A Bargaining Theory of Inefficient Redistribution Policies*

Allan Drazen†  Nuno Limão‡

This Draft: June 18, 2006

Abstract

When two policies are available to achieve the same goal why is the relatively inefficient one often observed? We address this question in the context of policies used to redistribute income towards special interest groups (SIGs) in a two-stage model. In the first stage the set of constraints on policy instruments is chosen. In the second stage the government and SIGs bargain over the level of the available transfer policies. Restrictions on the use of efficient policies and the use of inefficient ones reduce the surplus over which SIGs and governments can bargain. There is however an offsetting effect not generally recognized in models of inefficient redistribution: an improvement in the government’s bargaining position, which allows it to capture a larger share of the surplus. We show that this positive effect for the government dominates under plausible conditions. Inefficient policies are the equilibrium outcome under alternative first-stage mechanisms for policy selection such as the election of policymakers or, in some cases, bargaining between SIGs and the government.

**JEL classification:** D7; F13; C70; H23.

**Keywords:** inefficient transfers, lobbies, special interests, representative democracy.

---

*We thank Stephanie Aaronson, Daron Acemoglu, David Austen-Smith, Elhanan Helpman, Helen Milner, Peter Murrell, Robert Schwab and seminar participants at Harvard’s Political Institutions and Economic Policy Conference (December 2003), Syracuse University and University of Maryland for useful comments. The usual disclaimer applies.

†University of Maryland, NBER, and CEPR. I wish to thank the Jack and Lisa Yael Chair in Comparative Economics, Tel Aviv University for financial support. Email: drazen@econ.umd.edu

‡University of Maryland and CEPR. Email: Limao@wam.umd.edu.
1 Introduction

Policy analysis often focuses on a single policy instrument and provides positive and normative predictions about its level in the context of a specific model. However, the question of whether the specific policy would actually be the one used by the government to achieve that specific aim is generally ignored. This is a key question because frequently there are more efficient policies available for the same purpose.\(^1\) Models that fail to explain why apparently more efficient polices are not used are incomplete and likely to generate incorrect predictions.

In this paper we address the policy-choice question in the context of an important specific case—the use of inefficient policies to redistribute income. In particular, we ask why do governments redistribute income towards different special interest groups (SIGs), via geographically targeted public projects, production subsidies, or tariffs when, in the absence of specific externalities, lump-sum payments would be more efficient? Despite how important and puzzling this question is, only a few papers, which we discuss below, attempt to address it. The puzzle is not that the transfers take place—after all most governments are not social welfare maximizers—but that they are done in a way that reduces the surplus that governments and SIGs can bargain over.

Two key elements must be explicit if a model is to predict which policies are used: how the set of policies is chosen; and the preferences of all agents who influence that choice. For example, in our model if identical citizens could directly determine the rules or institutions governing transfers the outcome would be simple: no transfers would be allowed. However, direct democracy is an uncommon method of choosing rules or institutions. In fact, as North (1994, p. 360) puts it, “Institutions are not necessarily or even usually created to be socially efficient; rather they, or at least the formal rules, are created to serve the interests of those with the bargaining power to create new rules.”\(^2\) This implies that self-interested politicians or governments play a key role in determining the available policies and so we focus on a theory that highlights their incentive to restrict efficient policies and use inefficient ones.

We model policymaking as a two-stage process. In the first stage the set of constraints on policy instruments is chosen. This corresponds to a “constitutional” stage in which the rules of policymaking

---

\(^1\)For example, in reviewing the literature on the political economy of trade policy Rodrik (1995) states: “Of course trade policy is not the only, or even the most important, mechanism of redistribution used by governments. But practically all governments apparently use it for that purpose. A sufficiently general and convincing explanation for this phenomenon has yet to be formulated” (p.1476).

\(^2\)Beard (1913), is a classic reference on how the writing of the U.S. Constitution reflected the economic interests of the framers rather than an abstract notion of social welfare.
are decided.\textsuperscript{3} We consider two first-stage choice mechanisms: one is to allow each SIG to bargain with the government over the existence of restrictions on the redistribution policy; the other is a representative democracy where there is a general election for a policymaker who then chooses the set of restrictions (if any) in the first stage. Transfers are costly to the government. So, in the second stage the incumbent government bargains with the SIGs over the level of the available transfer policies that it provides in exchange for “lobby goods”.

We provide the conditions under which a government benefits from having restrictions on efficient transfers and using inefficient ones in addition to, or instead of, the efficient ones. Constraining the use of efficient transfer policies reduces the overall surplus that the SIGs and government can bargain over, which leaves both worse off. This is a well known effect and the source of the aforementioned puzzle. However, what has not been previously explored in explaining the use of inefficient transfer policies is that the switch can also increase the government’s share of any available surplus, that is, it can improve its bargaining position. This is the key effect behind the use of inefficient policies in our model.

By carefully modelling the interaction between the government and SIGs we can identify the causes for the improvement in the bargaining position. There are two necessary conditions for this improvement. First, the government must have some (but not all) bargaining power during the second stage negotiations with SIGs. Second, utility between them must not be transferable, otherwise any reduction in the total surplus would leave both worse off since they could exchange utility at a constant rate. As we will argue these two conditions are likely in practice, even though they are often ignored in theory for tractability reasons, as we point out in the literature section. When they are satisfied the type of transfer policy determines not only the available surplus but the rate at which it can be transferred across the parties. More specifically, a given increase in the SIG’s payoff is costlier to the government when it cannot be achieved through the more efficient transfer policy. This generates an improvement in the government’s bargaining position since it allows it to credibly offer a smaller transfer for any given level of the lobby good; that is, ex-ante restrictions on the use of the efficient transfer improve the government’s political terms-of-trade.

The interesting question then becomes whether the improvement in bargaining position we identify ever dominates the loss of surplus effect thus improving the government’s welfare. We show this occurs

\textsuperscript{3}Positive constitutional analysis often uses a two-stage analysis, where the first stage seeks to explain why one constitution rather than another is adopted, often through competition among groups who recognize how a constitution will later affect their interests. See, for example, Buchanan and Tullock, (1962) or Beard (1913). In our paper the “constitutional” stage can also be interpreted as, for example, a stage where a country can enter into an international treaty or one in which voters choose between policymakers who will themselves choose the rules and constraints.
when the government can choose any binding cap on the efficient transfer policy in the first stage. In the second stage, when such restrictions are in place, some relatively less efficient transfer policy is used instead of, or in addition to, the more efficient one. Hence, our model can explain not only why governments may use inefficient policies, but also why different policies aimed at achieving the same goal may co-exist.

The model also provides an interesting prediction about the government’s optimal redistribution policy when it is restricted to use only one policy. In this case we show that the improvement in bargaining position dominates when the government is relatively weak since when the SIG has most of the bargaining power it also bears most of the loss in surplus from switching to the inefficient policy.

We then consider alternative first-stage institutions and ask which ones yield restrictions on efficient transfers and the use of inefficient ones. A natural benchmark is to allow the government to choose the set of available policies. In this case, it chooses to restrict the use of efficient policies under the conditions described above. We are also interested in deriving predictions when the other affected parties play an active role in the first stage. When governments and SIGs bargain in the first stage we show that the outcome is still a binding cap on efficient policies and the use of inefficient ones if the government’s bargaining power is higher in the first stage than in the second. We argue that this condition is plausible but not universally satisfied, which suggests an interesting testable prediction.

Finally, we analyze the outcome under a general election for policymakers that, once elected, can choose restrictions on transfers and then bargain with SIGs in the second stage. We show that transfers occur in equilibrium and generally involve inefficient policies. This occurs even though voters are rational, fully-informed and vote solely on the basis of the effect of the redistribution policy. The sharp contrast of this outcome under representative democracy with the outcome under a direct democracy, where we show that generally all transfers are prohibited, further highlights the importance of considering the self-interested policymaker.

In this paper the only role of economic policy is to redistribute income towards SIGs. However, the basic insight that the government faces a trade off between the improvement in bargaining position and the reduction in bargaining surplus applies to any pair of policies that can be ranked according to their transfer efficiency. This includes models where one of the policies can address an economic externality (as we discuss in our working paper). Thus it would be interesting to apply our insight to other policy models and analyze how normative and positive predictions are affected once we allow
for the policy set itself to be endogenous.

The paper is organized as follows. In the remainder of this section, we discuss the literature and some examples of restrictions on redistributive instruments and of commitment mechanisms that can make them credible. In section 2 we set up the model. In section 3 we show under what conditions the government gains from restricting the efficient transfer and using the inefficient one. In section 4 we model alternative first-stage policy choice mechanisms and derive the equilibrium policy under each. In the final section we summarize our results. All proofs are in the appendix.

1.1 Literature

Two arguments stand out in explaining the use of relatively inefficient policies to redistribute income towards SIGs. One is the “disguised” transfer argument put forward by Tullock (1983). When a policy is not ostensibly aimed at redistribution, those who bear the costs may be ignorant of the redistribution and thus less likely to oppose it if the policy also has some social benefit. Coate and Morris (1995) elegantly formalize this idea and clarify when exactly it works. A “bad” politician—one who values social welfare and the utility of the SIG directly—chooses the inefficient transfer (a project that benefits the SIG) instead of a lump-sum transfer, and may be elected if there is asymmetric information relative to the voters about the value of the project and the aims of politicians. The key difference in our approach is that asymmetric information plays no role in the argument. We focus on a setting where the policies have no social benefit and show that inefficient transfers can arise even if voters are fully informed about this and about the government’s objectives. In fact, in our electoral framework, full information by voters about politicians may be seen as integral to inefficient policies being used in equilibrium. Although the “disguised” transfer argument is an appealing one, we believe that ours is an important complement to it because there are inefficient policies that are known to have no social welfare benefit beyond redistribution. Our model also delivers additional interesting predictions about the coexistence of policies and the effect of choice mechanisms other than elections on the adoption of inefficient policies.

Another argument is that inefficient policies make the redistribution process costlier and thus act like “sand in the wheels” of the redistributive process. This mechanism causes a reduction in the equilibrium amount of redistribution, which can explain why inefficient policies may be preferred from a social welfare perspective (Rodrik [1986], Wilson [1990], and Becker and Mulligan [2003]). However, these papers provide a normative rather than a positive theory of inefficient transfers since
they leave the government in the background and do not model the first stage of policymaking. In contrast, in our approach the government is an active player and self-interested agents choose or bargain over rules. Modelling the first-stage of policymaking allows us to provide a positive theory of inefficient transfers by showing when such policies are actually adopted. Moreover, in our model governments prefer the inefficient policies because they improve its bargaining position relative to SIGs, which is quite distinct from the “sand in the wheels” argument. In fact, in our model, the decrease in bargaining surplus from using the inefficient policy is costly for the government, so such policies are used in spite of acting like “sand in the wheels” not because of it.

Grossman and Helpman (1994) and Dixit, Grossman, and Helpman (1997) focus on bargaining between government and SIGs. Although their main focus is not on the choice of redistribution policy they do show that competition among SIGs for government transfers will imply that more distortionary instruments improve the outcome for SIGs. Like the papers discussed in the previous paragraph, in these there is no modelling of the crucial first-stage process. There are other key differences as well. Competition among lobbies is not the driving force in our model, so in our setting the SIGs generally prefer efficient policies whereas the government may prefer the opposite. Another key distinction is that two basic modelling assumptions in those papers—the SIGs have all the bargaining power; and, utility is transferable—actually imply that inefficient policies would not be adopted in our setting.

1.2 Some examples

Before presenting the formal model, we give a few examples of both restrictions on redistributive instruments and of commitment mechanisms that allow the government to make such restrictions credible. In considering these examples we should not be surprised if the public rhetoric used to justify them does not explicitly include one key reason: that limits on relatively efficient redistribution policies generally increase the policymakers’ payoff.

One example of caps on transfers is in agricultural policy. In the 1930's the U.S. federal government initiated an agricultural policy with the objective of providing income support to farmers. Historically the transfers have been based on a variety of price distorting policies such as price supports, production subsidies and trade policies. In 1996 the Freedom to Farm Act introduced direct

---

4 For example, in Becker and Mulligan (2003, pp. 305-6), “Government redistribution in this approach might be modeled as a two-staged “game,” where in the first stage tax and spending systems are chosen, while in the second stage, groups try to maximize their political surplus, taking these systems as given. A more complete analysis of the first-stage problem is beyond the scope of this paper...”
payments to farmers subject to annual caps and the 2002 Farm Security and Rural Investment Act
tightened some of the payment limits in the 1996 Act and included a cap on individual programs.
There is also a constraint on total expenditure on agriculture agreed to by the US in the context of
the World Trade Organization (see Westcott, Young, and Price [2002]).

Welfare payments in the US are often also subject to such limitations. For example TANF
(Temporary Assistance for Needy Families) entitles States to fixed bloc grants and was implemented
with a cap of $16.5 billion annually for 6 years. Another example is the Social Services Block Grant
Program that is also subject to a cap of $1,700 million in 2001.

A potentially credible way for a government to commit to limits in the use of redistribution policies
is to be bound by international agreements that are costly to break. The Stability and Growth Pact
that constrains European Union governments’ budget deficits and debt levels provides one example.
These constraints have been used to increase the government’s leverage in negotiations with domestic
SIGs as suggested by our model. In Portugal for example the government has used the Pact as a key
argument to limit wage increases in the public sector when negotiating with unions.\footnote{“Portugal
Chafes Under the Yoke of Austerity” Financial Times Sep 25, 2002. We are not arguing that this was
the main motive for countries to sign this agreement but to the extent that governments have used it in
this way it suggests it may have been one of the motives.}

Trade agreements provide another important example of commitment. The World Trade Orga-
nization allows countries to bind their tariffs at a ceiling level, under the threat of tariff retaliation if
that commitment is broken. Similarly regional trade agreements allow a country to commit to a limit
on its use of trade barriers. Our model provides a rationale for commitment via such international
agreements that is distinct from the usual one that appeals to time inconsistency problems.\footnote{See
for example Staiger and Tabellini (1987) and Maggi and Rodriguez-Clare (1998). In our approach the
 gain to the government from self-restraint is explained by the improvement in its bargaining position relative to the SIGs.}

Moreover, currently one of the main concerns in trade agreements is that as the limits on tariffs and other
basic measures of protection are set other, less efficient methods of redistribution, such as goods’
standards that discriminate against foreign products, are increasingly used. This is consistent with
the prediction of our model that once governments commit to a limit on a redistribution policy SIGs
find and pursue redistribution via relatively less efficient ones.

2 The Model

We illustrate our arguments in a model with no economic externalities such that the only role of
economic policy is to redistribute income towards SIGs. We do so both because many policies have
redistributive motives and because our argument is especially clear when applied to redistribution via lump-sum transfers versus less efficient redistribution policies, for example, production subsidies. We choose a basic economic framework similar to Grossman and Helpman (1994) in order to clearly contrast the results. However, the central insights also hold in more general environments, as will be clear below.

Each individual’s utility function is:

\[ u \equiv x_n + \sum_i u_i(x_i) \]  

(1)

where the subutility for good \( x_i \) is \( u_i \), which is twice differentiable and concave. The consumer price of each good, \( p_i \), is exogenously given, as in a small open economy without import restrictions that take world prices as given. The term \( x_n \) represents the consumption of the numeraire. The numeraire is produced using only labor with a marginal product normalized to unity, which implies the wage is equal to one.\(^7\) For given prices an individual who owns the specific factor used to produce \( i \) has income \( E_i \) and chooses consumption to maximize utility subject to a budget constraint, \( x_n + \sum_i p_i x_i \leq E_i \).

It is then straightforward to show that this constraint is satisfied with equality and indirect utility is the sum of income and consumer surplus, \( s(p) \).\(^8\)

The production of each good \( i \) exhibits constant returns in the two factors it uses: labor and a specific factor. Since the wage is unity the return to the specific factor depends only on the supplier price of the good, \( p^s_i \). The specific factor owner receives the quasi-rent \( \pi_i(p^s_i) \), i.e. revenue inclusive of any production subsidy minus labor costs, and thus equilibrium output is \( \pi'_i(p^s_i) \). In the absence of any government intervention we have \( p^s_i = p_i \).\(^9\)

To redistribute income to lobbies of specific factor owners in sector \( i \) the government may use combinations that include a lump-sum transfer, \( T_i \), or other types of transfer, which, for concreteness, we summarize by a unit production subsidy, \( t_i \).\(^9\) Transfers to lobbies are financed by lump-sum taxes charged on the voting population of \( N \) individuals. We allow for a unit collection cost of \( \beta \in (0, 1) \) and assume that the government balances its budget, so that a total transfer of \( \tau \) requires the government to collect \( \tau/(1 - \beta) \). Total transfers are given by \( \tau = \sum_i T_i + \sum_i t_i \pi'_i \).

---

\(^7\)This implicitly assumes the existence of a sufficiently large labor force in this country such that \( n \) is produced there and a fixed world price of \( n \) at unity.

\(^8\)An individuals’ demand for \( x_i \) is \( d_i(p_i) = u_i'(p_i)^{-1} \). Consumer surplus is \( s(p) = \sum_i u_i(d_i(p_i)) - p_i d_i(p_i) \).

\(^9\)Note that in a small open economy the consumer prices are determined by the world price so they are independent of the production subsidy. Production subsidies affect quantities produced and lower individuals’ income but this will only result in lower consumption of the numeraire.
An exogenously given set of sectors $L$ form lobbies\textsuperscript{10}; their gross welfare is:

$$W_i = l_i + \pi(p_i + t_i) + T_i + \alpha_i N[s(p) - \tau/(1 - \beta)N] \quad \text{if } i \in L$$

(2)

where $\alpha_i$ is the share of the voting population that owns factor $i$ and $l_i$ is their labor income. Each lobby can also use the numeraire to linearly produce some amount, $C_i$, of a good that it offers to the politician in exchange for an increase in a transfer in the form of $T_i$ or $t_i$. We assume that factor ownership in any one sector is sufficiently concentrated, i.e. $\alpha_i$ is sufficiently small, such that each SIG takes the size of the budget as given when bargaining over its own transfer. Thus the lobby maximizes its gross welfare net of its provision of lobby goods, which is given by:

$$V_i \equiv W_i - C_i$$

(3)

Social welfare is obtained by summing the indirect utility over individuals in and out of lobbies:

$$W \equiv l + \sum_i \pi(p_i + t_i) + \sum_i T_i - \tau/(1 - \beta) + Ns(p)$$

(4)

The policymaker’s preferences are represented by a weighted sum of social welfare and the lobby goods he receives in exchange for transfers:

$$G \equiv aW + \sum_{i \in L} \Psi_i(C_i)$$

(5)

We assume $a$ is positive but finite because our interest is on the role of a policymaker with preferences that are not identified with social welfare but reflect at least some social cost of the transfer made to the SIGs. However, the subsequent results showing the policymaker’s preference for restricting the efficient policies can be derived even if the cost to the policymaker arises from a source other than social welfare (e.g. if he incurs a direct cost to supply the policies to the SIGs such as paying a fraction of the taxes required to fund them).

If the SIGs could compensate the politician with the numeraire good, e.g. if any SIG could make unlimited cash contributions, and the politician valued these additively then utility would be transferable (as in Grossman and Helpman [1994]). As will be clear below, in that case any reduction in the bargaining surplus would always lower the utility of the politician and thus he would never

\textsuperscript{10}An interesting extension would be to allow for endogenous formation of lobbies, which is straightforward if we apply the insights from Mitra (1999).
choose to switch to inefficient policies. Therefore we assume that the lobby good is valued according to $\Psi_i(\cdot)$, which is strictly concave. In practice, the goods and services that politicians receive from different SIGs are not necessarily perfect substitutes, and politicians may well have diminishing marginal utility for various lobby goods and services. These include getting out the vote in a district where a lobby’s membership is concentrated; providing information about an issue; lending jets for campaigning or vacationing; etc. So we think the assumption is reasonable. Alternatively, we could model non-transferability by allowing $C_i$ to enter linearly in $G$ but requiring it to be produced by each lobby using the numeraire as the input into a diminishing returns production process.

Finally, by modelling lobby goods as additively separable in $G$ and assuming concentrated ownership (i.e., $\alpha_i \to 0$ for each $i$) we ensure no economic interaction among lobbies and thus are able to focus on their bilateral interaction with the government. Lobby competition is an interesting issue, but we want to look for important effects elsewhere. Concavity in each of the lobby goods is consistent with it being a “good” that can be supplied primarily by that lobby.$^{11}$

The timing is the following. In the first stage the restrictions on the use of policies are determined; we consider alternative mechanisms in sections 3 and 4. In the second stage the government and each of the lobbies bargain over a level of the lobby good and government transfers. We model the outcome in the second stage as the solution to a Nash bargaining problem, which can be interpreted as a bilateral game of alternating offers with an exogenous, constant risk of breakdown of negotiations in each round or if players discount the future (Binmore, Rubinstein, and Wolinsky [1986]). We do not specify the institutional structure, which might imply a game of alternating offers, but argue that the “give-and-take” that such a game is meant to represent is a key feature of the interaction of politicians and lobbyists.$^{12}$

3. Government Gains from Caps and the Use of Inefficient Policies

In this section we allow the government to unilaterally choose first-stage restrictions on the use of redistribution policies. This gives the government a determinant role, which is precisely what we want to highlight. In section 4 we examine the outcome under alternative choice mechanisms where SIGs and the citizens also play a key role in the first stage. We begin with a benchmark case where only lump-sum transfers are available and show that the government gains from setting a cap on them

$^{11}$Moreover, in several instances SIGs lobby for policies only in their own sector so the absence of lobby competition may be a plausible representation.

$^{12}$In our working paper, we show that proposition 1 also holds under the Kalai-Smorodinsky bargaining solution.
below the unconstrained solution. Once the mechanism is clear we introduce a production subsidy as the alternative, relatively inefficient, transfer and show when it will be used. We conclude by providing a general condition that allows one to determine the government’s preferred redistribution policy from any two policies that can be ranked in terms of their relative efficiency.

As we point out in the model section our assumptions allow us to focus on the interaction of the government and each SIG separately so in this section we drop the lobby subscript $i$.

3.1 Benchmark Case: The Government Caps Efficient Transfers

We begin with the case in which only lump-sum transfers are available.

3.1.1 Background — No constraints

As background, suppose first that the government set no constraint on the use of transfers. The bargaining solution is easy to calculate. Substituting (4) into (5) and maximizing the expression subject to the SIG receiving a given level of utility yields the first-order condition

$$\frac{G_T}{G_C} = \frac{V_T}{V_C}$$

(6)

where $G_T$, etc. are partial derivatives.$^{13}$ This is the contract curve, which uniquely determines the $C_i$ as we can see by using the definitions of $G$ and $V$ to rewrite (6) as

$$\Psi'(C_i) = \frac{a\beta}{1-\beta}$$

(7)

To determine the equilibrium level of the lump-sum transfer we must consider the division of the surplus that arises from the Nash bargaining solution, which may be represented by the solution to:

$$\begin{align*}
\max_{G \geq g^0, V \geq v^0} U &= (G - g^0)\gamma (V - v^0)^{1-\gamma} \\
\text{s.t.} & G = g^m - \frac{a\beta}{1-\beta} (V - v^0)
\end{align*}$$

(8)

where $v^0$ represents the SIG’s reservation utility, and $g^0$ the government’s reservation utility, corresponding to no bargaining so that $C$ and $T$ both equal to zero. The constraint in (8) represents the Pareto frontier in utilities $G$ and $V$. The government’s maximum attainable utility in the bargain is $g^m$, which is achieved when the SIGs utility is at its reservation level, $v^0$. Any increase in the

$^{13}$This interior solution exists if the marginal rate of substitution of lobby goods for transfers is lower for the government then the lobby at the origin, i.e. if lobbying is “politically efficient”. This is satisfied if $\Psi'(0) > a\beta/(1-\beta)$, which we assume holds.
interest group’s utility above \( v^0 \) requires a reduction in the government’s utility in the form of a lower transfer.

Since the marginal utility of the lump-sum transfer is constant for both, the unconstrained Pareto frontier is linear and the solution can be written as

\[
g^N - g^0 = \gamma (g^m - g^0) \quad ; \quad v^N - v^0 = (1 - \gamma) (v^m - v^0)
\]

(9)

The government receives a share of the bargaining surplus that is proportional to its bargaining power, \( \gamma \). Similarly for the lobby. It is then simple to solve for the level of the efficient transfer, \( T^N \).

This equilibrium is illustrated in Figure 1. The vertical axis denotes lobby goods to the politician, the horizontal axis represents transfers, \( T \), to the lobby. We use lower case to denote the values that the lobby and government utilities can take. So the line \( V = v^0 \) representing the lobby’s reservation utility is found by allowing the lobby to choose \( C \) to maximize \( V \) in (2) taking \( T \) as given. Similarly for the government’s reservation, \( g^0 \). The outcome with no bargaining yields \( C \) and \( T \) equal to zero so both \( v^0 \) and \( g^0 \) go through the origin. The lobby is indifferent between providing \( C \) to the government and receiving an efficient transfer of the same amount so the slope of \( V \) is unity (as is clear from (2) and (3) when \( \alpha \to 0 \)). Any movements towards the southeast leave the lobby better off. The government’s indifference curve is upward sloping because the negative effect of a transfer paid to the lobby (due to the cost of raising tax revenues) must be compensated by an increase in \( C \). The slope is increasing since \( \Psi(C) \) is concave. Movements to the northwest improve the government’s welfare. The segment \( g^m v^m \) represents the contract curve and it is horizontal because \( G \) and \( V \) are quasilinear in \( T \).

3.1.2 Caps on efficient transfers

We now allow the government to cap the efficient transfer in the first stage. No alternative transfer policies are yet available—an assumption which we relax in the next section. The government chooses a cap \( T^c \) in the first stage to maximize its objective function, \( G(T^{Nc}(T^c), C^{Nc}(T^c)) \) taking into account its effect on the second stage equilibrium values \( C^{Nc} \) and \( T^{Nc} \leq T^c \). Our objective is to show that there exists a cap that benefits the government, i.e. that the subgame perfect equilibrium level of the cap, \( T^c \), chosen by the government is lower than the unconstrained transfer, \( T^N \).

Solving backwards, suppose that the cap is given by \( T^c \) in Figure 2. The contract curve is now defined by the kinked segment \( g^{mc} v^{mc} \). Note that if the cap is not lower than \( T^0 \) then the government’s
maximum utility, \( g^m \), is still feasible as is \( v^0 \). But for the cap to be binding it must be strictly less than \( T^N \) and therefore the maximum utility for the lobby is \( v^{mc} \), which is lower than \( v^m \) as shown in Figure 2. If the equilibrium under the cap is at a point such as \( N^c \) in Figure 2, above \( G = g^N \), then we can see the government is better off. Proposition 1 shows under what conditions such caps exist and would therefore be selected by the government in the first stage.

**Proposition 1** (Government cap on efficient transfers)

*In the absence of alternative transfer policies to SIGs the government chooses a cap on the efficient transfer that is strictly binding at \((C^N, T^N)\) iff neither the government nor the SIG have all the bargaining power.*

The basic intuition is best understood if we recall that the Nash bargaining solution can be interpreted as the limit of an alternating offers game. By setting a binding cap the government credibly commits to transferring less than \( T^N \) in exchange for \( C^N \). This improves the government’s bargaining position and explains the resulting increase in its utility. That is, by constraining its supply of transfers that are to be traded for the lobby good the government improves its terms-of-trade.

This improvement in the government’s bargaining position can be illustrated in Figure 3 where we graph \( G \) against \( V \). The dashed straight line represents the Pareto frontier in the unconstrained case, with \( N \) as the respective solution. The constrained frontier coincides with the original one until the cap binds, after which point the lobby can only be made better off by offering less of \( C \). Reductions in \( C \) come at an increasing cost for the government given the concavity of \( \Psi(\cdot) \), hence the concave Pareto frontier. We refer to an increase in the steepness of the Pareto frontier as an improvement in the government’s bargaining position. Such an improvement is irrelevant if the government obtains all or none of the surplus but when \( \gamma \in (0, 1) \) the government can always find a binding cap that leaves it strictly better off, such a solution is illustrated by \( N^c \). In a model with transferable utility the slope of the Pareto frontier is constant and so a cap would not change the government’s bargaining position, it would only reduce the bargaining surplus and thus the government would not restrict \( T \).

The cap also raises social welfare, \( W \), because it reduces transfers and thus the taxes used to finance them (recall there is a unit cost of tax collection, \( \beta > 0 \)). Note however that Proposition 1 holds even if the cap had no effect on social welfare provided that the policymaker faced some cost of making transfers. To see this consider the case when \( \beta = 0 \) so that social welfare is independent of lump-sum transfers. If we now postulate \( G = \sum_i [\phi T_i + \Psi_i(C_i)] \) and \( \phi < 0 \) we still obtain Proposition 1 despite the fact that social welfare is unaffected by the cap.
Finally, Proposition 1 also makes clear the importance of allowing for a more general distribution of bargaining power between the government and SIGs. The strict gain for the government from setting a cap occurs only when $\gamma \in (0, 1)$. This is important because several leading political economy models focus on the extreme cases where the government has either no bargaining power (Grossman and Helpman [1994] and Dixit, Grossman, and Helpman [1997]) or all of it (see, for example the veto player model in Tsebelis [2002]).

3.2 Inefficient and Efficient Transfers

We now expand the policy space to allow for transfers that are not lump-sum. We show that if the government can determine policy restrictions in the first stage, then it continues to set a cap on the efficient transfer and, more importantly, the equilibrium will feature redistribution that uses the relatively inefficient policy.

Inefficient transfers to producers can occur via numerous instruments of industrial policy such as loan guarantees, tax breaks, unit production or export subsidies, price supports, etc. In practice, it is not possible for the government to anticipate and prohibit every possible form of inefficient transfer. Moreover, even in the absence of lobbying for transfers, a welfare maximizing government may want to use a production subsidy, for example, as a way to correct a production externality. Hence, a government may choose not to cap or outright prohibit the use of a production subsidy, even if it could commit to do so in the first stage.\textsuperscript{14} Therefore, either because the government cannot or does not want to prohibit all possible policies which have redistributive implications, it leaves itself open to credible offers of lobby goods in exchange for further transfers, which are potentially less efficient.\textsuperscript{15}

For concreteness, we consider the case of a production subsidy. We deliberately rule out any social benefit from the subsidy in the second stage so that if subsidies are used it is known that they are used for redistribution. This rules out any benefits for politicians to use them as disguised transfers.

When government and lobbies can gain from exchanging lobby goods for transfers, we may ask what does it mean to say a transfer policy is “inefficient”? And, how does it relate to any social welfare benefit (or lack of it) of the policy use? The following definition (and related Lemma 1 in the appendix) addresses these questions.

\textsuperscript{14} Evidence for this is found in the WTO agreement on subsidies, which rules out the use of production subsidies targeted at firms or industries but it allows subsidies aimed at correcting market failures, e.g. if they are aimed at education, infrastructure or R & D.

\textsuperscript{15} In our working paper, we address the case where the government can restrict both policies in the first stage. We show that it chooses a strictly positive cap for the inefficient transfer $t$ when it addresses a time-varying production externality. We also show that $t$ is used for redistribution even if in the second stage, when policies are implemented, there is no externality, i.e. even when $t$ is inefficient.
Definition: Policy $t$ is an inefficient transfer policy relative to $T$ iff there are no joint political gains from trade between the government and lobby by lowering $T$ and increasing $t$ above the social welfare maximizing level of $t \equiv t^{ext}$. That is $t^* = t^{ext}$ where $\{T^*, t^*\} \equiv \text{argmax}_{T,t}(G((.,\bar{C})+V((.,\bar{C})))$.

The social welfare maximizing value for $t$ is zero in the absence of externalities. This definition then requires that joint gains to the government and lobby are not possible from using $t$ as a transfer to partially replace $T$ for any given value of the transfer $\bar{C}$.

The timing of the two-stage game is the same as before. In the first stage, the government commits to a maximum level of the lump-sum transfer $T^c$ chosen to maximize its objective. In the second stage, the government and lobby bargain over the levels of $C$, $T$ and $t$ taking the cap as given. In the appendix we present a more formal definition of the equilibrium.

We start by analyzing the second stage, which is represented in Figure 4. The dashed line represents the Pareto frontier with no caps—identical to Figure 3 up to the point where the cap on $T$ is set because this policy is more efficient than $t$ and thus it will be the policy used until the cap binds. If no inefficient transfers took place after a cap was set then the Pareto frontier and solution would be exactly identical to the one in the benchmark case. However, the following proposition shows that is not the case.

**Proposition 2** *(Government cap on efficient transfers and use of inefficient transfers)*

In the political equilibrium, there is:

a. a cap on the efficient transfer, $T$, that is strictly binding iff neither the government nor the SIG have all the bargaining power; and

b. use of the relatively inefficient transfer policy, $t$.

According to this proposition if the government can cap the efficient policy it will do so even in the presence of alternative policies that are less efficient. The basic intuition is identical to Proposition 1: the cap allows the government to credibly commit to a lower offer. However, the presence of inefficient transfers introduces some additional complexity to the problem, which we now explain.

The result from Proposition 1 applies directly to part (a) of Proposition 2 once we show that the constrained Pareto frontier when $t$ can be used is concave, at least for small values of $t$. Intuitively this property of the frontier, denoted by the curve $g_{mc}v_{mc}$ in Figure 4, is due to the following. First, because the subsidy is inefficient relative to the lump-sum transfer the Pareto frontier when $t$ is used lies below the unconstrained frontier, marked by the dashed line. Second, the cap will never be so
low that the maximum government utility falls below $g''$ thus the constrained and unconstrained frontiers will coincide up to the point where the cap binds. Third, the relative inefficiency of $t$ disappears when $t$ is exactly zero and thus the slope of the two frontiers is identical at that point. So, for the constrained frontier to lie below the unconstrained one it must be steeper around the point where $t = 0$.\footnote{In the figure drawn we assume that the Pareto frontier when $T$ is capped and $t$ used is \textit{globally} concave. In the appendix to our working paper we show that a sufficient condition for this is for the contract curve in $C - t$ space to be downward sloping, which is assured if the production function is not too concave or convex. However, this global concavity condition is not necessary for proving Proposition 2.}

The second part of the proposition is less obvious. Why is the government setting a cap when it \textit{knows} that it will use the inefficient transfer policy in equilibrium? Why not simply relax the cap and replace $t$ with a similar value transfer using the efficient policy? Doesn’t that leave the lobby better off and thus willing to provide more lobby goods, which in turn would leave the government better off? This argument captures only the increase in the Pareto set from relaxing the cap. However, this will not cause an increase in government welfare because relaxing the cap worsens its bargaining position, as shown in Proposition 1. The inefficiency of the second transfer relative to the first partially “protects” the gain in the bargaining position and loosening the cap to avoid using the inefficient policy only erodes that gain.\footnote{As before, the cap on the efficient form of transfer will also increase social welfare if $C$ falls, since $G = aW + \Psi(C)$ rises. However, when the form of the inefficient transfer is a production subsidy per unit produced, it is theoretically possible that $C$ could rise, since the marginal benefit of $t$ to the lobby is $\pi'(p + t)$, which is increasing in $t$. To rule this out, we must ensure that the contract curve in $C, t$ space is always downward sloping. A sufficient condition for this is for the supply function $\pi'(p + t)$ not to be too concave or convex, as shown in our working paper.}

The equilibrium production subsidy is strictly positive and thus that policy is strictly less efficient than the lump-sum transfer. To understand this note that in the second stage with a binding cap on $T$ there would be joint gains to be made by exchanging higher $T$ for $C$ and, since at $t = 0$ the two transfer policies are equally efficient, $t$ will be used. As we noted above, graphically this implies that the slope of the constrained and unconstrained frontiers is identical at the point where the cap first binds, as we show in Figure 4. This condition is satisfied without requiring any further assumptions in the case of a production subsidy relative to a lump-sum transfer; we conjecture that would be true of other pairs of interesting policies, e.g. production subsidies and tariffs. However, the basic insight of Proposition 2 can be generalized to a case when we consider \textit{any} pair of policies that can be ranked in terms of efficiency, as we show in the following section.
3.3 The Government’s Optimal Redistribution Policy

Thus far we have allowed the government to set optimal caps on the relatively efficient policy. Doing so permitted us to clearly identify the government’s incentives and also to explain the coexistence of transfer policies. However, it may be easier for governments to rule out the use of a policy altogether than to commit to a positive cap (e.g. if the commitment device requires a third party to enforce it and there is imperfect information on the exact level of the policy but not on whether it is used). We therefore ask: Under what conditions would the government choose to forego the efficient transfer completely and instead use a less efficient transfer policy?

Below we refer to the policies as $T$ and $t$. However, the general condition we derive applies to any two policies that redistribute towards SIGs that can be ranked in terms of their relative efficiency in the way we previously defined. For example, we may be interested in comparing the lump-sum transfer to the production subsidy and subsequently the production subsidy to an import tariff. The condition we derive reflects the basic trade-off underlying Propositions 1 and 2—a switch to the inefficient policy causes a reduction in bargaining surplus but improves the government’s bargaining position. The difference is that now if a cap is chosen it must be zero, i.e., the policy is ruled out, and thus we are not assured that the government would always want to restrict the relatively efficient transfer. We show that this depends critically on the government’s bargaining power, $\gamma$.

In the first stage the government now chooses whether to use $T$ or $t$ as a transfer, where the chosen policy cannot be capped. In the second stage, the government bargains with the lobby. We could also allow the government to choose no transfer policy but it is simple to show that it would never strictly prefer this option since it yields only the reservation utility, $g^0$. Thus we focus on the choice between two policies. A government with bargaining power $\gamma$ chooses the inefficient policy if

$$G(T = 0, t^{Nt}(\gamma), C^{Nt}(\gamma)) > G(T = T^N(\gamma), t = 0, C^N)$$ (10)

Figure 5 illustrates why this condition may hold in the case of lump-sum transfers and some inefficient policy $t$. The line $g^{m,v^m}$ represents the Pareto frontier when the lump-sum is used. The curve $g^{mt,v^{mt}}$ represents the frontier when an inefficient policy $t$ is used, which is interior to $g^{m,v^m}$ because $t$ is inefficient. Suppose that a critical bargaining power, $\gamma^*$, exists at which the government is indifferent between the policies. This value is implicitly defined by

$$G(0, t^{Nt}(\gamma^*), C^{Nt}(\gamma^*)) = G(T^N(\gamma^*), 0, C^N)$$ (11)
We represent such an equilibrium in Figure 5 by the points $N(\gamma = \gamma^*)$ and $N^t(\gamma = \gamma^*)$ for $T$ and $t$ respectively. We can then define a weak government as one with a low bargaining power, $\gamma \in (0, \gamma^*)$. What we show next is that if $\gamma^*$ exists then a weak government chooses the inefficient policy since it yields a higher payoff, as shown by the equilibrium labelled $N^t(\gamma < \gamma^*)$ relative to $N(\gamma < \gamma^*)$. To understand why consider Figure 6 where we graph the government’s maximized utility against $\gamma$. When $\gamma = 0$ the government receives its reservation utility, which is identical under $T$ and $t$. But when the government has all the bargaining power it always chooses $T$ since this is the policy that maximizes surplus, which the government fully appropriates when $\gamma = 1$. Therefore, if at $\gamma = 0$ the government’s marginal gain from an increase in $\gamma$ is higher under $t$ than $T$ then (10) is satisfied for sufficiently low $\gamma$ since the government’s maximized objective is continuous in $\gamma$. So, a sufficient condition for the government to choose the inefficient policy when $\gamma$ is sufficiently low is

$$\lim_{\gamma \to 0} \frac{d}{d\gamma} G(0, t^{Nt}(\gamma), C^{Nt}(\gamma)) > \lim_{\gamma \to 0} \frac{d}{d\gamma} G(T^{N}(\gamma), 0, C^N)$$ (12)

When this condition holds there must exist at least one critical point $\gamma^* \in (0, 1)$ such that the government is indifferent between the policies. To interpret this condition we define the Pareto frontier when a policy $x = T$ or $t$ is used as $V^x - v^0 = \Omega^x(G^x - g^0)$. So the slope of the frontier in Figure 5 is $1/\Omega^x$. As we show in the appendix when we solve and simplify (12) we obtain

$$\lim_{\gamma \to 0} \frac{(1/\Omega^t)/(1/\Omega^T)}{(1/\Omega^T)/\Omega^t} > \lim_{\gamma \to 0} \frac{\Omega^T/\Omega^t}{\Omega^T/\Omega^t}$$ (13)

As we argued before the slope of the Pareto frontier captures the bargaining position. So it is natural to define the ratio of those slopes on the left-hand side of (13) as the improvement in the government’s bargaining position from using the inefficient policy. The ratio of the lobby’s utilities on the right side can then be interpreted as the reduction in bargaining surplus from using the inefficient policy. We are now ready to state the following proposition.

**Proposition 3** (Government choice of inefficient policy as the unique form of transfer)

a. Given a discrete choice a weak government prefers a relatively inefficient transfer policy in bargaining with SIGs if the resulting improvement in the government’s bargaining position exceeds the

---

18 Given that $g^N$ is linear in $\gamma$, as seen in (9), we could check that when $\gamma^*$ exists it is unique by confirming whether $g^{Nt}$ is strictly concave for the particular policy $t$ considered. In general if there are multiple $\gamma^*$ we can simply take the minimum of them when (12) holds to show that when $\gamma \in (0, \gamma^*)$ the government chooses $t$.

19 For example, when only lump-sum transfers are used, $\Omega^x(\gamma) = -\frac{1-\beta}{\alpha\beta}(G - g^0) + v^m - v^0$. 

---

17
reduction in bargaining surplus.

b. Moreover, there are strong enough governments ($\gamma \in (\gamma^*, 1]$) that always choose the relatively efficient transfer policy.

The second part of the proposition is straightforward: the bargaining surplus is higher under the relatively efficient transfer. Thus a strong enough government, i.e. one with a high $\gamma$, prefers it since it can appropriate most of that surplus. This is clearly illustrated in Figures 5 and 6. In other words, if the government has most of the bargaining power, the reduction in total surplus from using $t$ is the more important effect since it is appropriating a large share of it. Conversely, if the government is weak, i.e. has low bargaining power, it is likely to gain from switching to an inefficient policy because it is not obtaining much of the surplus and thus the improvement in bargaining position is the dominant consideration.

To better understand the sufficient condition in part (a) of the proposition, consider Figure 5. A critical value $\gamma^*$ exists if we can take a line through $g^m$ that is tangent to the Pareto frontier for $t$. Using a reasoning similar to that in the proof of Proposition 1 the solution under $T$ or $t$, at $N(\gamma = \gamma^*)$ and $N^t(\gamma = \gamma^*)$ respectively, will then entail the same utility for the government. Keeping all else constant we can see that if the surplus under $t$, $\Omega^t$, is sufficiently small then the point $v^{mt}$ would be close to $v^0$ and no such tangent would exist. A similar argument can be made to show the importance of the steepness of the Pareto frontier in ensuring that $\gamma^*$ exists. Consider now a weak government that obtains $g^N(\gamma < \gamma^*)$ under the efficient transfer. Evaluating the slope of the concave Pareto frontier for the inefficient policy at that point, $A$, we can see that it is steeper than the slope of the dotted line through $g^m$ and $A$. So the government payoff is higher under $t$ when $\gamma \in (0, \gamma^*)$.

In general the existence of a $\gamma^*$ that satisfies (11) must be checked for specific pairs of policies. The simulation in the appendix shows that the condition is satisfied for the policies we use to illustrate the results of the model—lump-sum transfers versus production subsidies—when the marginal benefit of lobby goods to the politician falls sufficiently fast. This condition requiring $\Psi$ to be sufficiently concave should be key in determining if the condition holds for other pairs of policies as well.

We can use Proposition 3 to determine the government’s optimal transfer policy as a function of $\gamma$ when it has more than two alternatives. For example, we can first compare the production subsidy to the lump-sum transfer; if we find the production subsidy is chosen for $\gamma \in (0, \gamma^*)$, we can subsequently compare the production subsidy with a tariff. For any set of redistributive policies that can be efficiency ranked, we could find the range of $\gamma$ for which each of them is the government’s
preferred policy.

Proposition 3 also contains an interesting testable prediction. The use of inefficient policies should be more prevalent when the government is weak, i.e. has low bargaining power. This can be tested across countries, or within a country if we can rank a government’s bargaining power versus different SIGs.

4 Alternative First-Stage Choice Mechanisms

Up to now, we have assumed that the government can unilaterally choose the cap on the efficient policy, or, in the binary case, the redistribution policy itself. In this section we consider two alternative choice mechanisms of policy restrictions. First, we suppose that citizens elect the policymaker who then determines the rules in the first stage and subsequently bargains with the lobbies. Second, we allow individual SIGs to bargain with the incumbent government in the first stage over which policy will be used and in the second stage over the level of the policy and lobby goods. Considering alternative choice mechanisms shows that use of inefficient policy may arise as an equilibrium outcome even when the politician does not choose them unilaterally. Moreover, and perhaps more importantly, contrasting the implications of citizens’ choosing policies directly versus their choosing policymakers in an electoral framework highlights the importance of modeling the government as a distinct actor in predicting the use of inefficient policies in equilibrium.

4.1 Representative versus direct democracy

We first consider the case in which policymakers are elected and then contrast it to the case where voters choose the policy framework directly. The setup for the election of policymakers is simple. Voting is costless (and sincere in a two-candidate election), with a voter’s choices depending only on the known fixed characteristics of the candidates. Potential policymakers differ only in their given and known bargaining power since this is a determining feature for the equilibrium use of inefficient policies. If elected the policymaker chooses the policy restrictions in the first stage that maximize his objective function given by equation (5). The bargaining power of a given policymaker

\footnote{Since the voters in our model are rational and have full information they are not “impressionable”. That is they cannot be persuaded to vote for someone by campaigning and so contributions are not useful in electing politicians, the justification for politicians valuing contributions in Grossman and Helpman (1996). This is compatible with the interpretation of $C_i$ as lobby goods valued by a politician in office, independently of elections, rather than representing cash contributions for campaigning.}
is identical relative to all SIGs and the same in both stages.\textsuperscript{21}

There are three groups of voters with potentially different voting preferences: organized owners of capital \(i \in L\), unorganized owners of capital, \(j\), and workers. Since consumer prices are given the latter two groups are affected by the transfers only through the tax burden imposed to pay for them, which is on a per capita basis. Therefore workers and unorganized owners have identical preferences over policy outcomes and thus over politicians: they choose the politician who implements the policy with the minimum tax burden. The preferences of organized factor owners are more complex, as will become clear below, but that is irrelevant for the initial result, namely that in a representative democracy there will be transfers and these will involve inefficient policies except in extreme cases.

**Proposition 4** (Use of inefficient redistribution policies in a representative democracy)

When the politician who bargains with SIGs in the second stage is elected and can choose to restrict all transfer policies, the efficient one, or neither in the first stage

\begin{enumerate}
\item a. there will always be transfers in equilibrium;
\item b. the equilibrium use of inefficient policies is independent of the fraction of population organized into SIGs if the two candidates are either not extreme, \(\gamma \in (0,1)\), in which case inefficient policies always arise, or extreme, \(\gamma = \{0,1\}\), in which case inefficient policies never arise.
\end{enumerate}

This result can be interpreted as a corollary to Proposition 2 that highlights two points. First, delegation to a policymaker ensures the existence of transfers to SIGs. Second, the equilibrium use of inefficient policies is assured if the set of relevant candidates are not extreme in their ability to bargain with SIGs (that is, \(\gamma \in (0,1)\)), which seems the most likely case. Note further that this result is independent of the composition of the voters and, in fact, of the choice mechanism for this set of politicians. If there were instead candidates that had the extreme of either no bargaining power or all the bargaining power—as is assumed either explicitly or implicitly in much of the work that studies the interaction of SIGs with politicians—the equilibrium would not feature inefficient policies.

The crucial role of a policymaker can be emphasized by considering a direct democracy, that is, where the first stage choice of policies is subject to direct vote. If the policy rules allow for transfers then a random incumbent politician will bargain over their level with the SIG subject to whatever restrictions have been imposed. To compare the outcome with the one in the last proposition, suppose the vote is over the same alternatives: to restrict all transfers, none, or only the efficient one. The

\textsuperscript{21} Differences between politicians in their bargaining power with SIGs may reflect their political experience, their position within their party or outside the party (or the strength of the party itself), or simply personal characteristics.
outcome under direct democracy will generally be quite different from the one under a representative democracy, as the next proposition shows.

Proposition 5 (Absence of transfers in direct democracy)
Suppose there is a direct vote on whether to restrict transfers followed by a second stage where an incumbent politician and SIGs bargain over the level of the (available) transfer policies. There will be no transfers under any incumbent politician ($\gamma \in [0, 1]$) if either
a. the majority of voters is not organized into SIGs (i.e. $\sum_{i \in L} \alpha_i < 0.5$) or
b. a sufficiently large share of voters is organized into identical SIGs (i.e. $\sum_{i \in L} \alpha_i > \tilde{\alpha}(\beta) \in [0, 1]$)

The first part of the proposition is straightforward: unorganized voters do not benefit from redistribution to SIGs and thus vote to prohibit transfers. Since this type of voter is likely to be in the majority, the contrast with the outcome under representative democracy is quite relevant.

The mechanism behind the second part of the proposition is perhaps less obvious: members of SIGs may also vote against transfers in the first stage. This can occur since these voters will take account of the tax burden on themselves caused by transfers to all SIGs. Voters from SIGs that believe they will fare significantly worse than the “average” lobby in second-stage bargaining could find it preferable to prohibit such redistribution. This is true even if all lobbies are identical, as considered in part (b). Intuitively, whether SIG voters support or oppose restrictions on transfers in the first stage clearly depends on the total value of those transfers and the share borne by each SIG. When they are identical it is particularly easy to show that as their share in the population increases so does the tax bill of the individual voter. Above a threshold value of that share, $\tilde{\alpha}(\beta)$ which we define in the proof in the appendix, that cost exceeds any benefits that may accrue from the second stage bargaining. Notice also that this does not require the whole population to be organized into SIGs, even if the tax collection costs are relatively low because SIGs must expend some amount in lobby goods to obtain transfers. Hence, under a direct democracy it is quite likely that transfers to SIGs would be prohibited whether or not their members represent a majority of voters.

The corollary to the last two propositions is that under the same conditions that predict no redistribution to SIGs under direct democracy, our model predicts that under a representative democracy, not only will such redistribution take place, but also that it will generally be done via inefficient means. Thus many models that fail to provide a motive for a politician to prefer inefficient policies or that do not allow him to participate in the first stage choice mechanism as an independent actor ignore a crucial explanation for the use of inefficient redistribution policies.
4.2 Bargaining with policymakers

There are numerous ways to model the government’s interaction with the lobby in the first stage. Our main objective here is to eliminate the asymmetry in section 3 where the government could make a take-it-or-leave-it offer on the cap or policy choice. We therefore maintain the rest of the structure of the model and simply allow each SIG and the government to bargain over the policy (or the cap) in the first stage. We assume that it is too costly for all the SIGs to coordinate in their efforts to bargain with the government, so that the government deals with each bilaterally. As we argue below this may provide a motive why each individual lobby would be unwilling to make any transfers to the government in the first stage for a particular policy to be available (or not capped) in the second stage for all lobbies. For now we simply assume this and do not allow other instruments or transfers to be bargained over in the initial stage. This allows us to remain consistent with the original setup and contrast the results with those obtained when the government had all the bargaining power in the first stage.

Consider first the case of a cap on efficient transfers when inefficient policies are also available, as discussed in section 3.2. As shown in Proposition 2 when the government can choose caps it sets a binding cap on $T$ provided neither party has all the bargaining power in the second stage. If instead we allowed each individual SIG to set the cap, each would choose a non-binding cap. Each of these outcomes can be seen as the extreme when either side has all the bargaining power in the first stage. Suppose now that the government’s bargaining power in the first stage is $\gamma_1$. We may expect $\gamma_1$ to differ from $\gamma$, the bargaining power once the policy has been decided, since the parties are bargaining over different things in the two stages: the choice of policy or cap in the first stage as opposed to the level of the policy and transfers in the second.\(^\text{22}\)

The threat point in the first stage is still the no-bargaining outcome, $(g^0, v^0)$. In the special case where $\gamma_1 = \gamma$ allowing for bargaining in the first stage leads to the unconstrained Nash solution and therefore only the efficient policy is used. To see why, note that Nash bargaining in the first stage implies that a cap must be jointly efficient. When the bargaining power is identical in the two stages, the Nash product being maximized in the first stage is the same as in the second stage. Since the Pareto frontier in the first stage includes the point with a non-binding cap and this has the highest joint surplus, it is the solution. The same is true if the government’s bargaining power is lower in the first stage than in the second, \textit{i.e.} if $\gamma_1 < \gamma$. This is illustrated in Figure 7, which shows the Pareto

\(^{22}\) Even a narrow interpretation of $\gamma$ when Nash bargaining represents alternating offers suggests that the risk of breakdown may be different at the different stages.
frontier in the first stage as the non-dashed curve through $N$, the unconstrained solution, and $N^c$, the constrained one if the government could set the cap independently.

In contrast, when the government has more bargaining power in the first stage, i.e. $\gamma_1 > \gamma$, a binding cap results and the inefficient policy is used in equilibrium if and only if neither side has all the bargaining power in the second stage. Such a solution is illustrated by $N^b$ in Figure 7 at the tangency of the non-dashed curves: $U^{Nb}$ and the Pareto frontier that results from considering all possible caps the government and lobby would ever choose. The intuition for this result is that, when $\gamma_1 > \gamma$, choosing $T^c$ to maximize joint utility in the first stage, $(G(T^c, \cdot) - g^0) \gamma_1 (V(T^c, \cdot) - v^0)^{1-\gamma_1}$, requires a higher utility for the government than the unconstrained Nash level, $T^N$, which maximizes $(G(T, \cdot) - g^0) \gamma (V(T, \cdot) - v^0)^{1-\gamma}$. This argument follows from the fact that, as the cap approaches $T^N$, the slope of the constrained frontier becomes identical to that of the unconstrained one, as previously shown.

There are several reasons why politicians may have higher bargaining power in the first stage. First, what is bargained over is formally under the control of the government—for example, a particular type of legislation or commitment via an international agreement. Second, some SIGs will not be present in the first, rule-making stage. Independently of the underlying reason, if $\gamma_1 > \gamma$ then allowing lobbies to bargain with the government over the cap on $T$ does not eliminate the result that the equilibrium redistribution policy is the inefficient one.

The analysis is more complex with binary choice of policies, since the result of first stage bargaining cannot be a policy somewhere between the policy preferred by the government and that preferred by the lobby. One way of representing the possible outcome of bargaining when choices are discrete in the first stage is as follows. The government chooses the policy with some probability $\rho$ and the lobby chooses it with probability $1 - \rho$. Previously we assumed $\rho = 1$ and showed that, under the conditions in Proposition 3, the equilibrium policy is the inefficient one. More generally, if whenever the government has some bargaining power it has a non-zero probability of being able to choose the policy then we still observe the inefficient policy with probability $\rho$ if the conditions in Proposition 3 hold.

We have allowed bargaining only over the choice of policy or cap in the initial stage. But if the inefficient policy is chosen in the first stage, there will potentially be unexplored gains from bargaining. One may therefore ask why any given lobby $i$ would not offer a side-payment to the government, for example, some of the lobby good, in exchange for the government using efficient policies. One answer is that each individual lobby may not find it optimal to do this due to a free riding problem across
lobbies. Suppose that whenever the government chooses a more efficient policy in place of another relatively inefficient one, it does so through an international agreement or legislation that necessarily applies to several sectors, so that if the government agrees to switch redistribution policies for one lobby it may need to do so for all. Hence, there is a basic collective action problem. In the absence of coordination across lobbies we should not expect side payments used in the first stage. This is one reason that can justify the type of bargaining over rules we model above that can predict an inefficient equilibrium redistribution policy even if we allow the lobbies to influence it.

5 Conclusions

We present a model of policymaking that makes explicit two key elements that are crucial in predicting whether inefficient policies will be used. The first is the choice mechanism over the sets of policies; the second, the policy preferences of all agents who can influence that choice. Policymaking is a two-stage process: in the first stage the set of constraints on policy instruments is chosen, while in the second stage, the government bargains with special interest groups over the level of the policy instruments. Our results show the importance of considering the policymaker as an independent agent in both stages.

In such a world, a key consideration is the bargaining position of the government relative to the lobbies, where a crucial feature is that neither side has all the bargaining power and utility is not transferable. The government will benefit if it can commit itself to offer lower benefits to the SIG for any given amount of lobby goods that the SIG provides. As we demonstrated, this commitment increases the welfare of the government because it improves its bargaining position. However, if the government caps or foregoes the use of one instrument, lobbies will find other, generally less efficient ways to bargain with the government. Hence, equilibrium redistribution is characterized by the use of inefficient instruments. If such instruments serve no social purpose, the government will also want to prohibit their use, but it will certainly find it impossible to eliminate every conceivable transfer to SIG. If the inefficient policy has a social value at some point in time, such as a production subsidy to correct an externality, the government will not find it optimal to prohibit its use. However, it is then impossible to effectively forbid its use as a redistributive device. Focussing on the case in which the inefficient instrument is known to have no social purpose makes clear that the use of inefficient ways of giving benefits to a SIG is completely independent of any motive related to lack of transparency and imperfect information.
The model yields a number of interesting results not only for the use of inefficient policies when the government can unilaterally choose which policies to use or what limitations on policies to impose, but also when these decisions are not made unilaterally. Even when the policy framework is bargained over, inefficient policies may still be used in equilibrium. When elections are used in the first stage of policymaking, direct versus representative democracy can have diametrically opposed implications for the use of inefficient policies by the government. When voters choose policy restrictions directly, redistribution to SIGs would generally be outlawed, perhaps even if members of SIGs are in the majority. When voters can only choose policymakers, who then determine what policies will be used, inefficient redistribution will generally arise in equilibrium.

The model also provides a rationale for commitment via international agreements other than as a solution to time inconsistency problems, as is often suggested. In our approach the gain to the government from self-restraint (which might be achieved via international agreements) is explained by the improvement in its bargaining position relative to the SIGs.

We chose a specific application to demonstrate a general mechanism that appears to be commonly used in practice by governments: restrictions on the amount they can offer in a subsequent bargain. We showed that the basic insight that the government faces a trade off between the improvement in bargaining position and reduction in bargaining surplus is not specific to lump-sum transfers and production subsidies. It extends to any pair of policies that can be ranked according to their transfer efficiency. As pointed out above, it can also apply in different political economy settings provided that the key bargaining elements are present. Thus it would be interesting to apply this insight to analyze how normative and positive predictions of various policy models would be affected if they allow for the policy set to be endogenously chosen.

Finally, our results highlight some important methodological issues about the interaction of governments and SIGs. First, models that assign all the bargaining power to either party and assume utility is transferable, e.g. through unlimited cash contributions, will fail to explain interesting outcomes, which suggests there is a high value to investigating alternative approaches to the interaction between governments and SIG. Second, models that leave the government in the background may be inadequate in predicting the type of policies that will be used, and especially why utility maximizing elected politicians may choose inefficient policy instruments even under full information.
References


APPENDICES

A  Formal Definition of the Political Equilibrium

In this appendix we provide a more formal definition of the political equilibrium described in section 3.2. As we point out in section 2 the structure allows us to consider the government’s bilateral interaction with each lobby $i$ separately. So the definition applies for each lobby and we suppress the subscript $i$. The set $\{T^c, T, \hat{t}, \hat{C}\}$ forms a subgame perfect Nash equilibrium of this game if and only if caps are chosen to satisfy

$$\hat{T}^c \equiv \arg \max_{T^c} G(\hat{T}(T^c), \hat{t}(T^c), \hat{C}(T^c))$$

and the second stage policies maximize the Nash product s.t. cap and Pareto frontier:

$$\{\hat{C}, \hat{T}, \hat{t}\} \equiv \arg\max_{\hat{C}, \hat{T}, \hat{t}} (G(T, t, C) - g^0)\gamma(V(T, t, C) - v^0)^{1-\gamma}$$

s.t. $\hat{T} \leq \hat{T}^c$; $(G(\cdot), V(\cdot)) \in P^e$; $G \geq g^0$ and $V \geq v^0$

where $g^0 \equiv \max_{T \geq 0, t \geq 0} G(T, t, C)$ and $v^0 \equiv \max_{C \geq 0} V(T, t, C)$. The utilities $(G, V)$ belong to the set $P^e$ iff they are feasible and efficient, i.e. $\not\exists (G, V)$ with $T \in [0, T^c]$ that yields $G(T, t, C) \geq G(\hat{T}, \hat{t}, \hat{C})$ and $V(T, t, C) \geq V(\hat{T}, \hat{t}, \hat{C})$ with at least one strict inequality.

B  Efficiency ranking of transfer policies

**Lemma 1:** A production subsidy $t$ is an inefficient transfer policy relative to $T$ iff no production externality is present.

**Proof:**

* Sufficiency: Consider the case where no externality is present, so that the economically optimal level of $t$ is $t^* = 0$. Deriving a contract curve in $T-t$ space for any given level of $C$, the definition requires that such a curve contain no points such that $t > 0$. For this to true, it must be the case that $t > 0$ implies no gains from bargaining. This requires:

$$-[G_t/G_T]_{dG=0} < -[V_t/V_T]_{dV=0}$$

$$[\pi'(p + \hat{\bar{t}})\beta + t\pi''(p + t)]/\beta > \pi'(p + \hat{\bar{t}})$$

This is always satisfied given the convexity of the profit function. Note that these equations imply that at $t = 0$ we have $G_t/G_T = V_t/V_T$.

* Necessity: Suppose a positive production externality is present. The optimal level of subsidy to address the externality is given by $t^{ext} : G_t^{ext} = 0$. Where $G_t^{ext}$ is the government objective reflecting the externality. For $t \geq t^{ext}$ to be inefficient, it must be the case that when $t \geq t^{ext}$, we have:

$$-[G^{ext}_t/G^{ext}_T]_{t \geq t^{ext}} < -[V_t/V_T]_{t \geq t^{ext}}$$

$$[G^{ext}_t/(a(\beta/(1 - \beta)))] \leq -[\pi'(p + \hat{\bar{t}})]_{t \geq t^{ext}}$$

But since $G_t^{ext}(t = t^{ext}) = 0$ by the definition of $t^{ext}$ and $\pi'(p + t = t^{ext}) > 0$, (16) cannot hold for $t = t^{ext}$. Hence, $t$ is not inefficient when an externality is present according to the definition in the text. Note however that the condition in (16) will be satisfied for some sufficiently high $t > t^{ext}$. $\square$
C Proofs

Proposition 1: (Government cap on efficient transfers)

Sufficiency:
Suppose that \( \gamma \in (0,1) \). We need only show the existence of a cap such that \( T^c < T^N \) and \( G(T^{Nc}, C^{Nc}) > G(T^N, C^N) \). The solution is illustrated in Figure 3. We first show that the constrained Pareto frontier is strictly concave. On the basis of that, we then show that \( g^{Nc} > g^N \).

The constrained Pareto frontier in Figure 3 coincides with the original one for \( T \leq T^c \) and thus its slope is simply \( G_T/V_T \) up to point \((C^N, T^c)\). From (6) we have \( G_T/G_C = V_T/V_C \) at \((C^N, T^c)\) so that \( G_T/V_T = G_C/V_C \). The rest of the constrained frontier is strictly interior to the unconstrained frontier and has a slope of \( G_C/V_C \), reflecting the ratio of changes in welfare as the amount of the lobby good provided changes. Moreover, \( G_C(C^N)/V_C = -\Psi'(C^N) > -\Psi'(C < C^N) = G_C(C < C^N)/V_C \), from the definitions of \( G \) and \( V \) as well as \( \Psi'' < 0 \), so the constrained frontier is strictly concave. Now define point \( A \) in Figure 3 as the intersection of the constrained frontier and \( G = g^N \). Since the constrained frontier is strictly concave and \( g^{mc} = g^m \) for \( T^c \geq T^0 \) (see Figure 2), the segment connecting \( g^m \) and \( A \) is everywhere below the constrained Pareto frontier.

Consider then an auxiliary problem where the Pareto frontier is defined by the straight line through \( g^m \) and \( A \), which has some slope \( m \). For any linear Pareto frontier the government equilibrium utility is \( g^N - g^0 = \gamma(g^m - g^0) \) (from (9)). Since the straight line through \( g^m \) and \( A \) is a rotation of the original Pareto frontier inwards around \( g^m \), and since \( g^m - g^0 \) and \( \gamma \) are unchanged in the auxiliary problem, the equilibrium government utility is also unchanged. Therefore if we derive the first-order condition for this auxiliary problem as we do for (8) we obtain \(-U_V/U_G|_A = m\). Strict concavity of the constrained frontier implies that at \( A, m > G_C/V_C|_A \), the slope of the constrained frontier at \( A \). Therefore, the equilibrium point \( N^C \) lies to the northwest of \( A \), implying \( g^{Nc} > g^N \).

Necessity.
If \( \gamma = 1 \) then the unconstrained solution is \( g^m \equiv Max_{C,T} G \) s.t. \( V = V^0 \). The equilibrium transfer is \( T^N(\gamma = 1) = T^0 \). A strictly binding cap entails that the government’s utility is now \( g^{mc} \equiv Max_{C,T} G \) s.t. \( V = V^0 \) and \( T^c < T^0 \), the extra constraint implies that \( g^{mc} < g^m \).

If \( \gamma = 0 \) then the second stage Nash bargaining solution is \( G^{Nc}(T^{Nc}, C^{Nc}) = G(0, 0) \). The government is therefore indifferent among all values of \( T^c \), which implies that there exist \( T^c \geq T^N \) (that is, caps that are not strictly binding) that are subgame perfect equilibria. \( \Box \)

Proposition 2: (Government cap on efficient transfers and use of inefficient transfers)

a. \( T^c \) binds iff the government does not have all the bargaining power.

In the political equilibrium \( T^c \) must satisfy the following FOC: \( dG/dT^c = 0 \), where \( dG/dT^c \equiv G_C T^c + G_T T^c + G_t \). Note that \( T^c = 1 \) since a marginal increase in the binding cap \( T^c \) will induce an equivalent increase in the transfer. Thus, to show the gain from capping \( T \), a proof similar to that in Proposition 1 applies provided that the Pareto frontier is strictly concave when \( T^c \) binds and \( t \) is available.

The slope of the Pareto frontier is \( G_T/V_T \) if \( T^c \) is not binding. If \( T^c \) binds then any further increases in the utility of the lobby must take place via changes in \( C \) being exchanged for \( t \), since as we will see \( \dot{t} > 0 \). Thus, if \( T^c \) binds, the slope is \( (G_t dt - G_C dC)/(V_t dt - V_C dC) = G_t/V_t \) since the equilibrium definition requires \( t \) and \( C \) to be set efficiently, i.e. for \( G_t/G_C = V_t/V_C \) Therefore we have

\[
\lim_{t \to 0} G_t/V_t = G_T/V_T > |G_t/V_t|_{t>0}
\]

where the first equality is due to the definition of \( G \) and \( V \). (As shown in the proof of Lemma 1 the utility frontier for efficient and inefficient transfers has the same slope when \( t \to 0 \), that is
\(\lim_{t \to 0} G_t/V_t = G_T/V_T.\) The inequality follows from the definition of \(t\) being inefficient relative to \(T.\) Thus the constrained Pareto frontier is strictly concave around \(t \to 0\) and we can apply the proof of Proposition 1 to show that \(T^c\) binds.

b. \(\hat{i} > 0\) in equilibrium. Suppose \(\hat{i} = 0.\) Since \(T^c\) is optimally chosen and binds the constrained solution would lie at the point where the new Pareto frontier meets the original one in Figure 4. However, since the unique unconstrained solution was \(\hat{i} = 0, T^N > T^c\) and the slope of the frontiers is identical when \(\hat{i} = 0\) the constrained solution cannot be \(T^c, \hat{i} = 0.\)

**Proposition 3:** (Government choice of inefficient policy as unique form of transfer)

a. When \(\gamma = 0\) we have \(G(0, t^{Nt}(\gamma), C^{Nt}(\gamma)) = G(T^N(\gamma), 0, C^N) = g^0.\) Equation (12) is thus sufficient to show (10) is satisfied for \(\gamma \in (0, \gamma^*).\) To evaluate (12), we first use the implicit function theorem to obtain \(\lim_{\gamma \to 0} dg/d\gamma = \lim_{\gamma \to 0} -\hat{L}_G\gamma/\hat{L}_{GG}\) where \(\hat{L}\) is the Nash product evaluated at the solution of the following program

\[\text{Max}_{G \geq g^0} L \equiv (G - g^0)^{\gamma}(\Omega(G - g^0))^{1-\gamma}\]

The FOC \(L_G = 0\) is

\[\gamma(\frac{\Omega}{G - g^0})^{1-\gamma} + (1 - \gamma)(\frac{G - g^0}{\Omega})^{\gamma} \Omega' = 0\]

\[G - g^0 = -\frac{\Omega}{\Omega'} \frac{\gamma}{1 - \gamma}\]

Using this we have \(\hat{L}\gamma = \hat{L}/(1 - \gamma)(\hat{G} - g^0)\) and \(\hat{L}_{GG} = [-\gamma/(1 - \gamma) + (1 - \gamma)\Omega''(\hat{G} - g^0)^2/\hat{\Omega}]\hat{L}/(\hat{G} - g^0)^2,\) which we use to obtain after some simplification

\[\lim_{\gamma \to 0} dg/d\gamma = \lim_{\gamma \to 0} -\hat{L}_G\gamma/\hat{L}_{GG} = \lim_{\gamma \to 0} -\hat{\Omega}/\hat{\Omega}'\]

Therefore (12) reduces to (13) in the text.

b. At \(\gamma = 1\) we have \(g^m > g^md\) thus the government chooses \(T.\) Since the inequality is strict and \(G\) is continuous in \(\gamma\) \((G\) is continuous in the policies and \((t^{Nt}(\gamma), C^{Nt}(\gamma))\) and \(T^N(\gamma)\) are continuous in \(\gamma)\) we can find a \(\overline{\gamma} < 1\) s.t. \(g^N(\overline{\gamma}) = g^N(\overline{\gamma}).\) If (11) has a unique solution, then \(\overline{\gamma} = \gamma^*.\) Otherwise \(\overline{\gamma}\) is the maximum \(\gamma\) that satisfies (11).\)

**Proposition 4:** (Use of inefficient redistribution policies in a representative democracy)

a. This follows from politicians having preferences \(G\) in (5) that are not perfectly aligned with either voting group. Since lobby goods initially have infinite value (that is, \(\lim_{C \to 0} \Psi'(C) = \infty\)), when \(a > 0\) and \(\beta < 1\) there is a surplus to bargain over with *each* individual SIG in the second stage, as is clear from Figure 1.

b. If the two candidates are not extreme then whichever one is elected finds it optimal to use a binding cap on \(T\) and thus in equilibrium the inefficient policy is used as shown in Proposition 2. If the candidates are extreme then neither will, if elected, have an incentive to restrict \(T\) thus \(t = 0,\) as shown in Proposition 2.\)

**Proposition 5:** (Absence of transfers in direct democracy)

a. Unorganized citizens do not benefit from transfers, but pay the taxes that allow them. Since no transfers imply no taxes, this is the preferred policy of all unorganized citizens. If they are in the majority, \(\sum_{i \in L} \alpha_i < 0.5,\) then the policy of no transfers, either efficient or inefficient, will defeat all
other proposals in majority voting, independent of the identity of the politician in the second stage.

b. To show this we have to consider a number of cases: a policy of no transfers versus a policy of $T_i > 0$ and $t = 0$ (the equilibrium outcome with no caps); a policy of no transfers versus a positive cap on $T$ and $t > 0$; and a prohibition of $T$ and $t > 0$. The different cases lead to different critical values of the share of SIG voters, $\tilde{\alpha}$, required for no transfers but for each case there exists a $\beta$ such that the result holds. Since the intuition is the same, we derive it here only in the case prohibiting all transfers relative to allowing unrestricted efficient transfers $T_i$ (so that $t = 0$).

The welfare of the representative SIG is $V_i$. Voters in the SIG will prefer to prohibit transfers if $W_i(T = t = 0) > W_i(T_i \in [T_i^0, T_i^1], t = 0) - C_i^T$, where the transfer is bounded by the value when the government has all bargaining power, $T_i^0$, or none, $T_i^1$. Using the definition of $W(.)$ in (4) this inequality becomes

\[ l_i + \pi(p_i) + \alpha_i Ns \geq l_i + \pi(p_i) + T_i + \alpha_i Ns - \sum_{i \in L} T_i/(1 - \beta)N - C_i^T \]

\[ 0 \geq T_i + \alpha_i[-\sum_{i \in L} T_i/(1 - \beta)] - C_i^T \]

If SIGs are identical then they supply identical goods, so that $\Psi_i$ is identical for all $i$, which implies $C_i^T = C^T$. Since we assumed $\gamma$ is the same relative to all $i$, we also have that $T_i$ is the same for all $i$. Also, $\alpha_i$ is identical across SIGs, so the same condition must hold for all SIGs. We may then aggregate by summing over all $i \in L$, so that the above condition may be written as

\[ \sum_{i \in L} [T_i/(1 - \beta)] \sum_{i \in L} \alpha_i > \sum_{i \in L} (T_i - C_i^T) \sum_{i \in L} \alpha_i > (1 - \beta)(T - C^T)/T \equiv \tilde{\alpha}(\beta) \]

where in the last line we use the fact that, when $\Psi_i$ is identical across lobbies, $T = T_i$ and $C = C_i$ for all $i$. Note that conditional on transfers being approved by the majority the equilibrium for each $T_i, C_i$ is independent of the number of lobbies (because of no lobby competition) or fraction of population in lobbies, so the expression on the rhs is independent of $\alpha_i$ and can be written as a function $\tilde{\alpha}(\beta)$. We can then show that $\tilde{\alpha}(\beta) \in [0, 1]$ by noting that, $\beta \in (0, 1)$ and $T \geq C^T$. If $T < C^T$ the SIG would choose not to bargain with the politician in the second stage since its utility would fall below the reservation value. $\square$

D Simulation

The following simulation shows that the condition in Proposition 3 can be satisfied so the government prefers production subsidies over lump-sum transfers when $\Psi$ is sufficiently concave.

**Assumptions:** $\Psi \equiv C^\psi, \psi \in (0, 1); q \equiv k^{1-\alpha} \Rightarrow \pi(p + t) = (1 - \alpha)(p + t)k((p + t)\alpha)\Psi, \alpha = .5$.

**Slope condition for efficient transfer**

\[ \lim_{\gamma \to 0} -\Omega^T/\Omega = \lim_{\gamma \to 0} (V - v^0)\Psi'(C^N) = (T_m - C^N)\alpha\beta/(1 - \beta) \quad (18) \]

The first equality is due to the definition of $\Omega$, the second is due to the first-order condition in (6). The last equality follows from the definition of $V^{mT}$, where $T_m$ represents the maximum transfer the lobby can extract and is defined by:

\[ G(T = 0, t = 0, C = 0) = G(T_m, t = 0, C^N) \]

\[ T_m = \Psi(C^N)/[\alpha\beta/(1 - \beta)] \]

30
Using (18), \( \Psi \) and the solution to \( C^N \) in (6) we obtain the general condition to be evaluated:

\[
\lim_{\gamma \to 0} -\frac{\Omega^T/\Omega^T}{\gamma^T} = \Psi(C^N) - C^N a/\beta (1 - \beta)
\]

\[
= \left( 1 - \frac{\psi}{\Psi} \right) \frac{a/\beta}{1 - \beta} \exp[(\psi - 1)\ln(\frac{a/\beta}{1 - \beta})]
\]

\hspace{1cm} (19)

**Slope condition for the inefficient transfer**

\[
\lim_{\gamma \to 0} -\frac{\Omega^T/\Omega^T}{\gamma} = \lim_{\gamma \to 0} (V - v^0)\Psi'(C^N_t) = \lim_{\gamma \to 0} (V^mT - v^0) \frac{a(\beta\pi' + t\pi''(p + t))}{(1 - \beta)\pi'(p + t)}
\]

\hspace{1cm} (20)

The first equality, is due to the definition of \( \Omega \), the expression for \( \Psi'(C^N_t) \) in the second equality is derived from the efficiency condition: \( G_t/G_C = V_t/V_C \). Using the definition of \( V \) we obtain \( V^mT - v^0 = \pi(p + tN(\gamma = 0)) - C^mT - \pi(p) \) where \( C^mT \) is the minimum level of the good provided by the lobby required to maintain the government at the reservation utility. Using the definition of \( G \) and the condition \( G(T = 0, t = 0, C = 0) = G(T = 0, t = tN(\gamma = 0), C^mT) \) we can write \( C^mT \) as

\[
C^mT = \Psi^{-1}(-a(\pi(p + tN(\gamma = 0)) - \pi(p) - t\pi'(p + tN(\gamma = 0))/(1 - \beta)))
\]

\hspace{1cm} (21)

Using (20), \( \Psi, \pi(p + t) \) and (21) we obtain:

\[
\lim_{\gamma \to 0} -\frac{\Omega^T/\Omega^T}{\gamma} = \left[ a(\beta\pi' + t\pi''(p + t)) \right] (\pi(p + tN) - \pi(p) - C^mT)\big|_{\gamma = 0}
\]

\hspace{1cm} (22)

\[
\lim_{\gamma \to 0} -\frac{\Omega^T/\Omega^T}{\gamma} = \left[ \frac{a(\beta k (p + tN_k) + tNk)}{(1 - \beta)k} \right] \times \left\{ 0.25(p + tN)^2k - 0.25p^2k \right.
\]

\[
- (-a(0.25(p + tN)^2k - 0.25p^2k - 0.5tk(p + t)/(1 - \beta)))^{1/\psi} \big|_{\gamma = 0}
\]

To calculate this we require the equilibrium \( t \), which is obtained using the efficiency condition \( G_t/G_C = V_t/V_C \) and (21):

\[
t^N : \Psi^{-1}(-a(\pi(p + t) - \pi(p) - t\pi'(p + t))/(1 - \beta))) = \Psi^{-1}(\frac{a(\beta\pi' + t\pi''(p + t))}{(1 - \beta)\pi'(p + t)})
\]

\[
t^N : (-a(0.25(p + t)^2k - 0.25p^2k - 0.5tk(p + t)/(1 - \beta)))^{1/\psi} = \left( \frac{a(\beta k (p + t) + tk)}{(1 - \beta)k} \right)^{-1/(1 - \psi)}
\]

Evaluating (19) and (22) at the parameter values below we obtain the following:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \psi )</td>
<td>1/2</td>
<td>( x = t )</td>
</tr>
<tr>
<td>1/5</td>
<td>0.72</td>
<td>( x = T )</td>
</tr>
<tr>
<td>0.25</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>0.70</td>
<td></td>
</tr>
</tbody>
</table>

**Parameters:** \( a = p = k = 1, \beta = 0.25, \alpha = 0.5, \gamma = 0 \)

**Table 1:** Simulation result for the choice of lump-sum versus production subsidies
Figure 1: Efficient Transfer

\[ G = g^m \]
\[ V = v^0 \]

Figure 2: Cap on Efficient Transfer

\[ G = g^N \]
\[ G = g^0 \]
\[ V = v^N \]
Figure 3: Bargaining Solution with Cap on Efficient Transfer

\[ U^N = (G - g_0^\gamma)(V - v_0^\gamma)^{1-\gamma} \]

Figure 4: Bargaining Solution with Inefficient Transfers

\[ U^N = (G - g_0^\gamma)(V - v_0^\gamma)^{1-\gamma} \]
Figure 5
Government's optimal redistribution policy

Figure 6
Bargaining power and the government's optimal redistribution policy
Figure 7: Bargaining Solution for caps in 1st stage

\[ G \]

\[ g^m = g^{mc} \]

\[ g^{Nc'} \]

\[ g^0 \]

\[ v^0 \]

\[ v^{mc'} \]

\[ v^N \]

\[ v^m \]

\[ V \]

\[ U^{mc'}(\gamma) \]

\[ U^{Nc'}(\gamma) \]

\[ U^N(\gamma) \]

\[ N^B(1=\gamma_1=\gamma) = N^c \]

\[ N^B(1>\gamma_1>\gamma) \]

\[ N^B(1>\gamma_1>\gamma) \]

\[ N = N^B(\gamma_1\leq\gamma) \]