October, over which debates continue. This was true in other countries as well. In Spain in 2008, for example, there were heated debates between the incumbent PSOE party, led by

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<sup>15</sup>See, for example, Ansolabehere, Snyder, and Tripathi (2002).

<sup>16</sup><http://www.senate.gov/artandhistory/history/common/briefing/Committees.htm>

Zapatero, and the opposition party PP, led by Rajoy, about the severity of the economic downturn.<sup>17</sup>

Another example concerns New York State. Though the state faced large budget shortfalls in the current economic downturn, “a lot of [state] legislators don’t feel the sense of emergency,” or, as one legislator put it, “it’s not clear that the sky is in fact falling”.<sup>18</sup> In contrast, Governor Patterson viewed the fiscal shortfall with such alarm that he proposed cuts in his own “pet projects”, it would appear to emphasize the severity of the budget situation.<sup>19</sup> This obviously points to heterogeneous beliefs about the magnitude of the State’s budget crisis among state legislators, where the administration proposing budget cuts faces disagreement the how serious the problem really is. In this paper we explore the possibility that cuts in pet projects could be more than mere budgetary necessity, but also an attempt to signal information about the severity of the State’s fiscal standing.

## 5.2 Equilibrium under asymmetric information

Under asymmetric information, only the formateur knows the state  $z$  *ex ante*, representing superior information about the effects of legislation. A legislative proposal may thus be used to reveal the state. That is, the equilibrium can be either separating, in which the proposal would reveal the state, or pooling, in which it would not.

More specifically, in the amendment subgame under imperfect information, in a screening subgame equilibrium, the centrist would offer one policy that would only be accepted in the state  $\bar{z}$  and another that would be accepted in state  $\underline{z}$ . In a pooling subgame equilibrium, he makes a single counterproposal that would be accepted by the formateur, regardless of the state. Analogously, in the proposal round, there could be a separating equilibrium, in which the formateur proposes different legislation, thus signaling the actual state. In one state, the full information policy analyzed above is proposed and in the other the formateur’s choice of policy is distorted by the need to signal. In a pooling equilibrium, the formateur proposes the same legislation independent of the state and the centrist does not update his beliefs.

Formally, our equilibrium concept is Perfect Bayesian Equilibrium (PBE), where the

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<sup>17</sup>We are indebted to Monica Martinez-Bravo for bringing this to our attention. See for example, <http://www.libertaddigital.com/economia/zapatero-se-burla-del-congreso-con-un-discurso-triumfalista-en-plena-crisis-1276334002/>

<sup>18</sup><http://www.thisamericanlife.org/radio-archives/episode/410/social-contract> , minute 28.

<sup>19</sup>See for example [http://www.syracuse.com/news/index.ssf/2010/07/ny\\_gov\\_david\\_paterson\\_vetoes\\_p.html](http://www.syracuse.com/news/index.ssf/2010/07/ny_gov_david_paterson_vetoes_p.html), [http://www.syracuse.com/news/index.ssf/2010/12/report\\_gov\\_paterson\\_doled\\_167.html](http://www.syracuse.com/news/index.ssf/2010/12/report_gov_paterson_doled_167.html).

precise definition and conditions are given in the Appendix.

We begin by analyzing the case in which pork is exogenously restricted to zero and then turn to a characterization of equilibrium with pork.

### 5.3 Restricting pork

The unavailability of pork means that legislative bargaining is over  $g$  and  $\tau$ , alone, with  $s^C = s^F = 0$ . The budget constraint (10b) makes this is equivalent to a choice of a single policy instrument  $\tau$ .

From here on, we restrict our previous assumption on the status quo policy to the case where it is at the level that would be chosen by a social planner in the absence of information about the state, that is,

$$\tau^q = \tau^*(z^e, X). \quad (17)$$

This restriction serves two purposes. First, the optimality of  $\tau^q$  when no legislator knows the state means that our results on the social value of pork are not driven by extreme assumptions about the default policy. Second, we showed above that under full information, the pragmatic conventional wisdom holds only for very specific parameter configuration. Showing it holds under asymmetric information highlights the role of information asymmetries in making the argument for the possible welfare benefits of pork.

When pork is restricted to be zero, the only equilibrium is pooling at the status quo policy  $\tau^q = \tau^*(z^e; X)$ . Denoting the centrist's beliefs by  $\tilde{z}$ , beliefs of  $\tilde{z} = z^e$  would imply that the status quo policy  $\tau^q$  is already his optimal policy. This policy is acceptable to the formateur, regardless of  $z$ . Hence, this is the only pooling equilibrium.

Screening (or signaling in the proposal round) is impossible because without pork the separating IC constraints and the centrist's participation constraint cannot be simultaneously satisfied. Separation cannot be achieved by decreasing taxes and public goods, as any such change would violate the formateur's participation constraint. Separation requires screening for the state  $z = \bar{z}$  by increasing  $\tau$  and  $g$  more than would be acceptable to the formateur if  $z = \underline{z}$ . That is, the tax rate must be no less than  $\tau^*(\underline{z} + \alpha, X)$ . However, the centrist strictly prefers  $\tau^*(z^e; X)$  to  $\tau^*(\underline{z} + \alpha, X)$  (or any higher tax rate) *even if*  $\tilde{z} = \bar{z}$ . Hence, no proposal satisfies both the separation and the centrist's participation constraint and no separating PBE exists. We are left with pooling at  $\tau = \tau^q$ .

We summarize these results as

**Proposition 2** *If pork is exogenously restricted to zero, the unique PBE equilibrium is pooling at the status quo.*

**Proof.** Discussion in the text above. ■

As no separating PBE exists, the unique PBE is the pooling equilibrium where the formateur proposes the status quo regardless of the state of nature  $z$ . *Information transmission in the legislature is never possible in the absence of pork.* The joint task of signaling and coalition building are at odds with each other when pork is unavailable. In contrast, with pork, information transmission is almost always possible, as we show in the following section.

## 6 Pork As A Signal

We now show that under asymmetric information about the state, pork can and will be used to signal  $z$ , that is, a separating equilibrium is possible when pork is available. The appendix gives a full characterization of this separating equilibrium. Not only is signalling possible, but for all but the highest values of  $X$ , separation is the *only* equilibrium and no pooling equilibrium exists. Even when policy is RPM when  $z = \underline{z}$ , pork may be provided when  $z = \bar{z}$  because it is pork that allows policy to respond to the high value of public goods. Hence, pork is not antithetical to “responsible policy-making”, but integral to it. We summarize this main result as

**Proposition 3** *For any  $X$  such that*

$$\mu(\tau^q) < \frac{\underline{z} + \alpha - z^e}{\underline{z} + \alpha - \bar{z}}, \quad (18)$$

*a separating Perfect Bayesian Equilibrium exists in the asymmetric information game. There is a unique separating equilibrium and it always contains a positive amount of pork provided to at least one legislative district when  $z = \bar{z}$ .*

**Proof.** See Appendix. ■

Propositions 2 and 3 are the main positive results of our analysis.<sup>20</sup> The combination of an informed but very ideological formateur ( $\alpha > \bar{z} - \underline{z}$ ) and a true need for increased

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<sup>20</sup>These results hold under a closed-amendment procedure as well.

public expenditures ( $z = \bar{z}$ ) creates a signal extraction problem. When pork is unavailable, this problem is insurmountable and the formateur cannot credibly convey her superior information to coalition partners nor can the centrist screen for the state. (This is the basic Cukierman-Tommasi [1998] result.) However, the availability of pork can solve this information transmission problem: information transmission is always possible with pork for all by the highest levels of  $X$ . This is in stark contrast to the predictions of the full information model.

The separating equilibrium may be one where the full information allocations (inclusive of pork) for  $\bar{z}$  and  $\underline{z}$  are consistent with separation or (for other values of  $X$ ), the formateur in one state would play his full information allocation, while the formateur in the other state would distort his full information allocation just enough to satisfy the separation constraint. In all cases, what makes separation possible is that the formateur in state  $\bar{z}$  values public goods  $g$  more than in state  $\underline{z}$  (combined with the allocation of pork to satisfy participation constraints). The formal derivation of equilibrium is given in the Appendix, but the case of separation for high values of  $X$  (where the policy would be RPM under full information in both states  $\bar{z}$  and  $\underline{z}$ ) illustrates the nature of an equilibrium where the separation constraint is binding. Given the assumption of  $\alpha > \bar{z} - \underline{z}$ , the formateur prefers the full-information proposal for  $z = \bar{z}$  of  $\tau = \tau^*(\bar{z}, X)$  and  $g = R(\tau^*(\bar{z}, X)) - X$  to the status quo, regardless of the value of  $z$ . The policy under asymmetric information is RPM when  $z = \underline{z}$ , but the  $z = \bar{z}$  policy is distorted by costly screening—involving pork barrel spending—to prevent the formateur from accepting this policy when  $z = \underline{z}$ .

The equilibrium allocation is intuitively simple. When the state is  $z = \bar{z}$ , the policy is one of increased taxes  $\tau$ , but with only part of the increase in taxes going to an increase in (socially valuable) public goods expenditure  $g$ . The remainder goes to pork to the centrist, that is, to  $s^C$ . The increase in  $g$  financed by a greater tax distortion is such that this policy would be unacceptable to the formateur when  $z = \underline{z}$  (that is, when  $g$  has a lower value to her), who would prefer the full information policy if this were the state. It is crucial however that higher  $\tau$  be used in part to give pork to the (rather than the extra revenues going to  $g$ ,  $s^F$ , or simply being “burned”). While a sufficiently large increase in  $g$  and  $\tau$  would be unacceptable to the formateur in state  $\underline{z}$ , it would also be unacceptable to the centrist without pork, as shown in section 5.3 above. One might say that the formateur signals the value of policy to herself by forgoing pork.

Key to showing the existence of such a separating equilibrium is showing that such a budget feasible division exists that satisfies separation while at the same time inducing the centrist to join the coalition. We now turn to this.

## 6.1 Separating equilibrium – the basic argument

We prove the existence of a separating equilibrium by constructing such an equilibrium. Crucial to the argument is that the marginal tax increase goes neither entirely to higher  $g$  nor to pork, but is divided in such a way to make both the  $z = \bar{z}$  formateur and the centrist better off (the former to satisfy her participation constraint) but to leave the formateur no better off if  $z = \underline{z}$  (to satisfy the separation condition).

Consider levels of  $X$  that are high enough that the full-information equilibrium is at the status quo when  $z = \underline{z}$  (and at  $\tau = \tau^*(\bar{z}, X)$  when  $z = \bar{z}$ ). The natural candidate for a pooling equilibrium is pooling at the status quo.

Consider, however, a marginal deviation from the status quo where an infinitesimal increase (of unit measure) in tax revenues is used to finance a combination of higher public expenditure  $\Delta g$  and pork to the centrist of  $\Delta s^C = 1 - \Delta g$ , and such that

$$\Delta g = \frac{\mu(\tau^q)}{(\underline{z} + \alpha) v_g(g^q)} < 1. \quad (19)$$

In words, consider a fraction  $\Delta g$  of the tax increase such that the marginal cost of the increase in taxation is just equal to the marginal value of the increase in  $g$  to the formateur if  $z = \underline{z}$ . This is budget feasible since  $(\underline{z} + \alpha) v_g(g^q) > \mu(\tau^q)$  (the left-wing formateur supports an increase in public goods spending even when  $z = \underline{z}$ ).

This deviation is acceptable to the formateur when  $z = \bar{z}$ , as her utility changes by

$$\begin{aligned} & \Delta g (\bar{z} + \alpha) v_g(g^q) - \mu(\tau^q) \\ &= \mu(\tau^q) \left( \frac{\bar{z} + \alpha}{\underline{z} + \alpha} - 1 \right) > 0, \end{aligned}$$

This change in policy alone does not make the centrist better off, even when  $z = \bar{z}$ :

$$\begin{aligned} & \bar{z} v_g(g^q) \Delta g - \mu(\tau^q) \\ &= \mu(\tau^q) \left( \frac{\bar{z}}{\underline{z} + \alpha} - 1 \right) < 0, \end{aligned}$$

because  $\underline{z} + \alpha > \bar{z}$ . This was precisely the argument in Section 5.3: if ideology dominates economic conditions, signalling is not possible in the absence of pork.

But with the remaining tax revenues  $(1 - \Delta g)$  allocated as pork to the centrist the centrist is better off, if

$$\bar{z}v_g(g^q)\Delta g - \mu(\tau^q) + 1 - \Delta g \geq 0$$

or, using (19),

$$\frac{1 - \bar{z}v_g(g^q)}{(\underline{z} + \alpha)v_g(g^q)} \leq \frac{1 - \mu(\tau^q)}{\mu(\tau^q)}. \quad (20)$$

This inequality must hold whenever  $\mu(\tau^q) \leq 1$ , since  $\bar{z}v_g(g^q) > \mu(\tau^q)$  and  $(\underline{z} + \alpha)v_g(g^q) > \mu(\tau^q)$ . Referring back to the full information case, note that this includes parts of the state space where pork would not be provided for either value of  $z$  under full information. Here, pork is provided when  $z = \bar{z}$ , i.e. when the public good is most valuable, but not when  $z = \underline{z}$ .

Using the fact that  $z^e v_g(g^q) = \mu(\tau^q)$  to rewrite (20) gives (18) as a sufficient condition for the existence of a separating equilibrium involving pork.

As long as this condition holds, we can find a policy involving pork that is acceptable to the coalition if  $z = \bar{z}$  but would not be if  $z = \underline{z}$ , thus signaling the state.

The intuition of why pork allows a policy response when  $z = \bar{z}$ , a response that would not be possible if pork were outlawed, may be explained as follows. The combined task of signalling and coalition building requires aiding and hurting different legislators—and in different states of nature—differentially. As demonstrated above, if *few* enough of the tax resources are allocated to public good expenditure, only when  $z = \bar{z}$  would the formateur be willing to tolerate the cost of public funds required to finance them, hence signaling that  $z = \bar{z}$ . However, for this to be an equilibrium, the residual tax revenues cannot simply be “burned”, which points to the coalition-building aspect of pork. As was the case when pork was restricted, a tax-expenditure trade-off that is unacceptable to the formateur when  $z = \underline{z}$  will also be unacceptable to the centrist in either state of nature. Rather than disposing of the remaining tax revenues, the centrist extorts them as rents.

The popular view of pork is that it is wasteful because it sacrifices the common good for sectorial interests. But this is *precisely* what makes pork a potent information-transmission tool. The joint task of signalling and coalition building cannot be achieved with common-good instruments alone if different factions disagree on the nature of the common good. An

additional, discriminatory instrument is required, and pork is particularly suited for this task.

We note that this additional instrument need not be pork. Other policies (such as specific legislative details) that have differential effects both across legislative districts and across “states of nature” could potentially serve the same purpose. In equilibrium, the information constraints requires the formateur to suffer harm (differentially relative to the  $z = \underline{z}$  state), while the participation constraint requires making the centrist better off than he would be in status quo. Hence, redistribution is required both across districts and across states of nature. Policies that are usually viewed as inefficient may be required. Use of a policy that affects the “common good” would not work.

## 6.2 Illustration of “Kosher Pork”

The result that pork is allocated when  $z = \bar{z}$  under asymmetric information in cases where RPM holds in both states under full information may be better understood from Figure 3, showing points of indifference with the status quo and the (top, dark blue) budget line. It is particularly illustrative to choose a high value of  $X$ , at which both legislators prefer public goods to pork regardless of  $z$ . In the absence of a rent-seeking motivation, information revelation is the primary role for pork. The circle marker shows the status quo, which is also equilibrium when  $z = \underline{z}$ , as we are considering parameter values, for which the  $z = \underline{z}$  equilibrium is RPM.<sup>21</sup>

Screening for the state  $\bar{z}$  requires a policy that the formateur would accept when  $z = \bar{z}$ , but not when  $z = \underline{z}$ . Revealing the state thus requires policies that are below the (second solid line from top, green) indifference curve of the formateur when  $z = \underline{z}$ . This indifference curve is drawn under the assumption that the formateur gets no pork (an assumption that is confirmed in equilibrium). For any proposed tax rate, separating requires a level of public good that the formateur would not tolerate at that tax rate if  $z = \underline{z}$ .

The vertical distance between the budget constraint and the level of public good proposed will be given to the centrist in the form of pork  $s^C$ . The formateur does not receive pork, as it does not help separate her from the formateur when  $z = \underline{z}$ , and provides her with a lower marginal utility than that of public good provision. The lowest (solid red) curve is the indif-

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<sup>21</sup>Parameter values used to create this figure were chosen for clarity of illustration, rather than to match realistic values. They have been chosen, moreover, so that the  $z = \underline{z}$  equilibrium is RPM.

ference curve of the centrist when it has been revealed that  $z = \bar{z}$ , while taking into account that the centrist receives all residual pork. It thus represents the centrist's participation constraint in the coalition conditional on his having learned the state  $\bar{z}$ . As the centrist prefers public goods to pork, once he has learned that  $z = \bar{z}$ , the centrist's participation requires policies that are above his indifference curve. Feasible legislative outcomes—regardless of legislative procedure—are therefore points within the lens between the green and red curves—the informational constraint and the centrist's participation constraint—and which in addition fall above the formateur's participation constraint when  $z = \bar{z}$ . (This latter constraint is not shown to avoid cluttering the figure. Its inclusion restricts feasible legislative outcomes only in the lower part of the lens.) The essence of Proposition 3 is to show that this lens is a non-empty set, so that profitable deviations from the status quo that reveal the state  $z = \bar{z}$ , are feasible.

In the open-amendment procedure we study, the centrist obtains all surplus. Thus equilibrium is the feasible legislative outcome that maximizes the centrist's utility. This point—illustrated with a square—is the point of tangency between the informational constraint and an indifference curve for the centrist. The (upper, red) dotted line represents the relevant indifference curve. Finally, an additional (lower, black) dotted line signifies points of indifference relative to the status quo for the average district, when  $z = \bar{z}$ . All points above this line represent higher social welfare compared to the status quo, when  $z = \bar{z}$ . As can be seen, an equilibrium involving pork is welfare improving.

Information transmission is costly. Under full information, when  $z = \bar{z}$ , equilibrium would be at  $\tau^*(\bar{z}, X)$ . This is the preferred pork-free policy of the centrist, which would occur at a point of tangency between the budget constraint and an indifference curve of the centrist. Given the high level of pre-existing fiscal commitments  $X$ , this policy is superior in a Pareto sense to the asymmetric information equilibrium. With asymmetric information, pork requires higher taxes and lower public good provision. Pork is costly, but necessary for information transmission and legislative change, and therefore socially valuable.

It is worth noting the importance of legislative procedure for this result. An open-amendment procedure gives maximal bargaining power to the centrist, whose policy preferences (not including pork) are identical to those of the average district. To take the opposite extreme, consider a closed-amendment procedure, which gives maximal bargaining power to the (partisan) formateur. Feasible legislation when  $z = \bar{z}$  is as described above, but

equilibrium is now the feasible policy that gives the formateur the highest utility. As the  $z = \bar{z}$  formateur’s indifference curve cannot be made tangent to the informational constraint (they must have different slopes at any given point, as the formateur obtains no pork in either state, and has different trade-offs between taxation and public spending depending on  $z$ ), equilibrium is at the intersection between the informational constraint and the centrist’s participation constraint—on the far right hand side of Figure 3. With a closed-amendment procedure, legislation involves very little pork in this example (equilibrium is very close to the pork-free budget constraint). Nevertheless, equilibrium is slightly below the welfare indifference curve, and pork is welfare reducing. How does one reconcile a lower allocation of pork (in a closed- relative to an open-amendment procedure) with lower social welfare. The answer lies in the fact that the partisan formateur uses the bargaining power bestowed upon her by the closed-amendment procedure to extract rents in terms of policy, rather than pork. Pork allows political compromise through information transmission. The formateur proposes legislation as close as possible to her (partisan) policy preferences that the centrist would accept—aided by some pork to sweeten the deal. But as the centrist’s preferences are

$$\hat{u}(\tau) + \bar{z}v(g) + s^C$$

and those of the average district, when  $s^\alpha = 0$  are

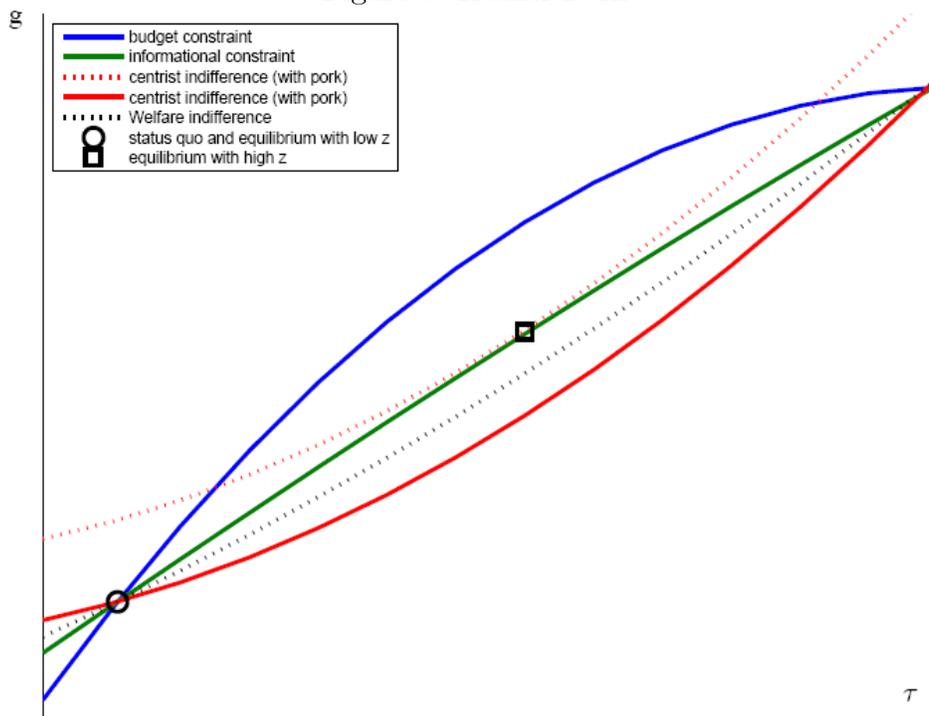
$$\hat{u}(\tau) + \bar{z}v(g) + \frac{s^C}{3},$$

the centrist’s binding participation constraint means that the average district is worse off, relative to the status quo. Ultimately, welfare-improving pork requires legislative procedure that gives sufficient bargaining power to “moderate” (in the sense of close-to-average) legislators.

## 7 Welfare-Improving Pork

The previous section demonstrated how pork may improve social welfare under certain conditions. We now try to ascertain whether such conditions are likely to arise in reality. To address this question, we solve the model computationally and calculate social welfare with and without the availability of pork.

Figure 3: Kosher Pork



We present here the computational solution with standard functional forms and parameter values from the existing literature. We chose the logarithmic form for the  $v(g)$  function. We set  $\varepsilon = 1.7$ , an elasticity commonly used in macroeconomic models (see for example Greenwood, Hercowitz, and Huffman, 1988).

The remaining variables  $\bar{z}$ ,  $\underline{z}$ ,  $p$  and  $\alpha$  relate to fiscal policy and political economy and were chosen as follows. The sum of US Federal government expenditures on public consumption plus investment never exceeded 17% percent of GDP in the post-war era. As  $g^{CB}(\bar{z})$  is an upper bound on public good provision in the model, we fix parameters so that  $g^{CB}(\bar{z})$  comprises 17% of GDP. Consistent with our view of  $\bar{z}$  being (relatively rare) times of crisis, we look for large shocks to public spending in the post-war data. Specifically, we look for years when the ratio of public purchases to GDP jumped by two standard deviations or more. This occurred six times or 9% of the years in the sample. We therefore choose  $p = 0.09$  and set the gap between  $\bar{z}$  and  $\underline{z}$  to match the magnitude such a 2-standard-deviation event (an increase of 2 percentage points in the ratio of government purchases to GDP.) Experimenting

with various values of  $p$  or of the gap  $\bar{z} - \underline{z}$  did not affect our results qualitatively.<sup>22</sup>

Finally, our model assumptions require  $\alpha > \bar{z} - \underline{z}$ . With no clear way to pin down quantitatively the degree of political polarization on fiscal issues we present solutions to the model with  $\alpha = 1.5(\bar{z} - \underline{z})$ , but results are similar for other values of  $\alpha$ . Exploring a range of parameter values led to results that were qualitatively similar. In addition, we note that the parametrization allows comparison with quantitative work in Azzimonti, et al's (2008) analysis of a full-information model of pork barrel spending: our choice of parameter values is roughly in line with the values arising from their calibration.

Results are shown in Figures 4 to 6. We solved the model for a range of  $X$  values, shown along the x-axis in all figures as a percentage of government revenues. "Reasonable" values of  $X$  depend on ones interpretation of this variable. Many political economy models of the determinants of fiscal policy consider only discretionary spending. With this assumption,  $X$  can be interpreted as debt service, which doesn't typically exceed 20% of revenues in industrialized countries.<sup>23</sup> A broader interpretation of  $X$  might include non-discretionary public spending, in which case its value may be much higher, often exceeding half of all revenues. For the sake of completeness, we show the entire range of  $X$  values from 0 to nearly 100% of revenues.

Figures 4 and 5 show how fiscal policy changes as increasing shares of revenues are pre-committed (higher values of  $X$  to total revenues). Solid lines in the figures reflect outcomes when  $z = \underline{z}$  and dashed lines reflect outcomes when  $z = \bar{z}$ . Not surprisingly, as seen in Figure 4, tax rates increase (left panel) and government spending declines as  $X$  increases. As expected, public goods are higher, and therefore tax revenues are lower, when  $z = \bar{z}$ .

Figure 5 shows, however, that pork barrel spending responds non-monotonically to changes in both fiscal commitments  $X$  and the value of public goods  $z$ . At low levels of  $X$  (below 10% of total revenues in the figure) the economy is in Complete BAU for both values of  $z$ . Accordingly, pork barrel spending is high (exceeding 2% of GDP), but lower when  $z = \bar{z}$  (less than 0.5% of GDP).

As  $X$  increases, the nature of pork barrel spending changes qualitatively. At higher

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<sup>22</sup>We experimented with a gap between  $\bar{z}$  and  $\underline{z}$  that range from those that deliver government spending to gdp gap between the two regimes of 1/100 of a percent to 10%. On  $p$  we experimented with values ranging from 1% to 50%.

<sup>23</sup> $X$  should not be interpreted as total debt, as there is no need to repay the entire stock of debt from revenues of a single period.

Figure 4: Taxes (left) and public goods (right) as a percentage of GDP

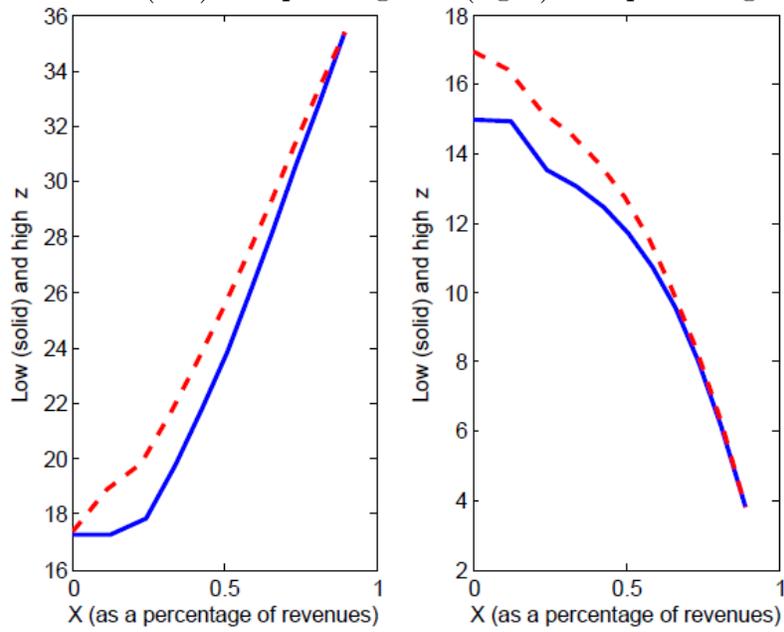
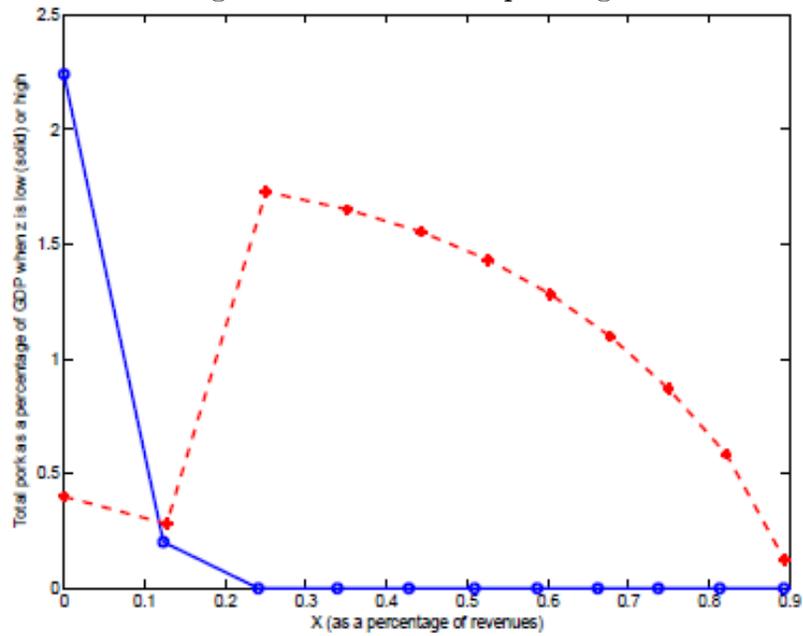


Figure 5: Pork Barrel Spending



levels of  $X$  (approximately 20% of tax revenues or higher) the economy would be in Partial BAU or RPM under full information. In the displayed imperfect information case, however, signalling the state  $z$  requires an RPM policy when  $z = \underline{z}$  and a Partial BAU policy when  $z = \bar{z}$ , as in the analysis of the previous section. Pork is not provided when  $z = \underline{z}$ , but rather when  $z = \bar{z}$  (ranging from 0% to 1.5% of GDP). Pork is increasing in the demand for public goods in this range and non-monotonic in pre-existing fiscal commitments.

When  $X$  is very large such that condition (18) is violated, we are in RPM regardless of the value of  $z$ . As Figure 5 shows, however, this occurs only at very high levels of  $X$ , when non-discretionary fiscal commitments consume almost the entire budget. Condition (18) holds and pork is used as part of the policy process, in all but the most extreme cases of fiscal duress. Pork’s informational role is central to this result: Under full information, the economy would be in RPM once  $X$  exceeds 60% of revenues with the same parameter values, regardless of the value of  $z$ .<sup>24</sup>

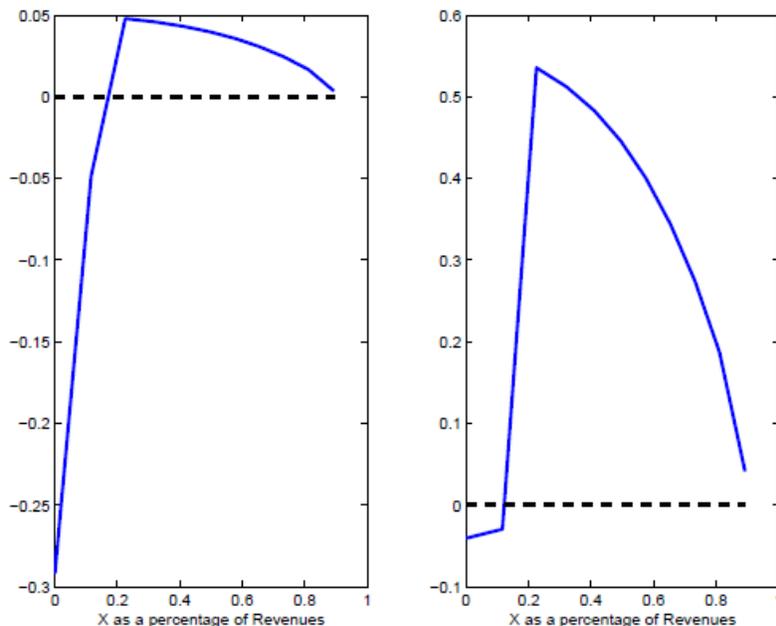
How does the availability of pork in the legislative process affect social welfare? The answer from our computational solutions is shown in Figure 6. Its left-hand side panel displays the difference between *expected* social welfare when pork is allowed and when pork is exogenously restricted to zero. The right-hand side panel shows the social welfare value of pork when  $z = \bar{z}$ . In both cases, welfare is measured as the consumption households would be willing to forgo to allow pork to be used in the legislative process, percentage of GDP. For low values of  $X$ , the economy is in complete BAU. While pork plays a signalling role in this case, pork consumes a large portion of fiscal resources, making its costs outweigh its benefits. As  $X$  increases, however, pork barrel spending is used primarily for informational, rather than rent-seeking purposes. Pork allows the centrist to learn when the state is  $z = \bar{z}$  and to agree to higher public spending in this case. Information would not be revealed without pork, and policy would be sub-optimal. Welfare is therefore higher when pork is allowed for higher values of  $X$ .

As  $X$  increases further, the social value of pork diminishes. As  $X$  takes on an increasing share of revenues, the difference between public good provision in the two states of the world decreases; this can be seen in Figure 4. The value of “getting policy right” becomes smaller

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<sup>24</sup>With homogenous agents, RPM occurs at far lower values, when  $X$  exceeds 20% of revenues. With heterogeneous agents, the economy is in Partial BAU when the ratio of  $X$  to revenues is in the 20% to 60% range.

Figure 6: Social value of pork as a percent of GDP in expectation (left) and when  $z$  is high (right)



and so the social value of pork as a tool for information transmission declines. At the limit as  $X$  exhausts all fiscal resources, the difference between optimal public good provision for the two states of the world approaches zero. The value of signalling goes to zero and eventually legislators no longer choose to use pork to inform the centrist. This explains why there exists an upper bound on  $X$ , given implicitly by (18), above which pork is no longer distributed in equilibrium. As we have noted, however, this bound is reached only when non-discretionary fiscal commitments exhaust almost all tax revenues.

Pork is “kosher” for a large range of  $X$ . Its expected welfare value is typically small, however, never exceeding 0.05% of GDP in the parameterization we have chosen. But as can be seen from the right-hand side panel of the figure, focusing attention on the state  $z = \bar{z}$ , the social value of pork is rather large, exceeding 0.5% of GDP. The difference between the two panels is due to the fact that  $z = \bar{z}$  occurs less than 10% of the time. Obviously, higher values of  $p$  would lead to higher expected values of pork.

In this section, we demonstrate that pork might play a socially beneficial role for reasonably chosen parameter values. The social value of pork does, however, depend on economic conditions—higher when debt (or other non-discretionary fiscal commitments) are large. From

a positive perspective, our model implies non-trivial effects of the value of public goods and the magnitude of debt on pork barrel spending. At low levels of debt, pork barrel spending is higher when the demand for public goods is low, as previous research has suggested. But at higher levels of debt, this relationship may be reversed, with more pork barrel spending when public goods are most valuable. While the overall relationship between public debt and pork barrel spending is negative, this relationship, too, is not monotonic.

## 8 Conclusions

Pork-barrel spending is generally viewed as “politics as usual” with lawmakers choosing to make expenditures to benefit their constituents at the general expense and to be distinguished from “responsible policy making” when public goods have high value. In this paper we have re-examined this view when all legislators are not equally informed and differ in the value they assign to public spending in the current economic situation. We argued that once one considers legislators who are heterogeneous both in ideology and their information about the economic situation, allocation of pork may serve a function in the legislative process of enabling the formation of coalitions to pass legislation appropriate to the situation.

Pork “greases the wheels” of the legislative process, but does this not by bribing legislators to accept legislation they view as harmful, but by conveying information about the state of the world and hence the value of policy change. We showed that it may be impossible to convey such information if signaling must be done via policies that affect welfare directly. Hence, conceptually, we think it is incorrect to argue that pork is simply “politics as usual” that is a sign of the absence of responsible policy-making. As we argued in the previous section, pork is not antithetical to “responsible policy making” but in fact may be crucial to policy being able to respond to a high valuation of the public good.

More generally, our results suggest that if signaling the value of policy change is important, it may better to use changes in policy that has no direct social benefit to convey information and build coalitions rather than using changes in policy with direct social benefits. Or, a leader may want to signal the importance she assigns to larger policy goals (for example, energy independence) by forgoing her preferred policy on smaller goals (for example, by allowing offshore oil drilling in specific areas).

Our arguments are in line other work in political economy arguing that specific political

institutions may be useful in conveying information. This may explain complex procedures, for example, standing committees and restrictive amendment procedures, as in Gilligan and Krehbiel (1987). As in the case of pork, information transmission may be important in an otherwise reviled practice, for example, special interest lobbies who have superior information about the effect of policies.

What should a reader take away from the paper? We think the general message is three-fold. First, in analyzing how legislatures operate, assuming homogeneous legislators may be reasonable for some questions but not others. This is more than the argument that heterogeneity is the *sine qua non* of political economy (Drazen, 2000); this is well recognized. It is the argument that the nature of heterogeneity may be crucial in analyzing political phenomena and especially how legislatures operate. Second, and more specifically, since coalition-building among legislators with different preferences is crucial to passing legislation, the allocation of pork or “favors” will play a role in the process. This too is recognized. Our addition is to show that this role may be for better-informed legislative leaders to convince less-informed legislators of the need for policy changes. Third, and most generally, our paper presents yet another example of pitfalls in using representative agent models.

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[Appendix to be added]