The Dynamic Politics of Policy Instruments[1]

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[1]**PRELIMINARY AND INCOMPLETE: PLEASE DO NOT CIRCULATE**

Abstract

Legislators may disagree on when intervention is appropriate, but they tend to agree as to what interventions are inefficient. Nevertheless, when regulating international trade, food security, environmental protection, or redistribution, governments oftentimes intervene with inefficient instruments such as distortionary taxes and quotas. We show that, despite the availability of an economically efficient policy in a dynamic setting with shocks to the environment, an inefficient policy instrument can be selected by fully rational parties when these parties disagree on when an intervention is desirable. Intuitively, intervening via an inefficient instrument makes repeal of the intervention more likely when the need for an intervention decreases, and thus makes the less interventionist party more inclined to intervene in the first place. This effect is more pronounced in volatile environments: parties tend to postpone the efficient resolution of a problem when the future is more uncertain. Further, there are conditions under which statically inefficient instruments can be Pareto improving. Finally, we apply our findings to shed some light on underutilization of the 'double dividend'.

1 Introduction

There is a wide consensus among economists that government interventions are oftentimes inefficient. A typical form of inefficiency is status quo inertia: policymakers fail to change the current policy even when they agree that it is inadequate, or they fail to enact an intervention even when they all agree that some intervention is needed. A different form of inefficiency, somewhat more surprisingly, occurs when policymakers agree on some public intervention but implement it using an inefficient policy instrument when an efficient instrument is available.

A classical example of inefficient intervention of the latter type is the regulation of negative externalities. Price instruments are usually considered more efficient than command-and-control interventions. One important advantage of the former instrument, as first pointed out by Tullock (1967), is that although both instruments can induce an optimal level of negative externality, only the former generate government revenues. If these revenues are used to offset other distortionary taxes, then the society obtains an additional benefit (the "double dividend" hypothesis). From this perspective, it is puzzling how widely used are command-and-control instruments when efficient tax policies are available. For example, car emissions are regulated by CAFE or emission quotas instead of Pigouvian taxes. Likewise, taxes have been argued to be more efficient in curbing systemic risk, but non-price regulation is used in practice (Masciandaro and Passarelli 2013). Inefficient instruments are also prevalent in redistribution. While the theory suggests that efficient redistribution policies involve only lump-sum transfers or progressive income taxation (Atkinson and Stiglitz 1976), most governments also use inefficient instruments such as non-uniform commodity taxes (e.g., tax exemptions on food, taxation of luxury goods), the public provision of private goods (e.g., education, health care), capital taxation or minimum income laws.

In a world in which policy interventions are the pregrogative of politicians rather than Benthamite social planners, however, we show that the use of inefficient instruments can arise as equilibrium behaviour in a parsimonious dynamic political economy model. In each period in the model, Nature randomly chooses a state of nature and, given the state, two parties (assumed unitary actors as usual) have to bargain over whether or not to implement some policy intervention.[1] Intervention can be carried out with one of two policy instruments: one policy instrument is Pareto inefficient in the static sense; the other makes both parties better-off in all states of nature. Hence, in a one-shot environment, the inefficient policy instrument would never be used. Suppose, however, that one party prefers to intervene in

[1] Although we do assume a particular bargaining model (one party is chosen to offer a proposal which replaces the status quo if and only if the other party agrees), this is simply a convenience. The key feature is that both parties have to agree to any change in the status quo (for instance, because they are the pivotal legislators under a supermajority legislative decision rule).

more states than the other party. Then in some states of nature, no intervention is preferred by both parties; in other states of nature, intervention is preferred by both parties; and in the remaining states of nature, parties disagree.

We show that, for a reasonable set of parameters, in a dynamic and changing environment, the inefficient instrument will be used repeatedly on the equilibrium path. The intuition for the result is straightforward. To fix ideas, suppose there are only two periods and that the parties agree to an intervention in first period. Now suppose that the realized state in the second period is a state in which the parties disagree: the relatively less interventionist party (the laissez-faire party, say) prefers to repeal the current policy while the relatively more interventionist party prefers to maintain this status quo. Since there is no agreement, the policy, as the prevailing status quo, remains in place at the expense of the laissez-faire party. But by definition of an efficient policy, however, there must be more states in which there is agreement on repealing an inefficient policy, than there are states in which there is agreement on repealing an efficient policy. Thus, a strategically rational laissez-faire party, anticipating the possibility of future disagreement when considering an intervention with the current state, can prefer an inefficient to an efficient policy as a way of minimizing its net aggregate loss.

We find environments in which all equilibria involve the use of the inefficient instrument, and environments in which the inefficient instrument may be proposed by the interventionist party. Moreover, the inefficient instrument is more likely to be used the more inefficient it is for the interventionist party and the less inefficient it is for the laissez-faire party. It can be used for moderate degrees of the conflict of interest between the parties, but is unlikely to arise when the conflict of interest is either very small or very large. Moreover, we find conditions under which both parties strictly benefit from the availability of the inefficient instrument. That is, an instrument that is statically Pareto dominated in *every* state of nature can be dynamically Pareto improving.

Finally, we enrich the model to allow for variation in the extent to which states of nature, and therefore parties' state-contingent policy preferences, are likely to persist through time. We show that, in equilibria in which the inefficient instrument is used, it is used only when states (and thus payoffs) are expected to be volatile. The intuition for this result is an extension of that for the main result, above. The less persistent is the state expected to be, the more likely it is that the laissez-faire party will want to repeal any existing intervention in the next period. And since the parties' disagreement over when to repeal an inefficient intervention is smaller than for an efficient intervention, the laissez-faire party typically prefers an inefficient intervention when the problem is likely to be transient. If one interprets the volatility of policy preferences as a measure of uncertainty, this result states that parties are more likely to use inefficient instruments when they are more uncertain about the future.

The prevalence of inefficient instruments has proved a puzzle, especially in view of the argument that political competition should eliminate inefficiencies (Becker (1976, 1983), Wittman (1989)). Unlike the current paper, most of the literature on accounting for such inefficiencis focuses on a particular policy instrument and uses a single policymaker framework. Coate and Morris (1995) consider inefficient transfers. They argue that if voters are uncertain as to what type (i.e. relative preferences between an interest group's payoff and social welfare) of politician they face and whether an externality exists, biased politicians will choose inefficient price subsidies rather than efficient lump-sum transfers to address any externality and conceal their type. Acemoglu and Robinson (2001) point out, however, that an honest politician who truly needs to regulate the externality could perfectly reveal her type by using lump-sum taxes to redistribute the wealth back from the subsidized group. Instead, Acemoglu and Robinson (2001) propose a model in which the subsidized group who currently has political power, but is in danger of losing it due to its shrinking size, may want to structure transfers in a way that attracts newcomers to the group. Such subsidies are distortionary, but they can still take a form of lump-sum transfers; hence, the paper does not explain the use of price subsidies per se. In these two papers, inefficient instruments are used by the policymaker to increase the probability of staying in power. In contrast, inefficiency in our model arises even when today's policy does not affect tomorrow's allocation of bargaining power.

A number of papers (e.g. Tullock (1993), Grossman and Helpman (1994), Becker and Mulligan (2003), Drazen and Limao (2008)) argue that any transfer increases wasteful lobbying activity from the group of beneficiaries, leading to excessive transfers. By committing itself to inefficient transfers, the government lowers the level of wasteful lobbying and the effective amount of transfer. But these papers do not explain why the government can commit to an inefficient instrument but not to a predetermined level of transfers. Focusing on the choice between taxes and quotas, Alesina and Passarelli (2014) and Masciandaro and Passarelli (2013) argue that, in a heterogenous society, quotas and taxes have different distributional consequences. Since the decision between them is made by the median voter, who does not internalize the costs and benefits to others, the choice of the instrument may not be socially optimal. However, in these papers, both taxes and quotas are always Pareto optimal. In contrast, our paper rationalizes the use of a Pareto suboptimal alternative. Finally, Aidt (2003) claims that command-and-control instruments are more bureaucracy intensive; hence, to the extent that bureaucrats influence policy design and derive value from implementing policy, such interventions are favoured by bureaucrats.

In Section 2, we consider a simple applied example, both to motivate the more general model and to provide a key intuition for our main results. Section 3 describes the general model and a basic result. Sections 4 and 5 develop the core equilibrium and welfare results; Section 6 extends the model with a comparative static result on the extent to which the state of nature is expected to persist; and, in Section 7, we return to the motivating example and apply the general results. Section 8 concludes.

2 A motivating example: taxes vs quotas

A classical problem in public economics concerns the use of taxes or quotas to manage an externality. Consider two political parties, L and R, bargaining on how to regulate a negative externality-generating activity. Let $a \geq 0$ denote the level of this activity in any time-period and $P(a)$ denote the private sector's profits from this activity. The social value of the externality in the period is described by $\theta E(a)$, where $\theta > 0$ is the realization of an iid random draw from a given distribution with full support on $\mathbb{R}_+$. Since the externality is negative, $E(a)$ is decreasing in a.

Each party cares about the profits of the private sector, the externality the latter imposes on society, and government revenues, denoted $B(a, x)$, where x is the policy implemented by the government. Each party $i = L, R$ maximizes

$$U_i(\theta, a) = \pi_i P(a) + (1 - \pi_i) B(a, x) + \theta E(a),$$

where $\pi_i \in [0, 1]$ is the weight party i places on business profit relative to the government's budget, and reflects too how i trades off either against the social externality. Assume only firms pay tax and, further, that $\pi_L < \pi_R < 1/2$. The first inequality says the party labels have content; the second inequality says that both parties care more about the government budget than business profit. This last assumption may be due either to social welfare considerations (e.g. public good provision), or to more overtly political motives (e.g. patronage).

Suppose, in the absence of intervention, the private sector produces $\hat{a}$. The government can choose not to regulate, denoted as policy $x = n$. Alternatively, given the realized social cost θ, it can induce the desired level of activity a^* either by using quotas, $x = q$, that do not generate revenue, or through taxes, $x = p$, that generate revenue $B(a, p) > 0$. By definition of a^*, $E(\hat{a}) < E(a^*)$.

Party i's flow payoff from policy $x \in \{n, q, p\}$ is given by

$$U_i(\theta,n) = \pi_i P(\hat{a}) + \theta E(\hat{a}),$$
$$U_i(\theta,q) = \pi_i P(a^*) + \theta E(a^*),$$
$$U_i(\theta,p) = \pi_i P(a^*) + (1-\pi_i) B(a^*,p) + \theta E(a^*).$$

Rescaling the flow payoff function U_i by $1/(E(a^*) - E(\hat{a})) > 0$ and collecting terms yields

$$U_i(\theta,p) - U_i(\theta,n) = \theta - w_i,$$
$$U_i(\theta,p) - U_i(\theta,q) = e_i;$$

where

$$w_i = \frac{P(\hat{a})-P(a^*)}{E(a^*)-E(\hat{a})}\pi_i - \frac{B(a^*,p)}{E(a^*)-E(\hat{a})}(1-\pi_i),$$
$$e_i = \frac{B(a^*,p)}{E(a^*)-E(\hat{a})}(1-\pi_i),$$

and we assume $w_L < w_R$ and $e_i \geq 0$ all i. Hence, p is the efficient regulation. It is useful to note that

$$U_i(\theta,q) - U_i(\theta,n) = \theta - (w_i + e_i).$$

Figure 1 illustrates these preferences.[2]

Figure 1 here

Finally, assume that any change to a ruling status quo policy must have the consent of both parties. Specifically, one party is allocated the right to make a policy proposal but the other party must accept the proposal for it to be implemented. In the event there is no agreement, the status quo remains in effect. Consider two cases. In each, we restrict attention to subgame perfect equilibria, defined in the obvious way as appropriate.

Case 1 There is only one period and the status quo is n. Then the following results for this case are clear from Figure 1: *(i) there is a status quo bias; (ii) q is never proposed in equilibrium and p is implemented only when $\theta \geq w_R$; and (iii) the feasible policy set $\{n,p\}$ Pareto dominates the feasible policy set $\{n,q\}$.*□

Case 2 There are two periods, $t = 0, 1$, with stochastic variables $\theta_0, \theta_1 \in \mathbb{R}$ presumed iid. The status quo for $t = 0$ is n and there is no discounting. Suppose $\theta_0 > w_R$ and R proposes p. Then p is surely implemented in the first period, becoming the $t = 1$ status quo. Now suppose $\theta_1 \in (w_L, w_R)$. In this event, R strictly prefers to repeal the regulation in favour of the laissez-faire option, n, but L would never consent to a change in the status quo (see

[2] Assume here that the net tax revenue is smaller than the induced change in profit so that $w_i > 0$. Also, while the figure is drawn with $w_L + e_L < w_R$, this need not be the case.

Figure 1). Hence, p is retained at a cost to R. However, although L would not agree to any change in the status quo p given θ_1, this is not true of a status quo q. For although L prefers p to both n and q for $\theta > w_L$, L strictly prefers q to n if (and only if) $\theta > w_L + e_L$. Anticipating the possibility that $\theta_1 \in (w_L, w_L + e_L)$, therefore, party R can improve its expected aggregate payoff by proposing q, or refusing to accept an intervention p, for at least some $\theta_0 > w_R$ in the first period. Going through the requisite calculations, the following results are true of the two-period case: *(i) the status quo bias is larger than for the static case; (ii) both parties may propose q in equilibrium; and (iii) the feasible policy set $\{n, p\}$ can be Pareto dominated by the feasible policy set $\{n, q\}$.*$\square$

Comparing the three results for these two cases suggest that politicians' strategically rational behaviour in a dynamic environment can be dramatically different from that in the static case. In particular, inefficient policies can be observed in equilibrium. Whether or not equilibria of this sort can survive in the absence of a finite horizon is unclear, as are the dynamics they exhibit if they do survive. Furthermore, there might also be other equilibria with only efficient policies implemented. Should such equilibria always exist whenever there exist equilibria with inefficient policies implemented, then the argument suggested here for the use of inefficient policies is less compelling. In what follows, therefore, we develop a more general, infinite horizon model.

3 The model

There are two political parties in the legislature, denoted L and R. In each period $t \in \mathbb{N}$, the legislature must implement one of three available alternatives: n, p or q. We will interpret policy n as no intervention, and policies q and p as two different forms of intervention.[3] The state of nature in some period $t \in \mathbb{N}$ is denoted by $\theta_t \in \mathbb{R}$, and it captures the desirability of an intervention in period t. For all $x \in \{n, p, q\}$ and $\theta \in \mathbb{R}$, let $U_i(\theta, x)$ denote party i's (state-contingent) flow payoff in any period with policy x and state θ, $i = L, R$.

Flow payoffs are parametrized as follows: for all $i \in \{L, R\}$ and all $\theta \in \mathbb{R}$,

$$\begin{aligned} U_i(\theta, p) - U_i(\theta, n) &= \theta - w_i, \\ U_i(\theta, p) - U_i(\theta, q) &= e_i. \end{aligned} \tag{1}$$

From (1), party i prefers the intervention p to no intervention n when $\theta \geq w_i$. Thus, w_i can

[3] In what follows, we use the terms "policy instrument" and "intervention" interchangeably to refer exclusively to alternatives p and q. The term "policy" may refer to any of the available alternatives, including n. This looseness should cause no confusion.

be thought of as i's ideological position on when the legislature should intervene through the policy instrument p. By convention, we define L to be the more interventionist party, so $w_L < w_R$. The key simplifying assumption in specification (1) is that the difference between intervening with p rather than q for party i, namely $U_i(\theta, p) - U_i(\theta, q)$, is independent of θ. Throughout, we assume that $e_L > 0$ and $e_R > 0$, so p is strictly Pareto-preferred to q regardless of the state of nature: p is the efficient instrument and q the inefficient instrument.[4]

The process $\{\theta_t : t \geq 0\}$ captures the evolution of the environment. For example, when regulating farming or trade, agricultural and economic conditions change constantly and the intervention should reflect such changes. For simplicity, we assume that $\{\theta_t : t \geq 0\}$ is distributed identically and independently over time according to some continuous cumulative distribution function F with full support on $\mathbb{R}$. We introduce a certain form of intertemporal correlation in Section 6.

Parties are infinitely lived. Every period t starts with some status quo policy $s_t \in \{n, q, p\}$. At the beginning of period t, both parties observe the realization of θ_t, and then choose which policy to implement according to the following procedure. One party is recognized as the *proposer* for that period, with the probability of recognition for party i being $b_i(\theta_t, s_t)$. Throughout we assume that the bargaining power of each party is bounded away from zero: for all $i \in \{L, R\}$ and all (θ, s), $b_i(\theta, s) \in (\underline{b}, 1 - \underline{b})$ for some $\underline{b} > 0$. The proposer offers a policy y_t. If the other party, the *veto-player*, accepts this proposal, then y_t is implemented, generates the flow payoffs for that period, and the game moves to the next period. If the veto-player rejects the proposal, then the status quo s_t stays in place and determines the parties' payoffs for period t. The policy implemented in t, whether the proposal or the status quo, becomes the status quo in $t + 1$. Each party is interested in maximizing its expected discounted payoff over the infinite horizon, where the common discount factor is $\delta \in (0, 1)$.

A *stationary strategy* for party $i \in \{L, R\}$ specifies, for any period t and any history to that period, two contingent actions. First, a policy proposal, conditional on being the proposer, that takes the realized state and status quo into a proposal; and second, conditional on not being the proposer, a veto decision that takes the realized state, the status quo and the proposal into a choice over accepting or rejecting the proposal.[5] Let σ_i denote i's a stationary strategy pair (proposal, veto) and write $\sigma = (\sigma_L, \sigma_R)$. We denote the corresponding (infinite horizon) game by Γ and restrict attention to stationary Markov perfect equilibria

[4]It is worth noting that the degree of party heterogeneity here, that is, $w_R - w_L$ *or* $|e_R - e_L|$, can be interpreted as the political system. To see this, let L and R be the two pivotal legislators in a supermajoritarian legislature; then (all else equal) the larger is the supermajority required to pass any legislation, the greater is the heterogeneity.

[5]Mixed strategies are admissible. More formally, writing ΔS for the set of probability distributions over a set S, i's proposal strategy takes $\mathbb{R} \times \{n, q, p\}$ into $\Delta\{n, q, p\}$; and i's veto strategy takes $\mathbb{R} \times \{n, q, p\}^2$ into $\Delta\{accept, reject\}$.

(simply"equilibria" in what follows).

For every stationary strategy profile σ, $i \in \{L, R\}$, $\theta \in \mathbb{R}$, and $x \in \{n, q, p\}$, let $V_i^\sigma(\theta, x)$ be the expected continuation payoff for party i of implementing policy x in some period $t \in \mathbb{N}$, conditional on $\theta_t = \theta$ and on continuation play σ.

Lemma 1 *Markov perfect equilibria exist in* Γ. *Moreover, for any equilibrium strategy profile* σ, *there exists* $(w_L^\sigma, w_R^\sigma, e_L^\sigma, e_R^\sigma) \in \mathbb{R}^4$ *such that, for all* $i \in \{L, R\}$, $\theta \in \mathbb{R}$, *the continuation payoff function* V_i^σ *satisfies*

$$\begin{aligned} V_i^\sigma(\theta, p) - V_i^\sigma(\theta, n) &= \theta - w_i^\sigma, \\ V_i^\sigma(\theta, p) - V_i^\sigma(\theta, q) &= e_i^\sigma. \end{aligned} \tag{2}$$

Proof All proofs are in the Appendix [NOT INCLUDED HERE!].□

By comparing (1) and (2), we see that players' continuation payoffs $V^\sigma = (V_R^\sigma, V_R^\sigma)$ have the same structure as their flow payoffs $U = (U_L, U_R)$, but with parameters $(w_L^\sigma, w_R^\sigma, e_L^\sigma, e_R^\sigma)$ instead of (w_L, w_R, e_L, e_R).[6] Call $(w_L^\sigma, w_R^\sigma, e_L^\sigma, e_R^\sigma)$ the continuation payoff parameters induced by σ.

In what follows, we characterize the equilibria of Γ in terms of their continuation payoff parameters, as $(w_L^\sigma, w_R^\sigma, e_L^\sigma, e_R^\sigma)$ (almost) uniquely determine players' behaviour. In any period t, the veto-player i accepts (rejects) any proposal x for which $V_i^\sigma(\theta_t, x) > (<) V_i^\sigma(\theta_t, s_t)$. For instance, i accepts proposal p under status quo n (q) when $\theta_t > w_i^\sigma$ ($e_i^\sigma > 0$) and rejects it when the reverse inequality holds. Likewise, the proposer i proposes the policy that gives i the greatest $V_i^\sigma(\theta_t, x)$ among the policies that are accepted.[7] Hence, the greater is w_i^σ, the more likely will party i accept or (as appropriate) propose to intervene via q or p on the equilibrium path; and the greater is e_i^σ, the more likely is party i to accept or (as appropriate) propose to intervene via p rather than via q.

Note that, generically, the profile $(w_L^\sigma, w_R^\sigma, e_L^\sigma, e_R^\sigma)$ differs from (w_L, w_R, e_L, e_R) because today's policy affects not only today's payoff, but also tomorrow's status quo policy. The difference between flow and continuation payoff parameters, therefore, captures players' forward-looking preferences over the next status quo.

[6] This result relies on $\{\theta(t)\}$ being i.i.d. and on the stationarity of σ as follows. If σ was nonstationary, the same expression would hold but the function V_i^σ and the parameter w_i^σ would have to be indexed by the period t from which the continuation payoff is computed. Likewise, if $\{\theta(t)\}$ was not i.i.d., w_i^σ would have to be a function of θ.

[7] The precise characterization of the equilibria of Γ is a bit more involved when a player i is indifferent between two alternatives for a nonnegligible set of states of nature, which happens when $e_i^\sigma = 0$. This possibility is taken into account in the appendix, but for the sake of clarity, we abstract away from it when describing the equilibria of Γ in the main text.

4 Equilibrium preferences over policy instruments

The main goal of this paper is to understand when and why parties might prefer to use the inefficient instrument q. To this effect, we first distinguish between equilibria in which there are surely no inefficient interventions from those in which inefficient interventions are used with positive probability, and identify the associated properties of the parties' induced preferences over policies. Subsequently, we focus more closely on the equilibria that necessarily involve inefficient policy interventions being adopted on occasion.

Definition 1 *Let σ be an equilibrium strategy profile. Then, σ is an **instrument efficient equilibrium** (EE) iff, conditional on $s_0 \in \{n, p\}$, q is implemented with probability-zero along the equilibrium path; σ is an **instrument inefficient equilibrium** (IE) otherwise.*

Note that an instrument inefficient equilibrium is inefficient in a strong sense: q is implemented with positive probability even when it is not the status quo. Unlike an instrument efficient equilibrium, therefore, for any initial status quo, the probability that q is implemented in any period does not vanish over time.

The following two propositions characterize EEs and IEs assuming that such equilibria exist, an issue addressed in the following section.

Proposition 1 *If σ is an EE, then $e_L^\sigma > 0$, $e_R^\sigma \geq 0$ and $w_L^\sigma < w_L < w_R < w_R^\sigma$.*

That $e_L^\sigma > 0$ and $e_R^\sigma \geq 0$ simply means that both players always get a greater continuation payoff from implementing p than from implementing q in an EE. As a result, they behave as if n and p were the only two policies available.[8] Proposition 1 further states that, when comparing n and p, dynamic considerations lead parties to behave in a more polarized way relative to the static environment. Specifically, the inequality $w_L^\sigma < w_L$ states that forward-looking considerations lead the interventionist party L to bias her behaviour, relative to L's primitive preference, in favour of the intervention p; conversely, $w_R^\sigma > w_R$ means that the laissez-faire party R's behaviour is similarly biased in favour of no intervention (see Dziuda and Loeper (2015) for a similar result in a two-alternative model). To see the intuition here, suppose, for example, that p is the status quo for some period t and that the realization of θ_t is such that R, the laissez-faire party, would surely repeal p if R was the only policy-maker. But replacing p by n in Γ also requires acquiescence by the party least willing to overturn p for n, the interventionist party L. Consequently, anticipating L's relative reluctance to

[8]When $e_R^\sigma = 0$, and only then, R is indifferent between q and p and therefore may veto a change away from q when it is the status quo. However, once $s_t \in \{n, p\}$, then q is never implemented in any period after t.

overturn an interventionist status quo, R prefers not to support an efficient intervention for some realizations of the state in which R would prefer otherwise. The intuition for L's relatively increased bias is symmetric.

It should be noted that in an EE, even if parties use only the efficient instrument, the equilibrium outcome exhibits some static inefficiency. When $s_t = p$ and $\theta_t \in (w_L^\sigma, w_L)$, policy p remains effective despite both players receiving strictly higher payoffs from n in period t. Similarly, when $s_t = n$ and $\theta_t \in (w_R, w_R^\sigma)$, policy n remains despite both players receiving strictly higher payoffs from p in period t. However, this inefficiency can only take the form of status quo inertia: although a status quo may stay in place when it ceases to be statically Pareto efficient, a change in the status quo can only occur if the change is statically Pareto efficient.[9]

Recalling that party i is indifferent (in equilibrium σ) between p and n at $\theta = w_i^\sigma$, and is likewise indifferent between q and n at $\theta = w_i^\sigma + e_i^\sigma$, the following result characterizes the main properties of IEs.

Proposition 2 *If σ is an IE, then* $\min\{w_L^\sigma, w_R^\sigma\} < \min\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\}$ *and one of the following conditions holds:*

(i) $w_L^\sigma < w_R^\sigma$, $e_L^\sigma > 0$ *and* $e_R^\sigma \leq 0$;

(ii) $w_L^\sigma > w_R^\sigma$, $e_L^\sigma \leq 0$ *and* $e_R^\sigma > 0$.

First consider IEs of type (i). The inequalities $e_L^\sigma > 0$ and $e_R^\sigma \leq 0$ imply that party L prefers to intervene via the efficient policy instrument p whereas party R prefers to use the inefficient instrument q. Now, for sufficiently high states θ_t, both players prefer to intervene in period t when the status quo is n although, for some more intermediate states, each party is willing to intervene only with its preferred instrument (p for L and q for R). Hence, if $s_t = n$, an intervention is implemented for relatively large θ; whether it is implemented using p or q depends on the severity of the problem reflected in θ and the identity of the proposer. Because parties disagree on which instrument they prefer, once an intervention is implemented it stays in place until both players agree to revert to no intervention, n. In particular, the efficient intervention p is repealed when $\theta < \min\{w_L^\sigma, w_R^\sigma\}$ and the inefficient intervention q is repealed when $\theta < \min\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\}$. And since IE exist only if $\min\{w_L^\sigma, w_R^\sigma\} < \min\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\}$, Proposition 2, therefore, claims that the inefficient intervention q is repealed for a larger set of states than is the efficient intervention p. In turn, the fact that inefficient interventions are less 'sticky' than efficient interventions mitigates

[9] A sequence of policies $(x_t)_{t\in\mathbb{N}}$ is statically Pareto efficient if, in each period $t \in \mathbb{N}$, there is no other policy y that is strictly preferred by both players to x_t, keeping all other policies in the sequence unchanged.

R's concern with being able to repeal an intervention to the extent that, for sufficiently high states, R prefers to intervene via q rather than p, despite the lower flow payoff that q generates.

Proposition 2 does not uniquely order all thresholds and there are two possible subtypes of type-(i) IE. Although the result says that the inefficient policy is less persistent than the efficient policy in all IE, it does not say which intervention is more likely to be adopted, if any, given a status quo n. This depends on the allocation of proposal power and on the intervention, p or q, more likely to be vetoed. And the latter hinges on whether $\max\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\} \lesseqgtr \max\{w_L^\sigma, w_R^\sigma\}$; both are possible, giving rise to the two subtypes of type-(i) IE left implicit in the statement of the proposition. An example of the subtype of type-(i) IE with $\max\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\} < \max\{w_L^\sigma, w_R^\sigma\}$ is illustrated in Figure 2.

Figure 2 here

From Figure 2, a status quo policy n remains unchanged unless $\theta > \max\{w_L^\sigma + e_L^\sigma, w_R^\rho + e_R^\sigma\}$. For $\theta \in (\max\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\}, w_R^\sigma)$, R prefers n to p and so would veto p if this intervention were proposed by L; however, both parties strictly prefer intervening here with q to staying with the status quo n. Consequently, when a state in this interval is realized, the inefficient instrument q is implemented regardless of the party with proposal power.[10] When $\theta > w_R^\sigma$, both players prefer any type of intervention to remaining with a status quo n. Whether the intervention for such states is efficient or inefficient, therefore, depends on the party with proposal power. If L is the proposer, p is implemented and remains the status quo for a larger set of states than is the case if R is the proposer and q is implemented.

Figure 3 describes an example of the second possible subtype of type-(i) IE, that is, with $\max\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\} > \max\{w_L^\sigma, w_R^\sigma\}$.

Figure 3 here

Given a status quo n and $\theta \in (w_R^\sigma, w_L^\sigma + e_L^\sigma)$ here, R prefers intervening with any instrument to maintaining the status quo but L strictly prefers n to the inefficient instrument q. In this case, then, p is implemented for any allocation of proposal power. And, similarly to the situation illustrated in Figure 2, when $\theta > (w_L^\sigma + e_L^\sigma)$ both parties strictly prefer any intervention to the status quo, so which particular instrument is adopted depends on the identity of the proposer exactly as for the previous example.

[10] In the appendix, we show that when $e_L = e_R$ or when e_L and e_R are small relative to $w_R - w_L$, then all IIE are as depicted in Figure 1. That is, they are of type (i) and are such that $\max\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\} < \max\{w_L^\sigma, w_R^\sigma\}$.

Before discussing type-(ii) IE, it is worth stressing that, even though an IE can take different forms, behaviour in any IE generates a qualitatively different inefficiency from the status quo inertia observed in an EE. On the equilibrium path, parties in an IE agree to an intervention that is statically Pareto inefficient and, in some cases, this can occur whatever the allocation of proposal power.

Now consider type-(ii) IEs. That equilibria of this sort can exist is somewhat surprising. This is because $w_R^\sigma < w_L^\sigma$ implies that the interventionist party is willing to accept the efficient intervention *less* frequently than the laissez-faire party. That is, in contrast to the situation under type-(i) IE, L is more concerned than R about status quo inertia if p is adopted. As a result, to hedge against status quo inertia with p, L prefers to intervene with q; hence, $e_L^\sigma \leq 0$.

For some intuition for why $w_R^\sigma < w_L^\sigma$ can occur in equilibrium, suppose R strongly prefers to intervene with p rather than q, if at all (i.e. e_R is large). Nevertheless, for high enough θ, R prefers any intervention over n. Therefore, if n is the status quo and L is the proposer in such a state, q is surely implemented. So to reduce the likelihood of this possibility, R strategically chooses not to repeal p in favour of n in some states where, other things equal, R strictly prefers n.

Given the empirically suspect properties of type-(ii) IE and the following proposition, hereon we exclusively focus on EE and type-(i) IE when discussing any intuition for the results to follow.

Proposition 3 *Whenever a type-(ii) IE exists, then either a type-(i) IE or an EE exists.*

5 Existence and value of instrument inefficient equilibria

The following proposition provides relatively weak conditions on the environment for which IE to Γ exist for any payoff parameters (w_L, w_R, e_L, e_R). In particular, all equilibria can be IE no matter how inefficient is the policy instrument q relative to p, the efficient intervention.

Proposition 4 *Let G be a c.d.f. with mean 0 and variance 1. For any (w_L, w_R, e_L, e_R), for all δ sufficiently close to 1, there exists a nonnegligible set of $m \in \mathbb{R}$ and $v > 0$ such that for $F(\theta) \equiv G\left(\frac{\theta - m}{v}\right)$, all equilibria of Γ are IE.*

The sufficient condition on the distribution of states here essentially requires that relatively little probability mass is concentrated in the tails. Given that both parties prefer only efficient interventions to persist when states are typically extreme, a property of this sort is necessary for any concern with the rationality of inefficient interventions to be relevant. More specifically, recall Figure 2, above. In this case, party R's preference for implementing q instead of p increases with the likelihood of states in which q is repealed but a status quo p remains, that is, in states $\theta \in (w_L^\sigma, \min\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\})$. Similarly, because, all else equal, p generates a greater flow payoff for R, R's preference for implementing q instead of p decreases in the likelihood of states where both interventions persist, that is, in the relatively extreme states $\theta > w_R^\sigma$ in Figure 2. Thus the condition on F used in Proposition 4 insures, for the example of Figure 2, that states in $(\max\{w_L^\sigma + e_L^\sigma, w_R^\sigma + e_R^\sigma\}, w_R^\sigma)$ are sufficiently likely, and states greater than w_R^σ sufficiently unlikely, to guarantee IE exist.

The next two propositions fix the uncertainty F (not necessarily satisfying the identified sufficient condition) and the discount factor δ, and consider how the payoff parameters and allocation of bargaining power affect the instrument efficiency of equilibria. Write $b = (b_i(.,.))_{i=L,R}$ to describe an arbitrary allocation of bargaining power.

Proposition 5 *Fix $\delta \in (0,1)$ and the c.d.f F.*

(i) *For all (w_L, w_R) and all allocations of bargaining power b, if all equilibria are IE for some (e_L, e_R), then all equilibria are IE for all $e'_R \leq e_R$ and all $e'_L \geq e_L$. Moreover, for any $e_L > 0$, all equilibria are IE as $e_R \to 0$.*

(ii) *For all (e_L, e_R) and all allocations of bargaining power b, there exists an EE for $(w_R - w_L) \to 0$. For a fixed w_L, as $w_R \to \infty$ all equilibria are IE whereas, for a fixed w_R, as $w_L \to -\infty$ all equilibria are EE.*

The comparative static claims in Proposition 5(i) regarding changes in R's payoff difference between the efficient and the inefficient interventions, e_R, are intuitive. If, at some (e_L, e_R), R is willing to accept the inefficient intervention q in exchange for an increase the likelihood that the intervention is repealed in the future, R is also willing to accept q in such circumstances for lower degrees of inefficiency. The claim in Proposition 5(i) regarding changes in e_L, however, is less obvious as an increase in e_L has two effects. On the one hand, L is prima facie more willing to repeal a status quo q when p is relatively more valuable (i.e. for larger e_L), which in turn increases the strategic value of q for R. On the other hand, since a larger e_L implies L's payoff from q is smaller, L's willingness to accept any proposal to implement q decreases as well. But regardless of the value of e_L, for θ large enough, L prefers q to a status quo n, so R proposes it (conditional on being proposer of course) and q is implemented on the equilibrium path.

It is informative to reformulate Proposition 5(i) in terms of party polarization. Recall that w_i and $w_i + e_i$ can be interpreted as the ideological position of party i on how often to intervene when using policy p and q, respectively. For a fixed (w_L, w_R), as e_L increases and e_R falls, the gap between the parties' on policy p remains unaffected; for policy q, however, the difference between the two parties decreases. Proposition 5(i) then says that as e_L increases and e_R falls, all else equal, parties become more inclined to use the inefficient, but more consensual policy, instrument q.

Finally, Proposition 5(ii) concerns how the equilibria change with the conflict of interest between the parties over n and p, as measured by $w_R - w_L$. Clearly, when this conflict of interest is small enough, the set of states in which a repeal of the intervention is desired by R but vetoed by L is likewise small. Hence, R's concerns with respect to the ability to repeal any intervention is mitigated to the extent that the inefficient instrument is never used in equilibrium. Given this logic, it is reasonable to conjecture the reverse is also true, that is, as the conflict of interest increases, it becomes more important for R to facilitate the repeal of an intervention. But Proposition 5(ii) says that this intuition has to be qualified. As we increase the conflict of interest by letting $w_R \to \infty$ for fixed w_L, indeed all equilibria become IE as expected; but increasing the conflict of interest by letting $w_L \to -\infty$ for fixed w_R, all equilibria become EE. The intuition for this is as follows. As $w_L \to -\infty$, L prefers to intervene in most states, even when the inefficient instrument q is used. Hence, L is unlikely to repeal any intervention. As a result, the use of q implies a large inefficiency loss for a negligible gain in terms of the increased likelihood of a future repeal.

By definition of the two interventions, efficient p and inefficient q, there is clearly no social welfare gain to be had from q in a static environment. Whether this holds for the dynamic setting here is less transparent. Prima facie, parties are free to ignore the inefficient instrument, in which case having q available seems at most welfare-irrelevant. But q can have positive strategic value when an efficient intervention might otherwise be appropriate. The existence of this possibility, therefore, could in principle lead to welfare-reducing equilibria relative to when only efficient instruments are available. The next result identifies conditions under which both parties are strictly better off with access to the inefficient instrument q, than if they restricted themselves to choosing only between n and p. In other words, there are environments in which a statically inefficient policy instrument supports Pareto improvements in the dynamic game. Let $\Gamma(n, p, q)$ denote the original game, let $\Gamma(n, p)$ denote the game in which the inefficient instrument is unavailable, and let $\Gamma(n, q)$ denote the game in which the efficient instrument is unavailable.

Proposition 6 *Assume $s_0 = n$ in all games $\Gamma(n, p, q)$, $\Gamma(n, p)$ and $\Gamma(n, q)$. Then, for any (w_L, w_R, e_L, e_R) and for all δ sufficiently close to one, there exists a distribution of states F such that, given F, both parties are better off in any equilibrium of $\Gamma(n, q, p)$ than in any equilibrium of $\Gamma(n, p)$, and both parties are better off in any equilibrium of $\Gamma(n, q)$ than in* *any equilibrium of* $\Gamma(n,p)$.

The intuition for Proposition 6 is similar to that of Proposition 4. If the c.d.f. F puts enough weight on $(w_L, \min\{w_L + e_L, w_R\})$, then L and R are likely to disagree over n and p, but are unlikely to disagree over n and q. Consequently, in the game $\Gamma(n,p)$, sufficiently patient parties become very biased in favour of the policy each prefers most on average. In particular, w_R^σ increases in δ, so R never agrees to intervene and the initial status quo n persists indefinitely. The availability of q, however, provides room for parties to intervene for states $\theta > \min\{w_L + e_L, w_R + e_R\}$, since the likelihood of agreement on repealing the intervention is greater with q than with p. This greater flexibility leaves both players better-off in equilibria in $\Gamma(n,q,p)$ than in $\Gamma(n,p)$. Similarly, since it is harder, others things equal, to repeal an efficient intervention than an inefficient intervention, the same relative welfare property applies when comparing $\Gamma(n,q)$ to $\Gamma(n,p)$.

6 Persistent states

To this point, we have assumed that states, and thereby parties' state-contingent preferences, are i.i.d. draws over time. However, in many applications, states might persist for several consecutive periods before a period of relative volatility. There may be periods of relatively stability when players do not expect to change their positions quickly, and there may also be periods in which new information about the desirability of an intervention arrives frequently, resulting in frequent revision of the relevant policy preferences. A painful example is the US Congressional response to the 2008 fiscal collapse. For some years before the 2008 fiscal collapse, the US economy was growing strongly and atypical Congressional economic interventions were minimal. The fall of Lehman Brothers and the subsequent turmoil in much of the global economy led to serious Congressional disagreement regarding the appropriate level and duration of any extraordinary intervention, from whether to bail out banks or the car industry, to extensions of unemployment and welfare benefits. In this section, we ask how expectations about the volatility or persistence of states affect parties' strategic policy decisions.

To capture the possibility (in an analytically tractable way) that states θ may or may not persist across periods, and that parties' expectations regarding persistence are sensitive to (if not fully determined by) the current state, consider, for every period t, the tuple $(\theta_t, v_t) \in \mathbb{R} \times [0,1]$. Assume the evolution of such tuples across periods satisfies, for all t:

$$(\theta_{t+1}, v_{t+1}) = \begin{cases} (\theta_t, v_t) \text{ with probability } 1 - v_t \\ (\theta_{t+1}, v_{t+1}) \sim H \text{ with probability } v_t \end{cases}.$$

As before, θ_t is the underlying policy-relevant state. We interpret the additional variable v_t as a measure of volatility or, equivalently, of parties' period t expectations over θ_{t+1}. In each period t, with probability $(1-v_t)$ the state θ_t and volatility v_t persist into period $t+1$; and with probability v_t, (θ_{t+1}, v_{t+1}) is drawn according to some joint c.d.f. H with full support on $\mathbb{R} \times [0,1]$. Thus, the volatility of future state-contingent policy preferences is redrawn if and only if the state-contingent policy preferences are redrawn; almost surely, therefore, both policy preferences and volatility change together.

Note that this evolution of the state collapses to the basic iid model if $v_t \equiv 1$ for all t. Similarly, $v_t \equiv 0$ for all t implies preferences never change and $v_t \equiv v \in (0,1)$ for all t implies the degree of volatility is fixed.

Lemma 2 *For any equilibrium strategy profile σ, there exist $(w_L^\sigma, w_R^\sigma, e_L^\sigma, e_R^\sigma) \in \mathbb{R}^4$ such that, for all $i \in \{L, R\}$, $\theta \in \mathbb{R}$, the continuation payoff function V_i^σ (as defined in Section 2) satisfies*

$$\begin{aligned} (1-\delta(1-v))\left(V_i^\sigma(\theta,v,p) - V_i^\sigma(\theta,v,n)\right) &= \theta - (1-v)\,w_i - vw_i^\sigma \\ (1-\delta(1-v))\left(V_i^\sigma(\theta,v,p) - V_i^\sigma(\theta,v,q)\right) &= (1-v)\,e_i + ve_i^\sigma. \end{aligned} \tag{3}$$

Hence, as in the basic model, players continuation payoff functions V^σ have the same shape as their flow payoff functions in (1), but the flow payoff parameters w_i and e_i are replaced by $(1-v)\,w_i + vw_i^\sigma$ and $(1-v)\,e_i + ve_i^\sigma$, respectively.[11] As before, the difference between the flow payoff parameters and the continuation payoff parameters, namely $v\,(w_i^\sigma - w_i)$ and $v\,(e_i^\sigma - e_i)$, captures the way parties distort their equilibrium behaviour relative to their flow payoff. Note that in this extended model, such distortion varies with v in a systematic way. When $v = 0$, players expect their preferences to remain constant in the future. In this case, each party behaves as in a one period-model and the difference in the continuation values coincides with the difference in the static flow payoffs (1). As v increases, the (state-contingent) preferences are more likely to change in the future and, therefore, the status quo becomes more salient, driving a wedge between the difference in the continuation values and the difference in the static flow payoffs.

Recall that the inefficient instrument q is implemented for some realizations of the preferences θ in some equilibrium σ only if $V_i^\sigma(\theta,v,p) - V_i^\sigma(\theta,v,q) \le 0$ for one party. From (3), there is no level of volatility v at which this can happen if $e_i^\sigma \ge 0$ for $i = L, R$; hence, q is never implemented on the equilibrium path. In environments where $e_i^\sigma < 0$ for some i, however, $V_i^\sigma(\theta,v,p) - V_i^\sigma(\theta,v,q)$ is strictly decreasing in v, yielding the following result.

[11] The common scaling factor $1-\delta(1-v)$ does not affect the sign of the expressions in (3), and thus does not affect which policy parties prefer to implement on the equilibrium path.

Corollary 1 *Suppose $s_0 \in \{n, p\}$ and consider any (w_L, w_R, e_L, e_R), δ, and H. In any equilibrium, either q is never implemented, or there exists $\bar{v} \in (0, 1]$ such that q is implemented for a noneglegible set of states θ if and only if $v > \bar{v}$.*

Corollary 1 states that q is implemented on the equilibrium path only in sufficiently volatile environments. Intuitively, when parties expect the state to remain fairly stable over time ($v_t \leq \bar{v}$), strategic concerns regarding the possibility of conflict over repealing today's intervention tomorrow, say, are muted and any intervention is efficient. When the state is expected to be sufficiently volatile, however ($v_t > \bar{v}$), today's choice is likely to need revision in the next period, making salient exactly the sorts of strategic consideration underlying the use of inefficient interventions in earlier results. In particular, when the state is expected to be sufficiently volatile, the laissez-faire party is more likely to resolve any conflict between the parties' to its advantage than when the state is relatively persistent.

7 Application: taxes vs quotas redux

Recall the motivating example of Section 1 above where the parties' are concerned with regulating an externality-generating private sector activity, $a \geq 0$. In particular, the underlying preferences of the two parties $i = L, R$, are given by

$$U_i(\theta, a) = \pi_i P(a) + (1 - \pi_i) B(a, x) + \theta E(a),$$

with $\pi_L < \pi_R < 1/2$. $P(a)$ is the private sector profit from activity a, $B(a, x)$ is the government budget given a and policy $x \in \{n, p, q\}$, and $\theta E(a)$ describes the net social value of the externality in the period. The only changes to the model in Section 1 are that the externality here may be positive or negative, so the social value $E(a)$ may be increasing or decreasing in a; and the social cost may be negative, that is $\theta \in \mathbb{R}$. Thus, the efficient policy may be the quota in some circumstances.

As before, suppose the private sector produces $\hat{a}$ without regulation and the government can induce a desired level of activity a^* through regulation; hence $P(\hat{a}) > P(a^*)$ and, by definition of a^* and $E(a)$, $E(\hat{a}) < E(a^*)$ regardless of whether the externality is positive or negative. Then party i's preferences can be written so that

$$U_i(\theta, p) - U_i(\theta, n) = \theta - w_i,$$
$$U_i(\theta, p) - U_i(\theta, q) = e_i;$$

where,

$$w_i = \frac{P(\hat{a}) - P(a^*)}{E(a^*) - E(\hat{a})}\pi_i - \frac{B(a^*, p)}{E(a^*) - E(\hat{a})}(1 - \pi_i),$$

and

$$e_i = \frac{B(a^*, p)}{E(a^*) - E(\hat{a})}(1 - \pi_i).$$

Under the assumption that $1 > \pi_i$, e_i has the same sign as $B(a^*, p)$, so p is the efficient policy when $B(a^*, p) > 0$. That is, p is the efficient policy when p is a tax regulating a negative externality. Conversely, when the externality is positive, p is a subsidy; hence, $B(a^*, p) < 0$ and the efficient policy is q. And when q is the efficient policy, the expression for e_i is as above, but the cutpoint w_i characterizing the flow payoff difference between the efficient policy, q, and no regulation, n, is given by $[P(\hat{a}) - P(a^*)][E(a^*) - E(\hat{a})]^{-1}\pi_i$ since $B(a^*, q) = 0$.

Given $\pi_R > \pi_L$, $w_L < w_R$ and $0 < e_R < e_L$ regardless of whether the externality in any period is positive or negative. Thus, any IE must be of type-(i) in Proposition 2 and the ordering of the cutoffs must be as in Figure 2 (see Lemma **??** in the appendix). For δ sufficiently large and for some specification of the distribution of θ, therefore, all equilibria are IE (Proposition 4) and both parties can be worse-off if the Pareto inferior instrument is not available to regulate the externality (i.e. the quota for a negative externality and the tax for a positive externality) (Proposition 6). Note that, in either case, dynamic considerations push both parties toward the policy that generates the least public revenue, in that a quota (for a negative externality) or a subsidy (for a positive externality) would never be implemented in a static model. In other words, strategic behaviour in the dynamic framework, along with the associated polarization of fiscal preferences, can mitigate the positive effect of the double dividend.

In the case of a positive externality, w_i and e_i depend only on π_i, permitting easy application of the first comparative static result from Proposition 5 here. For a fixed (π_L, π_R), the inefficient policy of subsidy is more likely to be implemented on the equilibrium path as parties' become more polarized, that is, as π_L falls and π_R increases.[12]

In sum, the observed use of inefficient interventions to manage externalities and the resulting underutilization of the double dividend is, within a dynamic political economy framework, quite consistent with rational behaviour on the part legislators.

[12]If the model is changed to allow the utility-weights on profit and public revenue to be independent, that is, assume $\pi_i \geq 0$, $\pi_R > \pi_L$, and replace $1 - \pi_i$ by some parameter $\rho_i > \pi_i$ with $\rho_L > \rho_R$; then the remaining comparative static result from Proposition 5 can be applied similarly.

8 Conclusion

The continued and widespread use of inefficient policy instruments in more-or-less democratic political systems is a puzzle: Why would rational politicians choose inefficient policies when efficient alternatives are available and understood? In this paper, we propose (to the best of our knowledge) an additional answer to those already found in the literature: Because, with a heterogeneous legislature, inefficient policy instruments are politically easier to repeal in dynamic environments subject to policy-relevant stochastic shocks.

Our explanation does not depend on any particular types of policy; it also has relevance to understanding the choice of inefficient agreements in settings in which policy reforms must be approved by heterogeneous policymakers. Such settings include democracies with supermajority requirements or checks and balances, as well as international organizations in which decisions are taken by unanimity rule. For example, the Eurozone's "stability pact" is a prima facie inefficient way to deal with fiscal free-riding in the EU monetary union, while the efficient instrument is a fiscal union. But the stability pact is in principle easier to amend or overturn.

The model abstracts away from a variety of potentially important issues. Perhaps most importantly, we do not admit side-payments between the legislative parties. Although this assumption is predicated on the difficulty, or even legality in some polities, of enforcing such transfers, it should be seen as a limitation on the results above. Nevertheless, it seems unlikely that strategic political decisions on how best to intervene in an economy are not coloured to some extent by the sorts of consideration underpinning our account. In particular, the level of transfers required to insure only efficient interventions are used needs to be large relative to the payoff differences between doing nothing and using an efficient policy.

9 Appendix

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Figure 1: Policy preferences

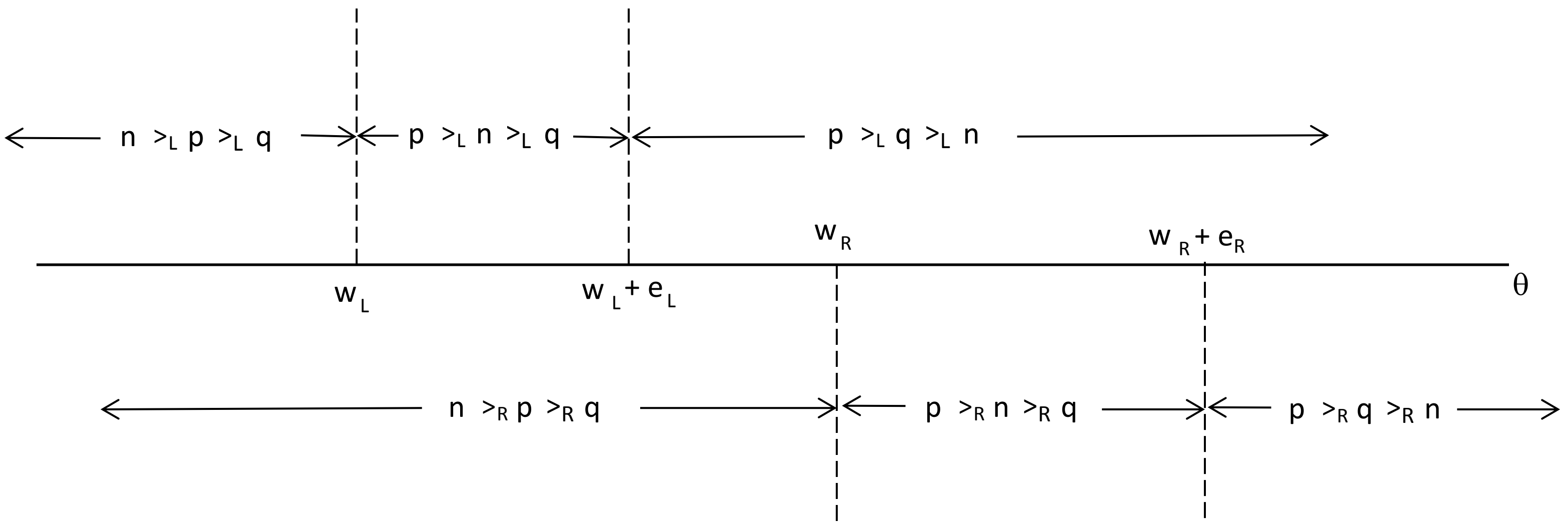

Figure 2: Type-(i) IE with $\max_{i=L,R}.\{w_i^\sigma + e_i^\sigma\} < \max_{i=L,R}.\{w_L^\sigma, w_R^\sigma\}$

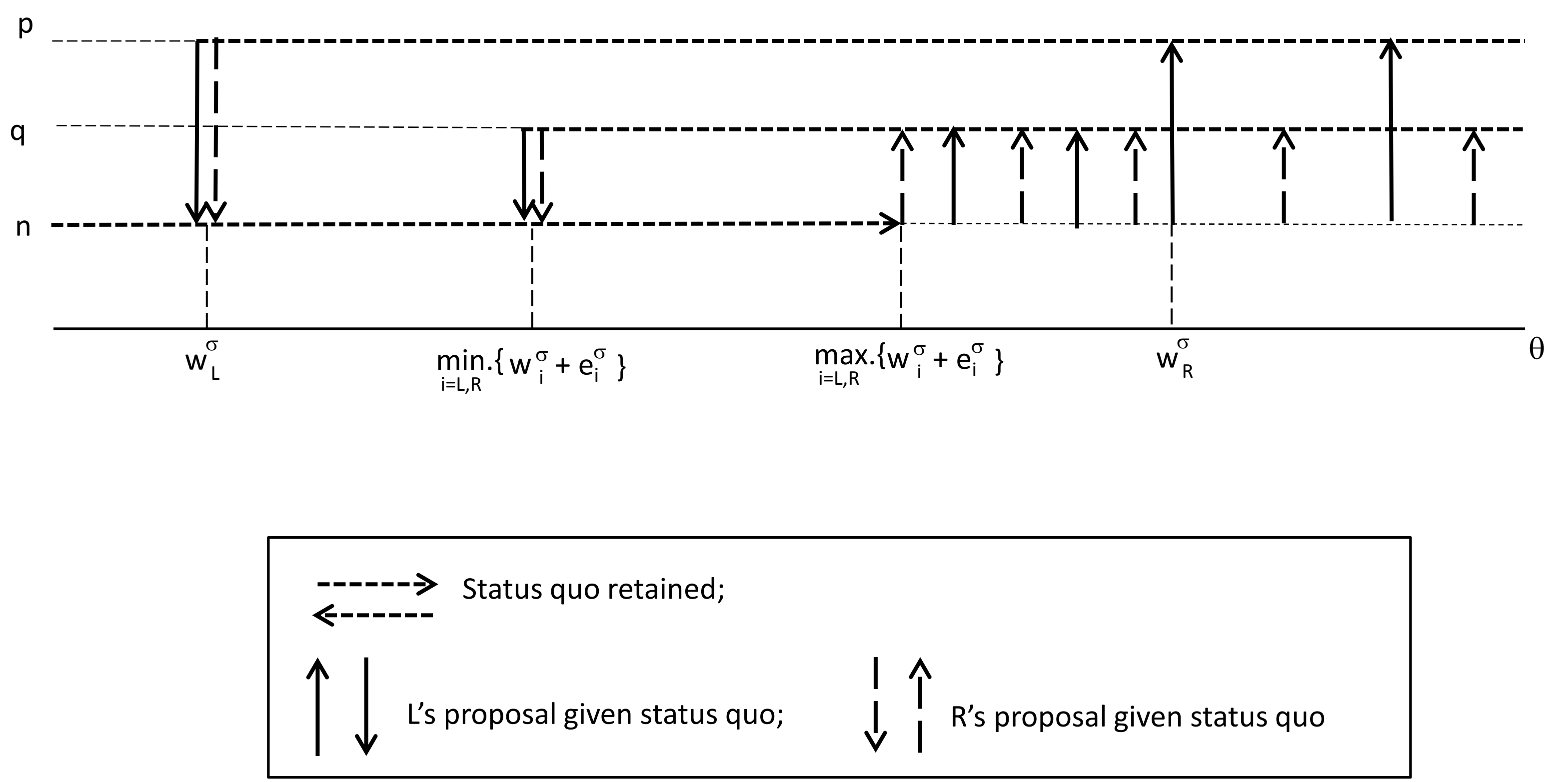

Figure 3: Type-(i) IE with $w_L^\sigma + e_L^\sigma > w_R^\sigma$