

Coasian Bargaining in World Politics: Re-Examining the Demand for International Regimes

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Abstract

Thirty years ago Keohane (1982) “inverted” the Coase Theorem providing a justification for international regimes: by reducing transaction costs and mitigating uncertainty, regimes enhance the efficiency of bargaining in an anarchic international system. These ideas are foundational to the study of international cooperation. Yet applying Coase’s Theorem requires an additional, overlooked condition. Efficiency in international cooperation requires the availability of side payments. We analyze a model of bargaining with side payments and show that in their absence cooperation is generically inefficient. The analysis makes three contributions. First, it amends the conventional wisdom regarding power and international cooperation: the impact of power on cooperative outcomes is circumscribed in the presence of side payments. Second, it identifies conditions under which side payments can (and cannot) enhance prospects of successful bargaining. Finally, it provides a framework through which the insights of contract theory can be brought to bear on the study of international regimes.

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1 Introduction

Thirty years ago Keohane (1982) “inverted” the Coase Theorem to provide a justification for international regimes. Against a background of power-based politics - and the prevailing ethos of realist theory - the existence of “institutionalized patterns of cooperation” demanded some explanation (Keohane, 1982, 325). In response Keohane conceived of international cooperation as akin to contracting between economic agents and regimes, by extension, as devices for enhancing the efficiency of international bargaining. By providing limited property rights, reducing transaction costs and mitigating uncertainty, regimes ameliorate the causes of market failure identified by Coase (1960) and others.

Yet this analysis obscures a crucial pre-condition for the application of Coase’s Theorem to international politics. Coase (1960) envisioned a setting in which economic agents buy and sell the right to impose externalities on one another. In the absence of transaction costs and uncertainty - and given stable expectations of property rights - this bargaining between economic agents yields efficient outcomes. In the international arena states similarly bargain over policies to limit the extent of externalities imposed on others through the pursuit of narrow self interest. But in the absence of some mechanism for compensation the outcomes of bargaining will fall short of efficiency. Efficiency in international cooperation requires the availability of *side payments*.

Side payments are pervasive in international cooperation, particularly so within international regimes where linkages across issues and over time enhance the credibility of any payment scheme. Consider a stark example. In 2008 the World Trade Organization’s Dispute Settlement Body ruled that U.S. cotton subsidies were in violation of its obligations under the multilateral trade agreements, having unfairly impinged on the competitiveness of Brazilian exports. Rather than alter its policy, the U.S. negotiated a private agreement with Brazil, agreeing to pay \$147 million per year in exchange for the right to continue subsidization of domestic cotton farmers (Pelc, 2014).¹ The arrangement has been roundly criticized by trade experts. Yet it perfectly illustrates the logic of Coasian bargaining at work in the international system.

Existing studies allude to side payments as a form of issue linkage, promoted by international regimes as a means of securing cooperation where states might otherwise balk (Haas, 1980). Side payments provide a means of “balancing” the benefits of an agreement or increasing the

¹For more on pay-to-breach provisions within international economic agreements see Kucik and Pelc (2016), Pelc and Urpelainen (2015), and Pelc (2010).

overall value of cooperation (Grieco, 1988; Tollison and Willet, 1979; Poast, 2012). These are reasonable assertions. Yet we argue the precise role of side payments in enhancing the efficiency of international cooperation has been under-appreciated. Side payments act as a numeraire good, providing a means of denominating and allocating the value derived from cooperation between states. In the absence of this numeraire there is little hope of efficiency in international bargaining.

We study a simple model of bargaining between two states and demonstrate how outcomes differ in the presence of side payments. When side payments are possible the outcome of bargaining is always efficient in line with the predictions of the Coase Theorem. When side payments are restricted the outcome will instead vary with the relative power of the negotiating parties. While we are not the first to formalize the intuition of the Coase Theorem our core contribution lies in the implications of this result for theories of international cooperation and bargaining. Most importantly, the analysis highlights the centrality of side payments in achieving efficient cooperation and suggests a justification for international regimes equally important to those identified in Keohane (1982).²

Building on this initial result, we develop a second, powerful implication of efficiency: when side payments are possible the outcome of negotiations is entirely independent of the distribution of power among states.³ The implications of this result for long-standing debates about power and international cooperation cannot be understated. One long-standing realist critique of regime theory holds that even where cooperation is possible, the institutions which result will be shaped by states' relative power (Krasner, 1991; Grieco, 1988; Stone, 2011). Our results show that this is misguided. Where side payments are possible the design of institutions is invariant to the distribution of power.

We next turn our attention to the relationship between side payments and the sources of bargaining failure as identified in Fearon (1995). In all cases we identify conditions under which side payments enhance prospects for cooperation and conditions under which they do not. It is particularly striking that under uncertainty about outside options we show the availability of side payments may actually *increase* the risk of bargaining failure. Our next result highlights a well-known finding in the broader literature on contract theory, that side payments can be used to elicit information under uncertainty about an opponent's value for policy concessions. Moreover bargaining failure may still result under this type of incomplete

²Also Keohane (1984).

³Our first result corresponds to the so-called "efficiency" version of the Coase Theorem while our second to the "invariance" version. As noted above we are not the first to formalize the logic of these results though we believe our exposition holds particular value for IR audiences. For a classic treatment of Coase's ideas see Stigler (1966).

information. Thus the analysis identifies a novel source of bargaining failure, overlooked in the literature to date.

Our final contribution is methodological. The paper establishes a simple framework through which side payments can be incorporated into the widely-studied crisis bargaining model (Powell, 1987; Morrow, 1989; Banks, 1990; Fearon, 1995). While issue linkage has received attention in a number of recent studies this is the first to develop a theoretical treatment consistent with the assumptions of existing crisis bargaining models. In doing so we recast the problem of international bargaining as one akin to monopolistic pricing (Spence, 1977; Mussa and Rosen, 1978; Goldman et al., 1984; Maskin and Riley, 1984). We show that, as a result, standard techniques from contract theory can be brought to bear on the study of international negotiations, highlighting a number of potentially fruitful avenues for future research.

2 Model

Our model resembles a standard two-player bargaining model of war with one novelty. In addition to bargaining over a policy outcome, players simultaneously bargain over a side payment (or transfer), T . Side payments can be thought of as a second policy dimension - one that is readily convertible to money - or any other form of cash transfer. There are two states: a challenger C who makes a take-it-or-leave-it offer and a defender D who can accept or reject her offer. If C 's offer is accepted, cooperation ensues. Rejection leads to bargaining failure. C 's offer consists of a proposed policy, $x \in [0, \bar{x}]$, and a side payment $T \in \mathcal{R}$ representing D 's transfer to C . Note that transfers may be positive or negative. Positive transfers represent a payment from D to C while negative transfers represent the reverse (a payment from C to D). We assume that states are unconstrained in the amount of transfers they can offer.⁴

Utilities for C and D are additively separable with respect to the policy outcome and side payment. We assume that money is valued linearly, but that players may differ in their valuation of the policy. State D values x according the function $v(x)$, where $v(\cdot)$ is strictly increasing in x , $v'(x) > 0$, and strictly concave, $v''(x) < 0$. Similarly C values the policy offered to D according to $c(x)$, which is strictly increasing in x , $c'(x) > 0$, and strictly

⁴Alternatively assume there is a budget constraint which is large relative to the value of the policy outcome.

convex, $c''(x) > 0$. In the case of a cooperative outcome utilities are,

$$U_C = T - c(x)$$

$$U_D = v(x) - T$$

This formulation implies that C 's ideal policy is $x = 0$ while D 's ideal policy is $x = \bar{x}$. While the resulting negotiations are distributional in nature (any gain by C is experienced as a loss by D) they are not necessarily zero sum. Rather we assume that joint gains from cooperation are possible. If bargaining failure occurs, each state receives a fixed payoff, w_C and w_D respectively. These outside options are common knowledge. Bargaining failure is inefficient, that is, there exists a pair (x, T) such that,

$$\mathbf{A1.} \quad U_C + U_D > w_C + w_D$$

Note that when side payments are restricted to zero the model is isomorphic to the standard bargaining model employed widely in the IR literature. This isomorphism is valuable since it enables us to link our discussion of efficiency in international regimes with the broader theoretical literature on bargaining failure (Fearon, 1995).

3 Results

3.1 Issue Linkage and Efficiency

We begin by considering the relationship between side payments and efficiency. The first result establishes the equilibrium policy in the absence of side payments.

Proposition 1 (Complete Information with No Transfers). *Restricting side payments to zero, there is a unique equilibrium in which the policy, \tilde{x} , is*

$$v(\tilde{x}) = w_D$$

Proposition 1 characterizes outcomes in the model with no side payments. Under complete information, the positive gains from cooperation ensure the two countries will reach an agreement. The equilibrium allocation, \tilde{x} , reflects two sources of bargaining power. First, the

challenger enjoys proposal power, thus is able to extract the full surplus from cooperation, leaving the defender indifferent between agreeing and pursuing his outside option. Second, the defender's outside option acts as a lower bound on the value which can be extracted and thus his equilibrium utility. The equilibrium allocation is shaped by the parties' bargaining power on both dimensions. The next result characterizes the equilibrium outcome when unrestricted side-payments are allowed.

Proposition 2 (Complete Information with Transfers). *With unrestricted transfers there is a unique equilibrium:*

1. *The equilibrium policy, x^* , is determined by*

$$v'(x^*) = c'(x^*).$$

That is, the efficient policy determines x^ .*

2. *Given x^* , D 's outside option determines T^* ,*

$$T^* = v(x^*) - w_D.$$

Generically the outcome x^ differs from \tilde{x} .*

Proposition 2 establishes that the equilibrium allocation when side payments are allowed is exactly the efficient allocation, x^* . In contrast to Proposition 1 the policy outcome in the presence of side-payments is *entirely independent* of the distribution of power on both dimensions highlighted above. The defender's outside option still acts as a lower bound on his equilibrium utility, yet given the availability of side payments, this acts as a binding constraint on the transfer, T^* , rather than the policy itself. A small modification to the model demonstrates that the policy is also independent of either player's agenda-setting power. Let $\mu \in [0, 1]$ be a measure of proposer power so that $\mu = 1$ implies full proposer power for the challenger and $\mu = 0$ implies full proposer power for the defender. Define *bargaining surplus* as $s(x^*) = v(x^*) - c(x^*) - w_c - w_D$ where x^* is the efficient allocation as defined as in Proposition 2.

Proposition 3 (Invariance to Proposal Power). *For any $\mu \in (0, 1)$ there is a unique equilibrium in which the policy outcome is x^* and payoffs are,*

$$(U_C, U_D) = (w_C + \mu s(x^*), w_D + (1 - \mu) s(x^*))$$

with equilibrium transfer, T^* characterized implicitly.

While proposal power matters in the allocation of the *gains* from cooperation, Proposition 3 establishes that it has no effect on the policy outcome. Taken together these results provide insight into the mechanisms by which side-payments enhance the efficiency of cooperation. In the absence of side-payments, the cooperative outcome is determined by the *distribution of power* across states, generically contributing to allocative inefficiency. Side-payments remedy this power-induced inefficiency, providing an alternate avenue by which states can be compensated for their material advantage while still maintaining an efficient level of exchange.

3.2 Bargaining Failure

Next we consider the relationship between side payments and the sources of bargaining failure identified in Fearon (1995). First we consider two types of information asymmetry: incomplete information over outside options and incomplete information over values.

3.2.1 Private Outside Options

In this section we assume that defenders may vary in the value of their outside option. Let there be a continuum of defender types, $w \in \mathbb{R}$. Types are private information and distributed according to strictly increasing CDF, F , where F is assumed to have an increasing hazard rate. We assume further that F admits a symmetric density, f .⁵ Again, letting x^* denote the efficient allocation, the next proposition characterizes equilibrium behavior.

Proposition 4 (Incomplete Information with Transfers). *In the game of incomplete information there is a unique equilibrium:*

1. The challenger offers division x^* and transfer $T^* = v(x^*) - w^*$ where w^* satisfies

$$\frac{F(w^*)}{f(w^*)} = v(x^*) - c(x^*) - w^* - w_C$$

2. Defenders with type $w \leq w^*$ accept the offer. All other types reject.

⁵These are standard assumptions satisfied by many common distributions, including the normal distribution. Alternatively assuming that F is log-concave yields the same results.

3. *Cooperation occurs with probability $F(w^*)$.*

The Challenger's equilibrium offer yields utility w^* to any defender that accepts. Defender types with outside option weakly lower than w^* then prefer cooperation while those with more valuable outside options prefer to walk away. The challenger's problem is to select w^* in order to maximize her own expected utility. As in the case of full information, side payments ensure that when cooperation occurs, the efficient policy outcome will prevail.

Note that even in the presence of transfers cooperation is not guaranteed and occurs only with probability $F(w^*)$. A natural question is how the probability of cooperation changes in the presence of side payments. The assertion that side payments make cooperation more likely is rarely questioned in the extant literature (Koremenos et al., 2001; Haas, 1980). Yet as the next result establishes this outcome is far from certain. Denote by x^r the equilibrium policy proposal when transfers are restricted and define w^r as the type which is indifferent between accepting and rejecting that offer.

Proposition 5 (Efficiency Under Incomplete Information). *$w^* \geq w^r$ if and only if,*

$$\frac{v(x^*) - c(x^*) - w^* - w_C}{-c(x^r) - w_C} \geq \frac{v'(x^r)}{c'(x^r)}$$

Proposition 5 demonstrates that the conventional wisdom that side payments increase the probability of successful negotiations is often, but not always true. Intuitively, the Challenger equates the expected gain from achieving cooperation with the marginal type against the expected cost of a more generous offer. Allowing for side payments enhances the efficiency of the equilibrium offer conditional on its acceptance, increasing the value of cooperation with the marginal type in particular.

At the same time the impact of side payments on the *cost* of achieving cooperation with the marginal type is ambiguous. Without side payments the Challenger can only transfer utility to the Defender at a rate of $c'(x^r)/v'(x^r)$. In contrast where side payments are available the Challenger can transfer utility to the Defender at a one to one rate. Where the marginal cost of policy concessions is low, contracting the marginal type may be relatively cheap and the resulting offers more generous in the *absence* of side payments.

3.2.2 Private Values

Next we consider the case of incomplete information about the defender's value for policy. The defender may attach a low (L) or high (H) value to marginal changes in policy. The defender's type is $t \in \{L, H\}$. Type t 's value for accepting an offer x is given by a function $v_t(x)$ where $v'_H(x) > v'_L(x)$ for all possible policies x . Again we assume that v is strictly concave for both types, $v''_t(x) < 0$. Let $\beta \in [0, 1]$ be the probability that the defender is a low value type and $1 - \beta$ be the probability that the defender is a high value type. Finally we assume that instead of offering a single contract, (x, T) , the Challenger may now offer a menu of contracts each specifying a policy and transfer pair.

In the model with private values the Defender will accept a particular contract only if he prefers that contract to any other contracts offered by the Challenger and to the option of rejecting all contracts. In designing the optimal menu of offers the Challenger must take into account both constraints, referred to as incentive compatibility (IC) and individual rationality (IR) respectively. Most importantly the IC constraint implies that the Challenger cannot simply offer both optimal contracts which he would choose if the Defender's type were known with certainty.⁶ Instead, by distorting the menu of offers the Challenger can induce each type of Defender to truthfully reveal his type by selecting the contract intended for him.⁷

Proposition 6. *If $\bar{w}_C \geq w_C$ for some \bar{w}_C , then there exists a fully separating equilibrium in which the Challenger offers a choice of contracts (x_H^*, T_H^*) or (x_L^*, T_L^*) with,*

$$\begin{aligned} x_H : \quad & v'_H(x_H^*) = c'(x_H^*) \\ x_L : \quad & v'_L(x_L^*) = \beta c'(x_L^*) + (1 - \beta)v'_H(x_L^*) \end{aligned}$$

and

$$\begin{aligned} T_H^* &= v_H(x_H^*) - v_H(x_L^*) + v_L(x_L^*) - w_D \\ T_L^* &= v_L(x_L^*) - w_D \end{aligned}$$

Type H selects (x_H^, T_H^*) and type L selects (x_L^*, T_L^*) . If instead $w_C > \bar{w}_C$ then there exists a fully separating equilibrium in which the Challenger offers x^* such that $v'_H(x^*) = c'(x^*)$ and $T^* = v_H(x^*) - w_D$. Type H accepts the offer while type L rejects. Bargaining failure occurs*

⁶That is the contract described in Proposition 2.

⁷In this analysis we follow standard treatments of adverse selection in bargaining. See for example Bolton and Dewatripont (2004).

with probability β .

The contracts described in the first half of Proposition 6 imply that while equilibrium utility to the low type is w_D (as in the case of complete information) equilibrium utility for the high type is $v_H(x_L^*) - v_L(x_L^*) + w_D$. While the Challenger offers the optimal policy concession to the high type, x_H^* , the corresponding transfer is lower than it would be under complete information, providing the necessary rent to induce the high type to accept the offer intended for him rather than deviate to accept the low type's more lucrative offer. In addition, note that this rent, $v_H(x_L^*) - v_L^*x_L^*$, is strictly increasing in x_L^* . Thus by reducing the policy concession offered to the low type, the Challenger reduces the rent which he must provide to the high type in equilibrium.

As the second part of Proposition 6 makes clear though if the distortion required in the L type's offer is large enough, the Challenger may prefer not to make an offer to the low type at all, but rather to make a risky offer which is efficient yet acceptable only to the high type. In this case when the Defender is a low type then bargaining failure will occur on the equilibrium path. Note that this source of bargaining failure is novel relative to existing literature which to our knowledge has considered only incomplete information over outside options.

3.3 Commitment Problems

Next we consider the implications of side payments for bargaining in the presence of commitment problems, that is where the relative balance of power between two states is shifting over time (Powell, 2006, 2004; Krainin, 2017). Suppose the Challenger and Defender bargain in each of two periods. Within each period all aspects of the bargaining problem are identical to the model discussed so far with the exception that in $t = 2$ the value of the Defender's outside option increases to $w_D + \Delta$ for some $\Delta > 0$. Suppose also that there is a budget constraint of b on the transfer which can be made from Defender to Challenger.⁸ Let the future be discounted at rate $\delta \in (0, 1)$.⁹ As our final result makes clear the equilibrium outcome depends on the magnitude of the shift in power, Δ .

Proposition 7 (Commitment). *In the dynamic game with transfers first period outcomes*

⁸We assume that b is sufficiently large that the results of Proposition 2 continue to obtain, that is efficient cooperation can occur.

⁹We assume that the second period represents the cumulative payoff of all future benefits and is thus weighted by $\frac{\delta}{1-\delta}$.

are as follows:

- If $\alpha \geq \Delta$ then no war occurs; bargaining is as in the static model.
- If $\Delta \in (\alpha, \beta]$ then no war occurs; bargaining is efficient; shifts in power are accommodated via transfers.
- If $\Delta \in (\beta, \gamma]$ then no war occurs; inefficient bargaining results.
- If $\Delta > \gamma$ no peaceful solution exists; war always occurs.

for some $\gamma > \beta > \alpha > 0$.¹⁰ Second period outcomes - for the first two cases - are as in the static game.

The first and last cases described above are similar to the model with no transfers. In the second and third cases side payments play a key role in determining equilibrium behavior which thus differs sharply from the standard crisis bargaining model. In the second case, the efficiency of bargaining is robust to shifts in the relative distribution of power as these shifts can be accommodated via side payments. Substantively this builds on Proposition 2 above: cooperative outcomes are invariant not only to the distribution of power but also to (moderate) shifts in that distribution.

As the shift in relative power grows larger (case three) this is no longer the case. When the policy chosen is the efficient one, satisfying the Challenger's own IR constraint requires a side payment which exceeds the budget constraint, b . For the Challenger to prefer peaceful bargaining to war it must be that the equilibrium policy departs again from the efficient allocation. That is, changes in the distribution of power may lead to inefficiency even when they are small enough that cooperation remains possible.

4 Conclusion

In this paper we analyze the effects of side payments in international bargaining. We demonstrate that bargaining is always efficient in the presence of side payments and that when side payments are possible the outcome of bargaining is invariant to the distribution of power among the bargaining parties. These results illustrate the central logic of the Coase Theorem while also highlighting its reliance on the availability of side payments. The analysis refines the conventional wisdom about cooperation and bargaining in international relations

¹⁰See Appendix A for a characterization of each threshold.

while providing a formal framework through which the insights of contract theory can be incorporated into future work.

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