The Economic Coercion Trilemma

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Abstract

States often use market access as a bargaining chip in international politics. A state that requires simultaneous compliance in multiple issue areas before granting market access maximizes incentives to comply but also makes them brittle – any targeted states that cannot comply in one issue area have no incentive to comply in any. More generally, programs of economic coercion can achieve at most two of the following three objectives: 1) secure a broad coalition of domestic political support, 2) the association of meaningful trade value with each policy issue, and 3) assurance that enforcing one political issue will not reduce the target's incentives to comply with conditionality on others. Characteristics of the program's domestic constituency, of the issues themselves, and of the international economy are key determinants of how the state prioritizes the three objectives. The trilemma explains the number and types of issues that can be linked to economic value.

1 Introduction

On January 3, 1985, the Generalized System of Preferences (GSP), a United States program which offers steep discounts on tariffs to member developing states, was at serious risk of expiring. Congress was hesitant to renew any program that directly encouraged imports

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competing with the powerful agricultural and textile lobbies. Labor unions also opposed renewal because they believed the GSP encouraged firms to offshore production. Against the odds, the program's supporters found a clever political strategy to revive its fortunes: create a new constituency for the program by transforming it into an instrument of economic coercion. First, the support of the labor unions was secured by requiring all beneficiary states of the program to respect labor rights. Second, the support of the pharmaceutical and film industries was secured by requiring all beneficiaries to respect intellectual property rights. Bolstered by an unlikely partnership of labor and capital, the GSP was renewed in its modified form.

But the architects of the renewed GSP legislation immediately faced a difficult decision. They had to decide how the value of GSP membership should be leveraged to simultaneously incentivize compliance in multiple issue areas. One option would be to divide the value of the tariff discounts across the two conditionalities. For example, perhaps half of the GSP products could become eligible for duty free importation after verifying compliance in each issue area. But the division of the trade value across issue areas could deplete the beneficiary's incentives to comply. Also, this design could create conflict between the labor rights and intellectual property rights supporters over how the products should be partitioned across the issues. The second option would be to allow all GSP eligible products to be imported duty free only after verifying compliance in both issue areas. But in this case, expelling a state from membership due to violations in one issue area would remove its incentives to comply in any other area. The labor rights and intellectual property rights lobbies would then be in conflict over which issue should be prioritized for enforcement by the US government.

The tradeoff is not unique to the design of the GSP. It applies whenever states might use commerce to simultaneously incentivize compliance in multiple issue areas. These occasions are common and include economic sanctions, trade dispute settlement, and the formation of monetary unions, among others. What limits the number and types of issues that can be connected in a program of conditionality? I find that states face an underlying *economic*

coercion trilemma constraining the design of any program of conditionality. States can only achieve two of three priorities when designing a program of conditionality: 1) secure a broad coalition of political support for the program, 2) attach meaningful trade value to each policy issue, and 3) ensure that enforcement never reduces the target's incentives to comply with conditionality on other policy issues.[1]

How states choose between the three objectives depends on the degree of economic dependence, the types of issues being bundled, and domestic politics. Generally, choosing a program that divides the available commerce among multiple issues raises the chances of compliance but decreases the degree of compliance on each issue. However, there are exceptions where full compliance can be achieved without division. Targets which are highly dependent on market access would be willing to comply in two or more different areas to guarantee their economic future. Moreover, certain types of issues which are *compatible* can be productively bundled even without requiring extreme dependence. If a target would be unlikely to simultaneously violate conditionality in two or more issue areas then simultaneous compliance can be required without raising the risk of encountering difficult enforcement decisions. The analysis points to an overlooked dimension of power in the international economy: states that can more efficiently convert economic value into political influence by using the same dollar of commerce as leverage in multiple issue areas.

The logic of the trilemma can be illustrated with reference to the GSP program as an example. The three rectangles in Figure 1 represent different ways of tying the economic leverage of GSP membership to two issues. Programs that partition the economic value among the conditionalities, as shown by the upper right rectangle, receive support from each interest group benefitting from compliance. These designs also ensure that enforcement of one condition never undermines the incentives in other issue areas. These programs can be called *leverage limited* because leverage is scarce: it is always possible to increase the incentives

[1]In this paper economic coercion is defined as the use of commercial or financial incentives as leverage in a program of conditionality. While the literature typically considers instances of economic coercion separately by instrument, the framework developed in this article enables the comparison of different economic coercion programs on the basis of their design.

for the target's compliance in every issue area by increasing the reward associated with compliance. Programs that condition the entire economic value on compliance in multiple issues, as represented by the upper left rectangle, always maximize the leverage assigned to each issue area. However, these programs are *enforcement limited* because enforcing the conditionality in one issue area also reduces incentives to comply in another. The only way to achieve both the objectives of consistent enforcement and maximum leverage is to attach just one issue to the conditionality as shown in the bottom rectangle. Programs are called *support limited* if they depend on a single interest group for political support.

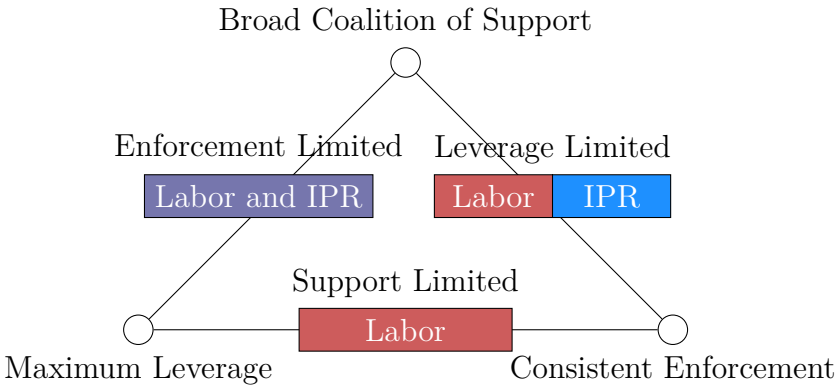

Figure 1: The economic coercion trilemma. Each rectangle represents a different possible assignment of issues to economic value. The available economic value is represented by the width of the rectangle. Either the entire value can be conditioned on compliance in multiple issues (enforcement limited), part of the value can be conditioned on each issue (leverage limited), or the entire value can be conditioned on a single issue (support limited). In leverage limited programs the domestic interest groups must bargain over the division of the economic value among the issues. In enforcement limited programs the interest groups must bargain over the right to enforce the conditionality.

This paper contributes a new mechanism by which asymmetric dependence can transmit political influence. A long tradition of literature has described how states leverage asymmetric dependence for political influence (Hirschman 1980; Baldwin 1985; Eaton and Engers 1992; Martin 1993; Smith 1995; Drezner 2003; Carnegie 2014). The logic is that whichever state values trade more highly would potentially be willing to offer political concessions to ensure its continuation.[2] The theory has been productively applied to the study of economic

[2]See also Wagner (1988), who concedes this point even while disputing its characterization as economic

sanctions (Hufbauer, Schott, and Elliott 1990; Pape 1997; Krustev and Morgan 2011; Morgan, Bapat, and Kobayashi 2014; Early 2015), aid conditionality (Svensson 2000; Carnegie and Marinov 2017), conditional lending from the World Bank and the International Monetary Fund (Vreeland 2006; Dreher, Sturm, and Vreeland 2009), and more. Recent work has studied asymmetric dependence induced by the position of states in networks (Farrell and Newman 2019; Drezner, Farrell, and Newman 2021). The literature has typically investigated whether asymmetric dependence was sufficient to extract concessions on a particular issue without analyzing how multiple political demands can interact. In particular, the question of whether asymmetric dependence can create linkages between economic and non-economic issues remains unanswered. The economic coercion trilemma explains how the number and types of issues relates to the required degree of dependence needed to exert influence.

The theory of the economic coercion trilemma explains how issues are credibly linked in the context of coercion. The literature emphasizes how issue linkage facillitates cooperation by expanding the set of potential gains in bargaining (Sebenius 1983; Eichengreen and Frieden 1993; Huelshoff 1994; Lohmann 1997; Davis 2004, 2012; Dobbin, Simmons, and Garrett 2007; McKibben 2010; Dür and Elsig 2015; Lee 2021).[3] While one strand of the literature has suggested that linkage politics potentially enhance credibility, another argues that linking issues hampers it. Issue linkage has most often been studied in this context as a mechanism for reducing the risk of bargaining failure – Poast (2012) even defined issue linkage a special case of "side-payments." But other authors have expressed skepticism. Morrow (1992) argued that linkages signal a lack of resolve and Moravcsik (1998) believed distributional consequences would render linkages impotent and merely symbolic. Tinbergen (1952) argued that distinct policy goals should be targeted by a dedicated policy instrument. Applied to the context of

coercion.

[3]See also Fearon (1995) on issue indivisibility. Davis (2004) studied how international institutions facillitated credible linkages between tariff reductions in agricultural and non-agricultural sectors that led to the success of the Uruguay Round. Other scholars have explored whether policy convergence across states can be explained by the deeper integration of trade agreements (Dobbin, Simmons, and Garrett 2007; Dür, Baccini, and Elsig 2014; Jinnah and Lindsay 2016). Scholars have also studied issue linkage in the realm of international security (Wiegand 2009; Poast 2012, 2013a, 2013b). This literature is also interested in understanding how issue linkage can serve as a commitment device.

economic coercion, the Tinbergen Rule would imply that each program target only a single political issue. The economic coercion trilemma explains that, generally, tying multiple issues to a single trade volume creates conflicting enforcement incentives. This result echoes the concerns of Moravcsik (1998). But the theory also reveals cases where a foreign state can be simultaneously influenced in multiple issue areas, showing how the conventional wisdom about successful issue linkage extends to coercive contexts. If the trade volume is sufficiently valuable to the target, or if issues are compatible in the sense that the target is unlikely to be noncompliant in more than one area at a time, then influence in multiple areas is possible.

Finally, the trilemma reveals the scope of economic coercion as a dimension of power in the theory of international bargaining. In doing so, it explains when domestic interest groups are a strategic asset or liability for coercive programs. Traditionally the literature has explained bargaining outcomes as a function of relative resolve, or the willingness of a state to endure the costs of negotiation (Schelling 1980; Mo 1995; Fearon 1998; Powell 2002; Tarar 2005; Leventoglu and Tarar 2005; McKibben 2013, 2015; Kertzer 2016). The literature has put special emphasis on the role of international institutions in enhancing the credibility of linkages by creating structures that "tie the hands" of the state, ensuring the linkage is enforced regardless of any future temptations to neglect it (Putnam 1988). The economic coercion trilemma shows how domestic interest groups can overstretch the state's influence by competing for the right to link their issues to commerce and for the right to enforce those linkages. States that divide the trade value across issues to avoid conflicting enforcement incentives are undercutting the value of the linkage for their domestic interest groups. A state that can "double dip" by using the same trade to exert influence in multiple issue areas is extracting influence from dependence more efficiently. States whose strategic circumstances facillitate multiple linkages can use economic coercion effectively even if they do not have large markets.

Section 3 illustrates how the economic coercion trilemma can be used to explain the institutions of issue linkage. The examples are drawn from sanctions, trade agreement

negotiations, and dispute settlement. As discussed above, the GSP program as implemented by the United States exemplifies the enforcement limited programs. The leverage limited programs are well illustrated by most economic coercion programs that commit to reciprocity.

2 A Theory of Economic Coercion Program Design

The theory is divided into two sections. The first section explores the "technology" of economic coercion: the policies states can use to transform value from economic relationships into political influence.[4] It establishes that the economic coercion trilemma is a tradeoff between program designs having different properties. States might prioritize different properties depending on their circumstances and preferences, but no program can have all properties simultaneously. The results of the first section are therefore independent of preferences. This section can be thought of as an exploration of the sender state's action space, which is formally introduced in Section 2.1.4. The second section, which introduces a strategic setting, studies how states choose which design properties to prioritize. It shows how the strategic interaction of the sender's and target's preferences determine the optimal program design. The results of the second section are useful for making predictions about how states choose between support limited, enforcement limited, and leverage limited designs. The first section will begin with a discussion of the three design properties and then introduce a model representing them.

2.1 The Technology of Economic Coercion

Like all tradeoffs, the economic coercion trilemma is driven by scarcity. No state can withdraw more than 100% of possible trade. It is simply impossible to withdraw trade that never would have occurred even in a world without trade barriers. The limited commercial volume creates a scarcity of political influence which ultimately must be divided among the interest groups

[4]The definition of "technology" invoked here is imported from economics. A technology is the process of transforming inputs into outputs.

vying to link their issues to trade. The state can choose whether this constraint will manifest as a competition for leverage or a competition for enforcement, but there is no way to escape the tradeoff completely.

Of course, not all trade is always available for coercive use. In the case of the GSP, the available trade consists of the value of all GSP eligible products. Different trade volumes could be available for coercive use at different times and contexts. What is important is that there is always a limit on the total amount of trade that can be tied to conditionality. This "budget constraint" applies to even the richest states and is the source of the trilemma's broad applicability.

2.1.1 Broad Coalition of Support

A program of economic coercion is supported by a broad coalition if multiple groups sustain the policy's political support. Interest groups support economic coercion through conditionality when it advances their agenda. These interest groups could be organized lobbies in a democratic society or simply a group of elites desiring to use conditionality to enrich themselves in a non-democracy.[5] Policies that are supported by a broad coalition comprising multiple groups are more stable. Some programs can survive with the support of just one group if that group is politically powerful, such as a large and well organized lobby in a democracy or an autocrat in a consolidated dictatorship.

Programs of conditionality have few natural allies. The distributional consequences of international commerce, especially trade policy, guarantee that conditionality will always displease at least one group. Importers will generally wish for conditionality to be replaced with free trade while import competers will generally wish to replace it with autarky.[6] One

[5]Democracies are accountable through electoral mechanisms, while autocrats must satisfy a selectorate when making policy. Different regime types would have different policy priorities and would assign different importance to the public interest. See Bueno de Mesquita et al. (2005) for details.

[6]For example, import competing firms may prefer that human rights violators continue to be sanctioned even if respect for rights improves because they benefit from trade protection. Firms that depend on imports may prefer free trade even if human rights violations continue unabated. The distributional consequences of trade policy are extensively analyzed in Stolper and Samuelson (1941), Dixit and Norman (1980), Rodrik (1995), and many others. The political implications of the distributional consequences of trade have been

efficient way of forming a coalition that sustains trade conditionality is to offer interest groups the opportunity to link their issues to it. For example, if trade is made conditional on the protection of labor rights then representatives of the labor movement (especially the unions) have an interest in defending the policy despite its economic disadvantages.

A broad coalition of support raises the chances that trade conditionality will survive as policy. Conditionality is politically vulnerable when interests groups that previously supported the policy evolve new priorities. The process is natural and inevitable – all political coalitions evolve as the interests of their constituent groups evolve. For example, a policy of promoting labor rights through trade conditionality might be more attractive to labor rights activists when the labor share of traded goods and services is relatively high. If the support of labor rights activists for conditionality weakens then the program will come under pressure unless support can be buttressed with resources from another interest group. A diversified coalition has a better chance of withstanding these fluctuations. Programs of conditionality are more likely to endure when their coalition of support is broad because the policy's continuation is not predicated on the support of any one group.

The breadth of the coalition is relatively less important to the program's longevity when support is deep or stable over time. Here, the "depth" of support means the political weight of the interest groups, measured both in the number of people they represent and the intensity of their interests. These criteria are more likely to be met for issues that affect the interests of the entire society such as national security. Other issues are far more difficult to sustain in a program of conditionality without broadening the coalition of support. A strategy of keeping all tariffs high unless a trading partner lowers tariffs on fertilizer would benefit farmers but few others. Even if there there is enough support from farmers to sustain the strategy in the short run, it will likely be discarded in the future unless the issues of other interest groups are incorporated into the program.

The model in the main text will focus on either one or two issues and it will take the

explored by Rogowski (1989), Hiscox (2001), Broz, Frieden, and Weymouth (2019), and many others.

number as given. Each issue represents a different interest group having an interest in the conditionality. The role of a broad coalition in the economic coercion trilemma can be demonstrated by comparing programs with one issue to programs with two. The version of the model in Appendix E contains a more general framework that can accommodate an arbitrary number of issues.

2.1.2 Maximum Leverage

Interest groups can maximize their leverage by linking as much trade as possible to the compliance of foreign states in their issue areas of concern. Although the behavior of the interest groups occurs outside the model, it is still useful to discuss their incentives and explain whether they would consider maximum leverage to be desirable. The objective behind seeking leverage is clear: better compliance can be achieved with better incentives. Of course, demanding too much can cause the target to decide that the costs of compliance exceed the costs of lost commerce. Interest groups might not demand maximum leverage if they believe that doing so would cause the target to balk. However, there are also going to be cases where the target's compliance is strictly increasing in the leverage applied. In these cases, the amount of leverage determines both demand for issue linkage and the compliance of the target. Multiple interest groups must compete for the right to link their issue to any given dollar of trade if the program of economic coercion is leverage limited.

Interest groups wish to increase the commercial volume linked to their issue right until the target would balk at any additional compliance. Conditional on compliance from the target, having stronger incentives always results in higher utility for the interest group. Even in cases where additional leverage would cause the target to balk, it is not clear which interest group should be required to reduce their demands. Why should one interest group reduce its leverage, and not some other interest group whose issues are also tied to conditionality? No group wants to be the one that must reduce their demands to elicit the target's compliance. Thus, groups have reason to maximize their leverage as long as the target's compliance

increases with the amount of value linked to their issue alone.

Competition among interest groups for leverage is a core characteristic of any leverage limited program. In a leverage limited program no dollar of commercial value can be tied to more than one issue. Therefore, interest groups compete to add additional value to their conditionality. Competition for leverage generally occurs at the moment of the program's design when the punishments for noncompliance are being specified. In the case of international trade, interest groups are often competing for the right to withdraw market access for specific products as punishment for noncompliance. Interest groups succeed by influencing the policymakers who decide how products and issues will be paired. Thus, the competition occurs in the legislating institutions that govern program design. Interest groups with influence in the legislation process would favor this form of competition.

2.1.3 Consistent Enforcement

The property of consistent enforcement describes the cross-issue spillovers from decreases in compliance. Enforcement is consistent unless reducing compliance in some issue area also reduces the leverage applied to some other issue area. The property is desirable in two circumstances. First, if economic coercion is consistently enforceable then a target's inability to satisfy one condition will not undermine their incentives to comply in other issue areas. Second, consistent enforcement removes the sender's incentives to selectively enforce the conditionality. For example, the sender might hesitate to enforce conditionality on an issue if doing so would remove the target's incentives to comply in some other more important issue area.

It is important to note that inconsistent enforcement only becomes a problem when the conditionality needs to be enforced. Even when facing inconsistent enforcement, targets may choose to comply in both issue areas depending on their preferences. The problem with inconsistent enforcement is that it creates a conflict of interest at the enforcement stage. The reason why a state would hesitate to enforce conditionality on some issue is because it might

sabotage its influence on another issue.

Consistent enforcement and the sender state's reputation for credibility are intricately linked. All programs of economic coercion represent a double commitment – a promise to reward compliant behavior and a threat to punish noncompliant behavior. Enforcement limited programs create temptations to selectively enforce these commitments because states can sometimes preserve influence on one issue by refusing to enforce conditionality on another. States that succumb to the temptation of selective enforcement are violating a prior commitment and potentially damaging their reputation for following through on commitments. The importance of credibility to relative power in international bargaining is well established in the literature (Powell 2002; Kertzer 2016). Bargaining is only possible when commitments are believable, so states that can more easily make believable commitments are negotiating from a stronger position (Putnam 1988; Fearon 1994, 1995).

It is not necessarily the case that all enforcement limited programs will threaten the state's reputation. Some states have institutional arrangements which bolster their ability to resist the temptation to abrogate their commitments. For example, Fearon (1994) discusses how audience costs in democracies can increase the credibility of their commitments because their leaders are electorally accountable for any reversals. It is possible that states endowed with legal and political institutions that facillitate credible commitments will embrace enforcement limited programs because they can commit to fully enforcing the conditionality. In that case, inconsistent enforcement does not threaten the state's credibility, but it does threaten the efficacy of the economic coercion program.

The strategic interaction between domestic interest groups depends on the program's location within the economic coercion trilemma. Interest groups compete for the right to enforce their conditionality when a program design is enforcement limited. By punishing a state for noncompliance on one issue, the program surrenders the opportunity to reward states for compliance on other issues. For example, the enforcement of intellectual property rights conditionality under the GSP removes the incentive to comply with labor rights conditionality.

In general, interest groups compete to ensure that their issue's conditionality is the one which is being enforced. This competition occurs *ex post* at the moment of enforcement rather than *ex ante* at the moment of program design. Different interest groups could be better situated to compete at the enforcement stage – for example, some interest groups might have better access to the bureaucracy (You 2017). Competition over enforcement rights is continuous because the right to enforce must be contested whenever noncompliance is detected.

2.1.4 The Trilemma

At this stage it is useful to introduce the setting more formally. Let there be two states: a sender and a target. The sender state wishes to influence the policy choices of a target state in each of two issue areas indexed by j. The game occurs in a single stage in which the sender and target simultaneously announce their actions. The target chooses policies α_j which are set in the unit interval and chosen separately for each issue $j \in \{1, 2\}$.[7] The preferences of each actor and the action space of the sender state are described in more detail below.

Both the target and the sender have preferences over the target's choice of policy. The ideal points for the target and the sender are $\alpha_j = 0$ and $\alpha_j = 1$ respectively for all issues j. Thus, the target is choosing its degree of compliance with the sender's wishes. To encourage the target to comply with their preferred policy choices the sender state can punish the target by interrupting commerce between them. Both states value the gains from trade – exports and imports create economic value for both the target and sender, but the two states may value the gains differently, allowing for different degrees of asymmetric dependence. The target state will always choose $\alpha_j = 0$ unless doing so would result in too much lost economic value. An example utility function would be $U_k(\alpha_1, \alpha_2; h) = K{\alpha_1}^2 + K{\alpha_2}^2 - h(\alpha_1, \alpha_2)^2$ where K is a positive constant for senders and a negative constant for targets and h is a function representing how much trade has been withdrawn by the sender.

[7] While two issues is sufficient to convey most of the model's intuition, the results can usually be extended to far more general circumstances. Readers interested in a version of the model that covers an arbitrary number of issues and significantly more general functional forms should consult Appendix E.

The sender state chooses issue specific punishment functions, which represent how much economic value will be withheld as a function of the target's compliance with conditionality. Let $\phi_j(\alpha_j) : [0,1] \to [0,1]$ be an **issue specific punishment function** for issue $j \in \{1,2\}$ and compliance level α_j. Issue specific punishment functions ϕ_j are chosen by the sender state and compliance levels $\alpha_j \in [0,1]$ are chosen by the target state. They must be nonincreasing (more compliance cannot result in more punishment). The **total punishment function,** which is the amount of economic value actually withheld, is defined as

$$\phi(\alpha_1, \alpha_2) = \min\{\phi_1(\alpha_1) + \phi_2(\alpha_2), 1\}$$

which is a simple sum of the punishment for the target's choice of compliance on each issue until all commerce is withheld, at which point the function takes its maximum value of 1.

The issue specific punishment function is a highly flexible representation of trade conditionality reflecting the wide variety of program designs employed by states. A brief comparison of the US GSP program and an analogous EU program can illustrate how real programs can be represented in the framework. As described in the Introduction, the US excludes states from program eligibility which do not take sufficient measures to protect intellectual property and labor rights. The analogous EU program, however, is limited to the protection of human rights. States can also be excluded from the EU's more generous GSP+ program if they violate conditionality on either human rights or on environmental protection. The issue specific punishment functions reflecting the US conditionality program could be $\phi_j(\alpha_j) = 0$ if $\alpha_j = 1$ and $\phi_j = 1$ if $\alpha_j < 1$ for $j \in \{1,2\}$. These functions each remove all trade under the GSP for any amount of noncompliance on either issue. The EU's issue specific punishment function representing conditionality on environmental rights could be $\phi_1(\alpha_1) = 0$ if $\alpha_1 = 1$ and $\phi_1(\alpha_1) = k$ if $\alpha_1 < 1$ reflecting how beneficiaries lose k percent of their trade benefit by losing access to GSP+ if they do not fully comply with environmental protection. The function for EU conditionality on human rights could be $\phi_2(\alpha_2) = 0$ if $\alpha_2 = 1$, $\phi_2(\alpha_2) = k$ if $\rho < \alpha_2 < 1$,

and $\phi_2(\alpha_2) = 1$ if $\alpha_2 < \rho$. The two steps in this function reflect how states which choose an intermediate level of compliance can be excluded from GSP+ while maintaining eligibility in the less generous basic GSP program. Some other possible issue specific punishment functions are depicted in Appendix Figure 2.

An issue specific punishment function regarding a particular issue j exhibits **maximum leverage** if $\max_{\alpha_j} \phi_j(\alpha_j) - \min_{\alpha_j} \phi_j(\alpha_j) = 1$. In other words, an issue specific punishment function exhibits maximum leverage if and only if the maximum possible economic value is tied to compliance. [8] For example, the issue specific punishment function $\phi_j(\alpha_j) = 1 - \alpha_j/2$ does not exhibit maximum leverage. We see that $\phi_j(0) = 1$ and $\phi_j(1) = 1/2$, thus $\phi_j(0) - \phi_j(1) < 1$. By contrast the issue specific punishment function $\phi_j(\alpha_j) = 1 - \alpha_j$ does exhibit maximum leverage because $\phi_j(0) = 1$ and $\phi_j(1) = 0$. In more casual language, maximum leverage means that the sender is creating the maximum possible incentive for compliance on a particular issue.[9]

A total punishment function exhibits **consistent enforcement** if and only if, for all issues j, $\max_{\alpha_j} \phi(\alpha_1, \alpha_2) - \min_{\alpha_j} \phi(\alpha_1, \alpha_2)$ is not increasing in α_i where $i \neq j$. In more casual language, enforcement is consistent unless reducing compliance in some issue area also reduces the leverage applied to some other issue area. For example, the total punishment function $\phi(\alpha_1, \alpha_2) = \min\left\{2 - \frac{\alpha_1}{2} - \alpha_2, 1\right\}$ does not exhibit consistent enforcement.[10] Inconsistent

[8] Note that the definition has a useful alternate representation: because α_j is restricted to the unit interval and ϕ_j must be nonincreasing, the maximum must be attained at $\alpha_j = 0$ and the minimum must be attained at $\alpha_j = 1$. Therefore, an equivalent formulation is $\phi_j(0) - \phi_j(1) = 1$. In words, this formulation says that 0% compliance is punished with a full withdrawal of economic value and 100% compliance is rewarded with full access to the economic volume.

[9] See Appendix A.2 for a discussion on the approach to the analysis of marginal incentives in this model.

[10] A short calculation illustrates the point. From the definition for $j = 1$:

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$$\begin{aligned}\max_{\alpha_1} \phi(\alpha_1, \alpha_2) - \min_{\alpha_1} \phi(\alpha_1, \alpha_2) &= \max_{\alpha_1} \left(\min\left\{2 - \frac{\alpha_1}{2} - \alpha_2, 1\right\}\right) - \min_{\alpha_1} \left(\min\left\{2 - \frac{\alpha_1}{2} - \alpha_2, 1\right\}\right) \\ &= \min\{3/2 - \alpha_2, 1\} - \min\{1 - \alpha_2, 1\} \\ &= \begin{cases} 1/2 \text{ if } \alpha_2 > 1/2 \\ \alpha_2 \text{ if } \alpha_2 \leq 1/2 \end{cases}\end{aligned}$$

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which is an increasing function of α_2 over a subset of its domain ($\alpha_2 \leq 1/2$).

enforcement means that the target might be able to reduce its costs of noncompliance on issue j by choosing to reduce its compliance on some issue i (unless the sender chooses not to enforce conditionality on issue i). For example, expelling a state that violates labor rights from the GSP would remove its incentive to protect intellectual property rights.

Finally, a program is said to have a *broad coalition of support* if there are at least two issues associated with conditionality, or $J > 1$.[11] At this point it is possible to formally establish the economic coercion trilemma. The formal statement is given in Proposition 1 and the proof is found in Appendix A.3. The proposition describes the precise sense in which maximum leverage and consistent enforcement are incompatible – unless only one issue is tied to the conditionality, achieving one objective precludes the achievement of the other. The trilemma is a consequence of the fixed volume of commerce available to the sender acting as a "budget constraint" of political influence on the target. The remainder of this section explores what conditions would cause a sender state to prioritize one objective over another. There are two main factors: the degree of asymmetric dependence and issue compatibility.

Proposition 1 (Economic Coercion Trilemma) *Every issue specific punishment function which exhibits maximum leverage is also part of an inconsistently enforced total punishment function unless there is only one issue tied to conditionality.*

2.2 The Behavior of States: Making Tradeoffs Under the Trilemma

2.2.1 Complementarities in Noncompliance

How do states choose between leverage and enforcement limited designs? Inconsistent enforcement potentially creates problems by potentially allowing the target to reduce its costs of noncompliance on issue j by reducing its compliance on some other issue i. But there can be advantages to enforcement limited strategies as well. Targets which are especially averse to the costs of punishment might choose a higher degree of compliance when more

[11] The behavior of the domestic interest groups is outside the scope of the model. Extending the model to account for strategic behavior of domestic interest groups would be an interesting area for future work.

economic value is tied to conditionality. Thus, the inconsistent enforcement property is polarizing in the sense that 1) targets might be less inclined to comply when confronted with these incentives and 2) targets that do comply will provide a higher degree of compliance.

Proposition 2 *If the total punishment function is not consistently enforceable and the target's utility function is additively separable then the target's optimum level of compliance on issue i is an increasing function of its compliance on other issues j.*

The precise statement is contained in Proposition 2. The proof, which explores the total punishment function through the lens of submodularity, is provided in Appendix B.[12] The intuition of the result is that inconsistent enforcement creates complementarities in noncompliance that encourage the target to choose either full compliance on all issues or zero compliance on all issues. In other words, inconsistent enforcement polarizes the compliance of the target.

The following example illustrates the core properties of consistent enforcement more concretely for specific functional forms. Consider two total punishment functions shown in (1) and (2). Note that ϕ and γ differ only in the fraction of trade that can be used to incentivize compliance on issue 1. And yet ϕ is consistently enforceable over the entire domain while γ is not consistently enforceable for $\{\alpha_1, \alpha_2 : \alpha_1/2 + \alpha_2/2 < 1/2\}$. Consider a target state having utility $U_t(\alpha_1, \alpha_2; h) = -\frac{a_1}{4}{\alpha_1}^2 - \frac{a_2}{4}{\alpha_2}^2 - h(\alpha_1, \alpha_2)^2$ where $h \in \{\phi, \gamma\}$ and a_i are positive real coefficients determining the weights on the two issues relative to the pain of lost economic surplus (coefficient 1 on h).[13]

[12] The general strategy of the proof is to show that 1) the total punishment function is strictly submodular wherever the sum of the issue specific punishment functions is greater than one, 2) subject to some assumptions, the target's utility function is supermodular over that domain, and 3) by the Topkis theorem there are cross-issue complementarities in compliance where the target's utility function is supermodular.

[13] The division by 4 simplifies the arithmetic but has no effects on the analysis beyond rescaling the units.

Sender choice	Target response α_1^*	Target choice α_2^*
ϕ	$\frac{2}{3a_1}H(1, a_1, a_2)$	$\frac{2}{3a_2}H(1, a_1, a_2)$
γ	$\frac{1}{a_1}H(1, a_1, a_2)$	$\frac{1}{a_2}H(1, a_1, a_2)$

Table 1: The target's optimal compliance choices for γ and ϕ.

$$\phi = \min\left\{\frac{1}{2} - \frac{\alpha_1}{2} + \frac{1}{2} - \frac{\alpha_2}{2}, 1\right\} = \min\left\{1 - \frac{\alpha_1}{2} - \frac{\alpha_2}{2}, 1\right\} \tag{1}$$

$$\gamma = \min\left\{1 - \frac{\alpha_1}{2} + \frac{1}{2} - \frac{\alpha_2}{2}, 1\right\} = \min\left\{\frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2}, 1\right\} \tag{2}$$

How will such a target respond to the incentives of the program of economic coercion? The target will choose α_1 and α_2 to maximize their utility given the consequences of being punished according to ϕ or γ. The target's optimal compliance choices when facing ϕ and γ are calculated in Appendices C.1 and C.2 and the results are given by the results in Table 1. where H is the harmonic mean. Recall that the harmonic mean is equal to the weighted arithmetic mean with weights $(1/x_i)/(\sum_j 1/x_j)$. In other words, when facing ϕ the optimal level of compliance is about 2/3 of the harmonic average of the weights on each component of the utility function. Also, compliance is decreasing in the weight associated to that issue. Note that the optimal choice of compliance on one issue is decreasing in the compliance of the other. The target effectively has a "budget constraint" of economic value defined by ϕ which is divided across compliance on two issues. The target chooses the optimal compliance vector by shifting along this negatively sloped budget constraint.

As discussed previously, the target will never choose full noncompliance on both issues when the total punishment function is ϕ. Some positive amount of compliance is always preferred because there is always a marginal incentive to comply for both issues. However, when the total punishment function is γ this is no longer true. After a certain point the sender has exhausted all its leverage and it cannot withdraw any more economic value. At this point the marginal incentive to continue complying has evaporated and the target will cease

to comply. As shown analytically in Appendix C.2, the target chooses total noncompliance on both issues for values of a_1 and a_2 satisfying $4/3 < H(1, a_1, a_2) < 2$. In this region it is feasible for the target to choose the interior solution, but the target can get more utility from exploiting the complementarities of noncompliance. For $4/3 > H(1, a_1, a_2)$ the target chooses the interior solution, meaning that they prefer to comply some amount on both issues. When they do choose compliance on both issues, the target chooses more compliance under γ than they would have under ϕ. Finally, when $H(1, a_1, a_2) > 2$ the target is at a boundary solution and chooses zero compliance because the needed compliance vector is not in the feasible set.

2.2.2 Asymmetric Dependence

This subsection identifies a sufficient condition for the existence of an enforcement limited strategy that elicits full compliance under conditions of asymmetric dependence. Put simply, it will be possible to extract full compliance using an enforcement limited strategy if the target values the economic relationship significantly more than it values its policy autonomy. Strictly speaking, the condition describes absolute dependence rather than asymmetric dependence because the sender's utility does not come into play. The proof appears in Appendix D.

Proposition 3 (Asymmetric Dependence) *Let* $\bar{U} = \max_{\alpha_1,\alpha_2} U_t(\alpha_1, \alpha_2; \phi)$ *s.t.* $\phi(\alpha_1, \alpha_2) = 1$ *be the highest utility the target can attain given the maximum possible punishment. Also, let* $\underline{U} = \max_{\alpha_1,\alpha_2} U_t$ *s.t.* $\phi(\alpha_1, \alpha_2) = 0$ *be the highest utility the target can attain given minimum possible punishment. If* $\bar{U} < \underline{U}$ *then there exists a leverage limited strategy that elicits full compliance.*

The proposition confirms that a target who values market access enough to clear a certain threshold would comply fully with an enforcement limited program of coercion. The threshold, which is sufficient but not necessary, is that the target must be willing to make full concessions on both policies to avoid a total loss of market access. Such a target would never risk the loss of its foreign markets to achieve a better outcome in one policy domain. Importantly, it

does not matter what preferences the target has over other all other compliance choices and punishments. In particular, the rate at which the target is willing to substitute compliance for market access does not matter as long as the above condition holds. The result partially explains why states that depend heavily on the global economy are vulnerable to coercion. In addition to having more ability to pressure the target into making concessions on a single issue, the target's dependence on trade also helps the sender avoid the associated challenge of maintaining credibility.

2.2.3 Issue Compatibility

Two issues are called compatible if a target which is noncompliant on one issue is unlikely to be noncompliant on the other. Issue compatibility minimizes the costs of inconsistent enforcement. Inconsistent enforcement is only a problem when the sender must enforce the conditionality in two separate issue areas simultaneously, which is unlikely to happen when issues are compatible. For example, consider a hypothetical program to combat climate change by financing the construction of nuclear power plants. The program might remove its funding from states that either 1) fail to build enough capacity to reduce their dependence on fossil fuels or 2) use the technology to pursue a nuclear weapons capability. These conditions are compatible because it is unlikely that a target would violate both simultaneously. If the target wishes to use the technology to surreptitiously enrich uranium they would need to be building the reactors. Thus, all the funding can be withdrawn if either condition is not satisfied without creating any strategic dilemma. Punishing the target for noncompliance on one issue does not reduce the target's incentives to continue compliance on the other.

Issues might be compatible for a variety of reasons. It could be that the target needs to choose noncompliance on one of two issues but it could choose either. For example, it could be that the target state is subject to multiple domestic pressures, one encouraging compliance on both issues and one preferring noncompliance, and the state wishes to take the middle ground. Or it could be that the type of state which might prefer noncompliance

on one issue is predisposed to compliance on another. For example, the states that produce greenhouse gas emitting products such as oil and coal tend not to be the ones that consume them. Thus, the issues of oil/coal consumption and production are probably compatible and can be conditioned on the same commercial volume.

To illustrate how issue compatibility can play a role in facillitating enforcement limited strategies I return to the example from the previous section with one modification: now we assume that the weights a_1 and a_2 are random variables drawn from the known joint distribution $F(a_1, a_2)$. This setup could be interpreted to mean that the sender is attempting to influence an entire population of targets using one program of economic coercion, or that the sender does not know the weights for a particular target. Appendix D.1 analyzes the case where a target having utility function $U_t = -\frac{a_1}{4}\alpha_1^2 - \frac{a_2}{4}\alpha_2^2 - h(\alpha_1, \alpha_2)^2$ faces the enforcement limited total punishment function $h = \gamma$ chosen by the sender. The analysis demonstrates how the probability of the target choosing full compliance is decreasing in the correlation of a_1 and a_2.

The concept of issue compatibility presents a criterion for evaluating which political issues can be bundled. Compatible issues are less likely to trigger the paradox of self-defeating success when bundled in a program of economic coercion. The literature has previously said relatively little about why some issues are more likely to be linked than others. Compatible issues are easier to bundle credibly because the sender is unlikely to need to choose between enforcing one or the other.

3 Applications

This section will use empirical illustrations to show how the trilemma illuminates the politics of economic coercion. In each of these cases a fixed amount of economic value is conditioned on the simultaneous fulfillment of multiple criteria. The objective of these cases is to illustrate how the economic coercion trilemma has been managed by actors in various strategic and

institutional contexts.

3.1 The Credibility Hazard of Enforcement Limited Designs

Enforcement limited designs occur commonly. For example, when she ran for President in 2020 Senator Elizabeth Warren (D-MA) proposed that the United States refuse to sign trade agreements with any state that did not meet a list of nine pre-conditions.[14] Also, in its 2018 report under Section 301 of the Trade Act of 1974 the US Trade Representative listed four issues that required Chinese compliance before sanctions could be ended.[15] Enforcing the conditionality with respect to any one condition would remove incentives to comply with the other stipulations. The requirement of simultaneous compliance as a precondition for achieving lower tariffs makes both of these cases examples of enforcement limited strategies.

Sometimes these enforcement limited strategies can backfire. The Maastricht Treaty lists four convergence criteria that states must fulfill before they can join the Eurozone: states must have a stable exchange rate and sufficintly low inflation, low government debt burdens, and low long-term interest rates (European Union 1992, Article 109j). Its insistence on simultaneous compliance makes it another example of an enforcement limited strategy. As such, there are conflicting incentives to enforcing the conditionality: the treaty calls for states to be left outside the Eurozone if they violate even one condition, but punishing a state for one violation could undermine its incentives to comply in other areas.

In 2004 this hypothetical dilemma became real. It was revealed that Greece had misrepresented its economic data sufficiently seriously to call its compliance with the Maastricht Treaty into question. Two of the four provisions were considered to have been affected

[14]Senator Warren's proposal would have required that all trade agreements be signed with states that recognize and enforce the core rights of the International Labor Organization, uphold internationally recognized human rights, uphold religious freedom, comply with the Trafficking Victims Protection Act, be a party to the Paris Agreement, eliminate domestic fuel subsidies, ratify the Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, comply with tax treaties signed with the US, and not appear on the Department of Treasury's monitoring list for currency manipulation (Warren 2019).

[15]The issues were the forced transfer of intellectual property to Chinese firms, non-market pricing for technology products, government direction of Chinese technology exports, and Chinese government support of cyberattacks (Office of the United States Trade Representative 2018).

(Carassava 2004). The situation called on the existing Eurozone members to enforce the conditionality, but expelling Greece from membership could undermine all the progress which Greece had made in the other areas and reducing its chances of becoming a member again in the future. The European Commission chose not to expel Greece from the Eurozone in spite of the revelations. Greece later became a major vulnerability for the Union's financial health during the Euro Crisis.[16]

3.2 The Generalized System of Preferences: Enforcement Limited Designs and Issue Compatibility

As discussed in the Introduction, the economic coercion trilemma has shaped the development of the GSP throughout its history. Initially, the GSP was not conditional on beneficiaries' policies at all, but the program encountered resistance from import competing industries.[17] Additional support was secured by conditioning program membership on compliance with labor and intellectual property rights conditions.[18] Ultimately, the program required that compliance in both issue areas was necessary to maintain membership. What are the political consequences of that decision? And why did politicians decide to make simultaneous compliance necessary?

It was possible to require simultaneous compliance in labor and intellectual property rights protections because of issue compatibility. The issues are compatible particularly when considering the correlation of severe violations. The most consequential intellectual property rights states occur in the GSP beneficiaries with the largest markets. There is also a strong negative correlation between per capita GDP and labor rights violations. Thus, there are relatively few states being prioritized for compliance monitoring by both the labor and

[16] See Pisani-Ferry (2011) for a discussion of the link.

[17] The history of the GSP labor rights amendment is given by Congressman Don Pease (D-OH), the congressman who led the legislative effort, in Pease and Goold (1985). One explanation for why the unions were willing to support trade liberalization under the GSP program is that their concerns about jobs being offshored to low wage markets were somewhat mitigated by the workers' rights conditionality.

[18] Drahos and Braithwaite (2002) argue in Chapter 6 that adding the intellectual property issue was crucial to renewing the GSP authorizing statue over the objections of protectionist interests.

intellectual property rights interest groups. As a consequence, the Subcommittee generally only needs to consider arguments from one interest group when deciding any particular case. Thus, the enforcement limited strategy enables both interest groups to promote their interests using the maximum possible trade volume without getting in each other's way too often.

3.3 Dispute Settlement Mechanisms: Leverage Limited Strategies

Many bilateral trade agreements feature dispute settlement mechanisms as a last recourse if one partner violates the agreement. These clauses declare the conditions under which one state will cease compliance with all or part of the agreement. They are also punishment functions because they determine how much trade can be interrupted as a function of how the agreement was violated. The trilemma applies to dispute settlement mechanisms because there is only a fixed economic value available to incentivize compliance: the value of the sender's concessions to the target.

Most dispute settlement mechanisms specify that the economic value of retaliation cannot exceed the economic value of the violation. See, for example, the following typical text:

> If there is no agreement in accordance with paragraph 1 within 20 days after receipt of the request mentioned in paragraph 1, *the complaining Party may suspend the application of benefits of equivalent effect to the responding Party* if the arbitral panel decides the responding Party does not implement the recommendations contained in the final report to bring the inconsistent measure into conformity within the reasonable period of time established in accordance with Article 92. (China-Chile PTA, Article 93, Paragraph 2 (emphasis added))

The phrase "equivalent effect" appears commonly in dispute settlement mechanisms. The reciprocal nature of this punishment locks in a leverage limited strategy because the aggrieved party cannot withdraw more trade than they were denied. By contrast, an enforcement limited strategy would allow for punishments to exceed the value of the violation.

The nearly ubiquitous reciprocity of dispute settlement mechanisms can be understood through the lens of the trilemma. The mechanism can only be effective at resolving a dispute if both sides are certain the specified punishment will actually be applied. Leverage limited strategies minimize the sender's credibility problem because they ensure that the enforcement of conditionality in one issue area never undermines incentives to comply in other areas. For example, consider whether China would follow through on a threat to entirely withdraw from the agreement on finding any instance of Chilean noncompliance. If China withdraws then Chile would probably also withdraw from its commitments, thereby revoking any other concessions valued by China.

3.4 Bilateral Trade Agreement Negotiations and Red Lines

The trilemma constrains the strategies that trade negotiators can deploy to secure concessions. Trade agreements consist of contingent concessions – each state offers tariff concessions conditional on receiving certain concessions from the other state. Although the choice to engage in negotiations is typically considered a form of cooperative politics, the actual negotiation is an example of trade conditionality to the extent that negotiators attempt to use market access as leverage to extract concessions. This section will interpret trade agreement negotiations as an example of trade conditionality through the lens of the trilemma.

The literature traditionally understands preferential trade agreements as examples of interstate cooperation – states choosing to put aside their protectionist inclinations and lower their trade barriers so they can enjoy the mutual gains from trade (Mansfield, Milner, and Rosendorff 2002; Mansfield, Milner, and Pevehouse 2005; Dür, Baccini, and Elsig 2014; Dür and Elsig 2015). While the choice to enter into negotiations might be described as cooperative, the negotiation itself is a bargaining process. Negotiators use market access as leverage by offering to lower trade barriers on some products in exchange for lower barriers on other products.[19] Even more starkly, negotiators may threaten to abrogate an agreement

[19]For an illuminating account highlighting the role of bargaining during negotiations from a trade negotiator,

unless the partner agrees to implement certain regulations on issues which may or may not be trade-related. Implicitly, negotiators are conditioning the opening of their markets on the compliance of their partner on either a trade or non-trade related issue. While states do sign trade agreements willingly, the division of the gains is still subject to bargaining.

The negotiation tactic that exemplifies an enforcement limited strategy is a "red line". Negotiators sometimes specify certain conditions they consider to be necessary to any deal. For example, the EU's Chief Brexit negotiator Michael Barnier was quite explicit about two red lines in February 2020: "The trade deal will be associated with a fisheries agreement and a level playing field, otherwise there won't be any agreement at all" (Morris 2020). The use of red lines qualifies as an enforcement limited strategy: enforcing the red line takes the entire economic value of the agreement off the table, thereby removing incentives for the target to make other concessions. The alternative to the use of red lines would be a "tit-for-tat" approach that exchanges one concession for another. This approach would be leverage limited because failure to win a single concession would not jeopardize the entire deal.

3.5 Multilateral Trade Agreement Negotiations

The Uruguay Round negotiations are an important example that shows how international institutions can change the tradeoff between enforcement and leverage limited strategies. Unlike previous negotiations, the Uruguay Round was formally considered to be a *single undertaking*, meaning that all concessions had to be jointly approved or rejected. As shown by Davis (2004), the institutionalized rule made it possible for Japan and the EU to make concessions in the agricultural sector by linking concessions in agricultural and non-agricultural sectors.[20] Seen through the lens of the economic coercion trilemma, the single undertaking forced states to pursue a enforcement limited negotiation strategies. The leverage of agricul-

see Grozoubinski (2018).

[20]Japan and the EU valued the non-agricultural concessions highly enough that they were willing to make concessions in the agricultural sector to avoid losing the agreement. Without the single undertaking Japan and the EU could have carved the agricultural sector out of the agreement as they had done in previous multilateral negotiations. See Davis (2004) for additional details.

tural concessions alone was insufficient to motivate Japan and the EU to make agricultural concessions – progress required the addition of non-agricultural concessions to the agenda. As an institutionalized rule of the negotiation, the single undertaking ensured that no state could defect from an enforcement limited strategy in the service of other objectives, ensuring that Japan and the EU were put under maximum pressure to liberalize.

Why did the single undertaking in the Uruguay Round not undermine the credibility of cross-sectoral linkages? The economic coercion trilemma would predict that a state pursuing an enforcement limited design might have limited credibility. By contrast, Davis (2004) argues that the single undertaking at the Uruguay Round negotiations enhanced the credibility of cross-sectoral linkages by preventing states from decoupling sectors. These two theories are reconciled because Japan and the EU had a high value for the agreement. In this example, Japan and the EU were willing to make concessions in the agricultural sector in order to preserve the agreement and the concessions of other states in non-agricultural sectors.

An implication of this analysis is that the single undertaking could undermine the credibility of cross-sectoral linkages when trade liberalization is less valuable. In fact, the economic coercion trilemma may have contributed to the failure of the Doha Round negotiations. After the success of the single undertaking in the Uruguay Round, the subsequent Doha Round was also designed to be a single undertaking. And yet the Doha Round has failed to produce any meaningful agreements after nearly two decades of negotiations. While many factors which contributed to the ultimate failure of the negotiations, most analysts blame the agenda's inclusion of the Singapore issues (Evenett 2007). These issues, which covered how trade should be regulated with respect to government procurement, facillitation, competition, and investment, were prioritized by developed states.

Why were the possible gains from additional trade liberalization insufficient to overcome the resistance to tackling the Singapore issues? In the Uruguay Round, the single undertaking ensured that Japan and the EU could not access tariff reductions in non-agricultural sectors without making concessions in their agricultural sectors. In the Doha Round, average tariffs

were significantly lower at the start of the negotiations. Thus, the potential gains from liberalization for developed states were smaller. They were arguably too small to overcome resistance to additional concessions without settling thornier points such as the Singapore issues.

While Japan and the EU found it worthwhile to make concessions in the agricultural sector in order to preserve the Uruguay Round agreement, the same is not true of the Doha Round. The developed states resisted liberalizing agricultural sectors because the gains from liberalization in non-agricultural sectors are no longer sufficiently enticing.[21] The substantial concessions made in the Uruguay Round mean that the available gains from lowering tariffs are smaller. Thus, there are smaller incentives to the developed states to address thornier areas such as the Singapore issues in the Doha Round.

Without the single undertaking, perhaps it would have been possible to carve the difficult issues out of the agreement. In the language of the trilemma, the negotiators could have converted to leverage limited rather than enforcement limited strategies. But the strongly institutionalized nature of the single undertaking within the Doha Round negotiation framework prevented this course of action. Instead, states have turned to preferential trade agreements to liberalize non-agricultural sectors on a bilateral or plurilateral basis while the Doha Round, where the difficult issues are inexorably linked to the areas where progress is possible, has languished.

3.6 Iran Deal Negotiation and Leverage Limited Strategies

The US domestic politics of the Iran Deal negotiation illustrates how the trilemma affects the incentives of interest groups. The US participated in a multilateral effort to use sanctions to pressure Iran to end its nuclear program.[22] But the US had preexisting sanctions against Iran

[21]For a thorough analysis of the challenges facing the Doha Round see Baldwin (2016). Baldwin develops the idea, among other arguments, that developing states had insufficiently large markets to incentivize further liberalization from the developed states.

[22]For detailed information about the negotiations, see Alcaro (2014), Davenport (2015), Rogin (2015), US Department of Treasury and US Department of State (2016), Schumer (2015), McCain and Graham (2015),

that were nominally intended to improve human rights. Once Iran's nuclear program was revealed it was necessary to make a decision. The US could choose an enforcement limited strategy by requiring both human rights protections and the end of the nuclear program before sanctions would be terminated. The alternative would be to pursue a leverage limited strategy by dividing the sanctions between the issues.

Hawks in the United States understood that ending the sanctions as a way to reward Iran for the nuclear deal would undermine influence on the human rights issues. Therefore, they had no appetite for enforcement limited strategies. Ultimately, US sanctions were divided. The existing sanctions regime targeting human rights was largely untouched during the negotiations. Instead of opening its markets directly, the US offered to waive its secondary sanctions if Iran terminated its nuclear program. The secondary sanctions were sanctions on firms outside the US that continued to do business in Iran. This leverage limited strategy could be credibly offered by the US because it did not threaten to undermine the US's interests in promoting human rights.

4 Conclusion

Although the use of economic coercion is commonplace, states have chosen to implement conditionality using a wide variety of program designs. Some programs, such as the US GSP, condition market access on simultaneous compliance with conditionality in multiple policy areas. Others, including most trade negotiations, attach only a fraction of the market value to each issue area subject to conditionality. This paper explains the diversity of program designs as a consequence of how different sender states choose to navigate an underlying economic coercion trilemma. No program of economic coercion can simultaneously 1) secure a broad coalition of support for conditionality from multiple interest groups whose issues are linked to trade, 2) tie the maximum trade value possible to each issue, and 3) guarantee the program's consistent enforcement across issues. States with different institutions, preferences,

Fabius (2016), Alcaro (2018), and Davenport (2018).

and political environments will make the tradeoff differently, leading to the wide variety of program designs. The "budget constraint" that generates the trilemma is the fixed economic value available as a bargaining chip to the sender state.

What factors determine how sender states navigate the trilemma? I find that states which are willing to accept less compliance from the target in return for less fragile influence are more likely to prioritize consistent enforcement. I also find that consistent enforcement is relatively less important for states whose targets are highly dependent on trade. Finally, I find that compatible issues, or issues chosen so that the target is unlikely to simultaneously violate conditionality in multiple areas, can be bundled more effectively. Applying the economic coercion trilemma to real applications enables a deeper analysis of the strategic situation of sender states. Taken as a whole, these results illustrate why some states can induce more compliance for every dollar of commerce tied to a political issue.

The economic coercion trilemma illuminates a new dimension of power in international politics. In general, states cannot tie the same dollar of commerce to multiple political issues without raising the possibility of inconsistent enforcement. However, in specific circumstances some sender states do not need to be concerned about the consequences of inconsistent enforcement. States that are risk-tolerant, that wish to bundle compatible issues, or whose targets are more dependent on international commerce are able to "double dip" by conditioning the same commercial volume on compliance in multiple issue areas.

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The Economic Coercion Trilemma
ONLINE APPENDIX

January 2022

A Simple Model

A.1 Issue Specific Punishment Function Examples

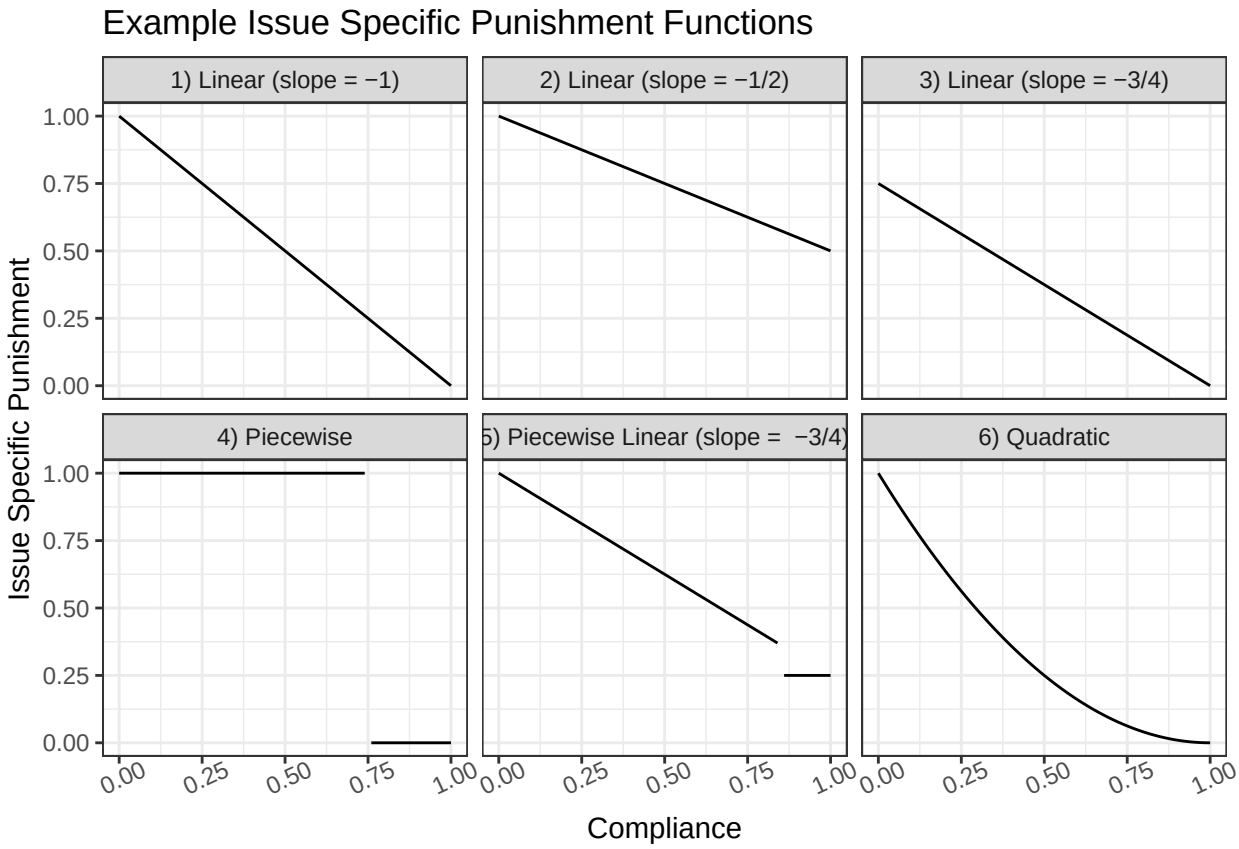

Figure 2: The only requirements on the issue specific punishment punishment functions $\phi_j(\alpha_j)$ is that the functions must 1) be nonincreasing in compliance and 2) map to the unit interval. Functions 1, 2, and 3 illustrate linear punishment functions where the total amount of trade tied to the issue varies. Function 1 rewards compliant behavior with full access to trade and punishes noncompliant behavior with zero trade. Functions 2 and 3 have different amounts associated with fully noncompliant and compliant behavior. In each of these cases less compliant targets are always punished more. Functions 4 and 5 illustrate discontinuities in the punishment schedule which correspond to strategies where trade is interrupted suddenly when the target crosses a compliance threshold. Function 6 illustrates a valid non-linear punishment schedule.

A.2 Discussion of Approach to Marginal Incentives

My focus on "leverage," defined as the economic value attached to conditionality, might at first glance appear neglectful of the target's incentives at the margin. Initial intuition from the literature might presume that the degree of compliance should depend on marginal incentives, i.e. the economic losses resulting from an infinitesimal decrease in compliance. I do not dispute that the target will respond to marginal incentives. But in this interaction the marginal incentives are not always well defined because of potential discontinuities in the total punishment function ϕ. For example, derivatives of the issue specific punishment function

$$\phi_j = \begin{cases} 0 & \text{if } \alpha_j < 1 \\ 1 & \text{if } \alpha_j = 1 \end{cases}$$

would be completely uninformative about the target's incentives where they exist. Instead of studying the marginal incentives, which frequently do not exist in many real world examples of conditionality, the analysis focuses on an upper bound of the marginal incentives: the total economic value tied to the issue. An increase in compliance cannot be rewarded with more economic value than would result from unrestricted commerce. Thus, the marginal incentives are bounded above by the total economic volume attached to conditionality on a particular issue. And this is why the maximum leverage property matters: issue specific punishment functions that exhibit maximum leverage have no artificial restrictions on the marginal incentives that can be used to encourage compliance from the target.

A.3 Proof of Proposition 1

Let ϕ be a consistently enforced total punishment function having one maximum leverage issue specific punishment function (ϕ_1 without loss of generality). By the consistent enforcement of ϕ it must be that $\max_{\alpha_1} \phi(\alpha_1, \alpha_2) - \min_{\alpha_1} \phi(\alpha_1, \alpha_2)$ cannot be an increasing function of

α_2. Simplifying the expression

$$\begin{aligned}\max_{\alpha_1}\phi(\alpha_1,\alpha_2)-\min_{\alpha_1}\phi(\alpha_1,\alpha_2) &= \max_{\alpha_1}\left(\min\left\{\phi_1(\alpha_1)+\phi_2(\alpha_2),1\right\}\right)-\min_{\alpha_1}\left(\min\left\{\phi_1(\alpha_1)+\phi_2(\alpha_2),1\right\}\right)\\ &= \min\left\{1+\phi_2(\alpha_2),1\right\}-\min\left\{\phi_2(\alpha_2),1\right\}\\ &= 1-\phi_2(\alpha_2)\end{aligned}$$

where the second line uses the property that $\phi_1(0)=1$ and $\phi_1(1)=0$ which is implied by the maximum leverage of ϕ_1. Note that because ϕ_2 is nonincreasing over its domain by assumption it must be that $1-\phi_2(\alpha_2)$ is an increasing function of α_2. The only way to avoid this difficulty is to tie only one issue to conditionality.

B Proof of Proposition 2

The proof proceeds by first establishing the submodularity of the total punishment function and then studying its implications for the behavior of the target. Unlike the other proofs in this section, the proof here is immediately extended to an arbitrary number of issues because the extension is straightforward from the main proof. It is necessary to use the submodularity of the total punishment function because of possible discontinuities and consequent nondifferentiability.

Lemma 1 (Submodularity of the total punishment function) *The total punishment function is submodular. It is strictly submodular over the domain* Υ *where* $\Upsilon := \{\boldsymbol{\alpha} : \sum_{j\in\Upsilon}\phi_j(\alpha_j)>1\}$.

Proof: by construction. For ease of notation, let $\sum_k \phi_k(\alpha_k)=\psi(\boldsymbol{\alpha})$ where $\boldsymbol{\alpha}=[\alpha_1,\ldots,\alpha_k,\ldots,\alpha_K]$. By definition, ϕ is submodular if and only if, for all $\boldsymbol{x}$ and $\boldsymbol{y}$,

$$\begin{aligned}\phi(\boldsymbol{x}\uparrow\boldsymbol{y})+\phi(\boldsymbol{x}\downarrow\boldsymbol{y}) &\leq \phi(\boldsymbol{x})+\phi(\boldsymbol{y})\\ \min\left\{\psi(\boldsymbol{x}\uparrow\boldsymbol{y}),1\right\}+\min\left\{\psi(\boldsymbol{x}\downarrow\boldsymbol{y}),1\right\} &\leq \min\left\{\psi(\boldsymbol{x}),1\right\}+\min\left\{\psi(\boldsymbol{y}),1\right\} \qquad (3)\end{aligned}$$

where $x \uparrow y = [\max\{x_1, y_1\}, \cdots, \max\{x_k, y_k\}, \cdots, \max\{x_K, y_K\}]$ denotes the componentwise maximum and $x \downarrow y = [\min\{x_1, y_1\}, \cdots, \min\{x_k, y_k\}, \cdots, \min\{x_K, y_K\}]$ denotes the componentwise minimum.

We proceed by considering cases describing the relationship between ϕ and ψ. First, note that if $\phi(\boldsymbol{x} \downarrow \boldsymbol{y}) < 1$ then it must be that $\phi(\boldsymbol{x} \uparrow \boldsymbol{y}) < 1$, $\phi(\boldsymbol{x}) < 1$, and $\phi(\boldsymbol{y}) < 1$. Thus, Definition (3) simplifies as follows:

$$\min\{\psi(\boldsymbol{x} \uparrow \boldsymbol{y}), 1\} + \min\{\psi(\boldsymbol{x} \downarrow \boldsymbol{y}), 1\} \leq \min\{\psi(\boldsymbol{x}), 1\} + \min\{\psi(\boldsymbol{y}), 1\}$$
$$\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + \psi(\boldsymbol{x} \downarrow \boldsymbol{y}) \leq \psi(\boldsymbol{x}) + \psi(\boldsymbol{y})$$

Observe that the final line above must hold with equality $\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + \psi(\boldsymbol{x} \downarrow \boldsymbol{y}) = \psi(\boldsymbol{x}) + \psi(\boldsymbol{y})$ because the left hand side is just a rearrangement of the terms on the right hand side. Every element appearing in $\boldsymbol{x}$ or $\boldsymbol{y}$ also appears in either $\boldsymbol{x} \uparrow \boldsymbol{y}$ or $\boldsymbol{x} \downarrow \boldsymbol{y}$.

Now consider the case where $\phi(\boldsymbol{x} \downarrow \boldsymbol{y}) = 1$, $\phi(\boldsymbol{x} \uparrow \boldsymbol{y}) < 1$, $\phi(\boldsymbol{x}) < 1$, and $\phi(\boldsymbol{y}) < 1$. In this case Definition (3) reduces to

$$\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + 1 \leq \psi(\boldsymbol{x}) + \psi(\boldsymbol{y})$$

This line must hold true because in this case $\psi(\boldsymbol{x} \downarrow \boldsymbol{y}) \geq 1$ and, as shown above, $\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + \psi(\boldsymbol{x} \downarrow \boldsymbol{y}) = \psi(\boldsymbol{x}) + \psi(\boldsymbol{y})$. Thus, $\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + 1 \leq \psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + \psi(\boldsymbol{x} \downarrow \boldsymbol{y}) = \psi(\boldsymbol{x}) + \psi(\boldsymbol{y})$.

Now consider the case where either $\phi(\boldsymbol{x}) = 1$ or $\phi(\boldsymbol{y}) = 1$. These cases imply that $\phi(\boldsymbol{x} \downarrow \boldsymbol{y}) = 1$ because $\psi(\boldsymbol{x} \downarrow \boldsymbol{y}) \geq \psi(\boldsymbol{x}) \geq 1$. Definition (3) reduces to

$$\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) + 1 \leq \psi(\boldsymbol{x}) + 1$$
$$\psi(\boldsymbol{x} \uparrow \boldsymbol{y}) \leq \psi(\boldsymbol{x})$$

The above line must be true because the punishment functions are nonincreasing in their arguments and $\uparrow$ is a componentwise maximum.

The final case is $\phi(\boldsymbol{x}) = 1$ and $\phi(\boldsymbol{y}) = 1$. These cases immediately imply that $\phi(\boldsymbol{x} \downarrow \boldsymbol{y}) = 1$ since ϕ is nonincreasing and $\boldsymbol{x} \downarrow \boldsymbol{y}$ is a componentwise minimum. Since $\phi(\boldsymbol{x} \uparrow \boldsymbol{y}) \leq 1$ it must be that Definition (3) must be satisfied. ■

Now it is possible to prove the proposition. Let the target's utility be given by $U_t(\boldsymbol{\alpha}; \phi)$. Assume that there exists a monotonic transformation of U_t that can be written as $U_t = au(\boldsymbol{\alpha}) - b\phi(\boldsymbol{\alpha})$ where $a, b > 0$. It is well known that linear combinations of supermodular functions with nonnegative coefficients are also supermodular. By definition, $-\phi$ is supermodular because ϕ is submodular by Lemma 1. Thus, U_t is supermodular if u is supermodular. A well known sufficient condition for the supermodularity of u is that $\partial^2 u / \partial \alpha_i \alpha_j \geq 0$ for all issues i and j. Thus, the target's problem will be $\max_{\boldsymbol{\alpha}} U_t$ where U_t is supermodular. Applying the result of Topkis (1978) it must be that $\alpha_i^*(\alpha_{-i}) = \arg\max_{\boldsymbol{\alpha}} U_t$ must be a nondecreasing function of α_{-i}. It will be a strictly increasing function when U_T is strictly supermodular, which will occur when ϕ is strictly submodular, which in turn occurs when $\psi(\boldsymbol{\alpha}) > 1$. ■

The interpretation of the proposition is that inconsistent enforcement (i.e. choices of ψ that allow $\psi(\boldsymbol{\alpha}) > 1$ for some $\boldsymbol{\alpha}$) creates complementarities in noncompliance (i.e. $\alpha_i^*(\alpha_{-i})$ increases in the elements of α_{-i}). These complementarities encourage the target to choose either full or zero compliance on all issues.

C Example of the Polarization Result

C.1 Optimal Response to Consistent Enforcement

First, consider the program ϕ. Because the program is consistently enforceable, ϕ can be simplified as $\phi = 1 - \frac{\alpha_1}{2} - \frac{\alpha_2}{2}$. The target's optimal response is characterized by

$$\max_{\alpha_1,\alpha_2\in[0,1]} U_t(\alpha_1,\alpha_2;\phi(\alpha_1,\alpha_2))$$
$$\max_{\alpha_1,\alpha_2\in[0,1]} -\frac{a_1}{4}{\alpha_1}^2 - \frac{a_2}{4}{\alpha_2}^2 - \left(1-\frac{\alpha_1}{2}-\frac{\alpha_2}{2}\right)^2$$

Solving this for optimal compliance:

$$\begin{aligned}
\frac{\partial U_t}{\partial \alpha_1} &= -\frac{a_1\alpha_1}{2} - 2\left(1-\frac{\alpha_1}{2}-\frac{\alpha_2}{2}\right)\left(-\frac{1}{2}\right) = 0 \\
0 &= -\frac{a_1\alpha_1}{2} + \left(1-\frac{\alpha_1}{2}-\frac{\alpha_2}{2}\right) \\
\alpha_1 &= \frac{2-\alpha_2}{a_1+1} \\
\alpha_2 &= \frac{2-\alpha_1}{a_2+1}
\end{aligned}$$

which writes α_2 using symmetry. Plugging in to get α_1^* in terms of parameters:

$$\begin{aligned}
\alpha_1 &= \frac{2-\frac{2-\alpha_1}{a_2+1}}{a_1+1} \\
\alpha_1(a_1+1) &= 2 - \frac{2-\alpha_1}{a_2+1} \\
\alpha_1(a_1+1)(a_2+1) &= 2(a_2+1) - 2 + \alpha_1 \\
\alpha_1((a_1+1)(a_2+1)-1) &= 2a_2 \\
\alpha_1 &= \frac{2a_2}{(a_1+1)(a_2+1)-1} \\
\alpha_1^* &= \frac{2a_2}{a_1a_2+a_1+a_2} \\
\alpha_2^* &= \frac{2a_1}{a_1a_2+a_1+a_2}
\end{aligned}$$

which again uses symmetry to find α_2^*. Rewriting the expression:

$$\begin{aligned}
\alpha_1^* &= \frac{2a_2}{a_1a_2 + a_1 + a_2} \\
\alpha_1^* &= \frac{2\frac{1}{a_1}}{1 + \frac{1}{a_1} + \frac{1}{a_2}} \\
\alpha_1^* &= \frac{2}{3a_1}\frac{3}{1 + \frac{1}{a_1} + \frac{1}{a_2}} \\
\alpha_1^* &= \frac{2}{3a_1}H(1, a_1, a_2) \\
\alpha_2^* &= \frac{2}{3a_2}H(1, a_1, a_2)
\end{aligned}$$

where H is the harmonic mean. Recall that the harmonic mean is equal to the weighted arithmetic mean with weights $(1/x_i)/(\sum_j 1/x_j)$. In other words, the optimal level of compliance is about 2/3 of the harmonic average of the weights on each component of the utility function. Also, compliance is decreasing in the weight associated to that issue.

C.2 Optimal Response to Maximum Leverage

Now consider the other function γ which is not consistently enforceable but does exhibit maximum leverage. In this case the target's utility function is

$$U_t = \begin{cases} -\frac{a_1}{4}{\alpha_1}^2 - \frac{a_2}{4}{\alpha_2}^2 - \left(\frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2}\right)^2 & \text{if } \frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2} < 1 \\ -\frac{a_1}{4}{\alpha_1}^2 - \frac{a_2}{4}{\alpha_2}^2 - 1 & \text{if } \frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2} > 1 \end{cases}$$

The target's problem can be written

$$\max\left\{\max_{\{\alpha_1,\alpha_2:\frac{3}{2}-\frac{\alpha_1}{2}-\frac{\alpha_2}{2}<1\}} U_t, \max_{\{\alpha_1,\alpha_2:\frac{3}{2}-\frac{\alpha_1}{2}-\frac{\alpha_2}{2}>1\}} U_t\right\}$$

First considering the case where $\frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2} > 1$, it is clear that the target cannot reduce the punishment with any amount of compliance. Thus, the optimal choice is $\alpha_1 = \alpha_2 = 0$

and the utility will be $U_t(0,0,\gamma(0,0)) = -1$. Now consider the case where $\frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2} < 1$. Solving again for optimal compliance:

$$\begin{aligned}
\frac{\partial U_t}{\partial \alpha_1} &= -\frac{a_1\alpha_1}{2} - 2\left(\frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2}\right)\left(-\frac{1}{2}\right) = 0 \\
0 &= -\frac{a_1\alpha_1}{2} + \left(\frac{3}{2} - \frac{\alpha_1}{2} - \frac{\alpha_2}{2}\right) \\
\alpha_1 &= \frac{3-\alpha_2}{a_1+1} \\
\alpha_2 &= \frac{3-\alpha_1}{a_2+1}
\end{aligned}$$

where the final line follows from symmetry. By a similar procedure to the above, the final optimal compliance vector in terms of parameters is

$$\begin{aligned}
\alpha_1^* &= \frac{3a_2}{a_1a_2 + a_1 + a_2} \\
\alpha_2^* &= \frac{3a_1}{a_1a_2 + a_1 + a_2}
\end{aligned}$$

These values can also be rewritten in terms of the harmonic mean:

$$\begin{aligned}
\alpha_1^* &= \frac{3a_2}{a_1a_2 + a_1 + a_2} \\
\alpha_1^* &= \frac{3\frac{1}{a_1}}{1 + \frac{1}{a_1} + \frac{1}{a_2}} \\
\alpha_1^* &= \frac{1}{a_1}H(1, a_1, a_2) \\
\alpha_2^* &= \frac{1}{a_2}H(1, a_1, a_2)
\end{aligned}$$

Note that compliance is strictly greater under γ when the target chooses α_1^* and α_2^* than it was under ϕ.

However, recall that these formulae are only valid for $3/2 - \alpha_1/2 - \alpha_2/2 < 1$ or $1 < \alpha_1 + \alpha_2$.

Thus, the formulae are only valid when:

$$\begin{aligned}
1 &< \frac{3a_2}{a_1a_2+a_1+a_2} + \frac{3a_1}{a_1a_2+a_1+a_2} \\
\frac{1}{3} &< \frac{a_2+a_1}{a_1a_2+a_1+a_2} \\
1-\frac{1}{3} &> 1-\frac{a_2+a_1}{a_1a_2+a_1+a_2} \\
\frac{2}{3} &> \frac{a_1a_2}{a_1a_2+a_1+a_2} \\
\frac{2}{3} &> \frac{1}{1+\frac{1}{a_1}+\frac{1}{a_2}} \\
\frac{2}{3} &> \frac{1}{3}H(1,a_1,a_2) \\
2 &> H(1,a_1,a_2)
\end{aligned}$$

When valid, the utility received from the interior solution is

$$\begin{aligned}
U_t(\alpha_1^*,\alpha_2^*;\gamma) &= -\frac{a_1}{4}\left(\frac{3a_2}{a_1a_2+a_1+a_2}\right)^2 - \frac{a_2}{4}\left(\frac{3a_1}{a_1a_2+a_1+a_2}\right)^2 - \left(\frac{3}{2}-\frac{3}{2}\frac{a_2}{a_1a_2+a_1+a_2}-\frac{3}{2}\frac{a_1}{a_1a_2+a_1+a}\right. \\
&= -\frac{9}{4}\frac{a_1{a_2}^2}{(a_1a_2+a_1+a_2)^2} - \frac{9}{4}\frac{{a_1}^2a_2}{(a_1a_2+a_1+a_2)^2} - \left(\frac{3}{2}\left(1-\frac{a_1+a_2}{a_1a_2+a_1+a_2}\right)\right)^2 \\
&= -\frac{9}{4}\frac{a_1{a_2}^2+{a_1}^2a_2}{(a_1a_2+a_1+a_2)^2} - \frac{9}{4}\frac{{a_1}^2{a_2}^2}{(a_1a_2+a_1+a_2)^2} \\
&= -\frac{9}{4}\frac{a_1{a_2}^2+{a_1}^2a_2+{a_1}^2{a_2}^2}{(a_1a_2+a_1+a_2)^2} \\
&= -\frac{9}{4}\frac{a_1a_2}{a_1a_2+a_1+a_2}
\end{aligned}$$

The target will choose full noncompliance on both issues when $U_t(0,0;\gamma) > U_t(\alpha_1^*,\alpha_2^*;\gamma)$. Both quantities are now established in terms of parameters. The target chooses full noncompliance when

$$\begin{aligned}
-1 &> -\frac{9}{4}\frac{a_1a_2}{a_1a_2+a_1+a_2} \\
\frac{4}{9} &< \frac{a_1a_2}{a_1a_2+a_1+a_2}
\end{aligned}$$

Rewriting the above in terms of the harmonic mean:

$$\begin{aligned}\frac{4}{9} &< \frac{1}{1+\frac{1}{a_1}+\frac{1}{a_2}} \\ \frac{4}{9} &< \frac{1}{3}H(1,a_1,a_2) \\ \frac{4}{3} &< H(1,a_1,a_2)\end{aligned}$$

D Proof of Proposition 3

Let ϕ be the enforcement limited total punishment function where its component ϕ_j are defined

$$\phi_j = \begin{cases} 1 & \text{if } \alpha_j < 1 \\ 0 & \text{if } \alpha_j = 1 \end{cases}$$

In other words, this strategy calls for the sender to withdraw all trade for any infraction on the conditionality. It is immediately clear that the target must either comply on all issues or no issues because noncompliance on one issue reduces the cost of noncompliance on all other issues to zero. We now partition the compliance space into points where $\phi = 1$ and points where $\phi = 0$. The best that the target can do under maxmimum punishment (i.e. where $\phi = 1$) is $\alpha_1 = \alpha_2 = 0$. The best that the target can do under minimum punishment (i.e. where $\phi = 0$) is to choose $\alpha_1 = \alpha_2 = 1$ because only this choice confers minimum punishment. If the target chooses to comply on all issues their utility will be $\underline{U}$ and if they choose to noncompliance on all issues their utility will be $\bar{U}$. By the proposition we know $\bar{U} < \underline{U}$, so the target will choose full compliance.

Furthermore, note that an enforcement limited strategy is not guaranteed to elicit full

compliance. Modify the total punishment function such that

$$\phi_j = \begin{cases} b_j & \text{if } \alpha_j < 1 \\ 0 & \text{if } \alpha_j = 1 \end{cases}$$

where $\sum_j b_j = 1$ and $b_j > 0$. The total punishment function is no longer enforcement limited, but it is leverage limited because $b_j \neq 1$ for any issue j. Now it is no longer the case that noncompliance on one issue reduces the costs of noncompliance to zero on all other issues. Therefore, the target may find it beneficial to comply on some issues but not others. It may be the case, for example, that $U_t(1, 0; \phi(1, 0) = b_2) > U_t(1, 1; \phi(1, 1) = 0) > U_t(0, 0; \phi(0, 0) = 1)$. In this case, partial compliance would be expected.

D.1 Example of Issue Compatibility

As before, the target will choose the interior solution when facing the total punishment function γ if

$$\begin{aligned} \frac{a_1 a_2}{a_1 a_2 + a_1 + a_2} &< \frac{4}{9} \\ a_1 a_2 &< \frac{4}{9}(a_1 a_2 + a_1 + a_2) \\ \frac{5}{9} a_1 a_2 &< \frac{4}{9}(a_1 + a_2) \\ \frac{5}{4} &< \frac{a_1 + a_2}{a_1 a_2} \\ \frac{5}{4} &< \frac{1}{a_2} + \frac{1}{a_1} \\ \frac{4}{5} &> \frac{1}{\frac{1}{a_2} + \frac{1}{a_1}} \\ \frac{8}{5} &> \frac{2}{\frac{1}{a_2} + \frac{1}{a_1}} \\ \frac{8}{5} &> H(a_1, a_2) \end{aligned}$$

where H is the harmonic mean (which is well defined because the weights must be positive by definition). This expression interprets the weights a_j as ratios measuring how much the target values noncompliance relative to how much it values potential lost economic surplus (recall lost economic surplus has weight 1). The target will choose some amount of compliance as long as the average ratio is sufficiently small – targets that weight economic surplus relatively more will be inclined towards compliance. Note that the harmonic mean has the following property:

$$\lim_{a_1 \to \infty} \frac{2}{\frac{1}{a_2} + \frac{1}{a_1}} = \lim_{a_1 \to \infty} \frac{2a_1 a_2}{a_1 + a_2} = 2a_2$$
$$\lim_{a_2 \to \infty} \frac{2}{\frac{1}{a_2} + \frac{1}{a_1}} = \lim_{a_2 \to \infty} \frac{2a_1 a_2}{a_1 + a_2} = 2a_1$$

Because both limits must hold true simultaneously, and because these functions approach the limit monotonically from below, it must be that $H(a_1, a_2) \leq 2a_1$ and $H(a_1, a_2) \leq 2a_2$. These two inequalities can be written more compactly as $H(a_1, a_2) \leq 2\min\{a_1, a_2\}$. This result forms an upper bound on the harmonic mean of the two weights. Indeed, it directly implies that the harmonic mean is decreasing in the correlation of its inputs. Negative correlation means that there is a higher chance of having one low and one high value. Positive correlation between the inputs is the only way to raise the expectation of the minimum value of the two random variables. Thus, we can already conclude that the probability of the target choosing the interior solution is decreasing in the correlation of the two variables.[1] More formally, we can say that a sufficient condition for the target to choose the interior solution is

$$\frac{8}{5} > 2\min\{a_1, a_2\} \geq H(a_1, a_2)$$
$$\frac{4}{5} > \min\{a_1, a_2\}$$

[1]The monotonicity of the function ensures that the harmonic mean decreases at every point when its minimum input decreases.

When seeing the weights as random variables drawn from $F(a_1, a_2)$, the probability of meeting this constraint is

$$\begin{aligned} P(\min\{a_1, a_2\} < 4/5) &= P(a_1 < 4/5 \cup a_2 < 4/5) \\ &= P(a_1 < 4/5) + P(a_2 < 4/5) - P(a_1 < 4/5, a_2 < 4/5) \\ &= F_{a_1}(4/5) + F_{a_2}(4/5) - F(4/5, 4/5) \end{aligned}$$

where $F_{a_j}(x) = \lim_{a_i \to \infty} F(x, a_i)$ is the marginal distribution of a_j. Let I_{a_1} and I_{a_2} be indicator variables for the events $A : a_1 < 4/5$ and $B : a_2 < 4/5$, respectively. Note that $Var(I_{a_1}) = \mathbb{E}[I_{a_1}^2] - \mathbb{E}[I_{a_1}]^2 = P(A) - P(A)^2 = P(A)(1 - P(A))$. For ease of notation, let $\sqrt{Var(I_{a_1})} = \sigma_{a_1}$. Then:

$$\begin{aligned} Cov(I_{a_1}, I_{a_2}) &= \mathbb{E}[I_{a_1} I_{a_2}] - \mathbb{E}[I_{a_1}]\mathbb{E}[I_{a_2}] \\ Cov(I_{a_1}, I_{a_2}) &= P(A \cap B) - P(A)P(B) \\ Cov(I_{a_1}, I_{a_2}) + P(A)P(B) &= P(A \cap B) \\ Cov(I_{a_1}, I_{a_2}) + P(A)P(B) - P(A) - P(B) &= P(A \cap B) - P(A) - P(B) \\ -Cov(I_{a_1}, I_{a_2}) - P(A)P(B) + P(A) + P(B) &= -P(A \cap B) + P(A) + P(B) \\ -Cov(I_{a_1}, I_{a_2}) - P(A)P(B) + P(A) + P(B) &= P(A \cup B) \\ \sigma_{a_1}\sigma_{a_2}\left(-\frac{Cov(I_{a_1}, I_{a_2})}{\sigma_{a_1}\sigma_{a_2}} + \frac{-P(A)P(B) + P(A) + P(B)}{\sigma_{a_1}\sigma_{a_2}}\right) &= P(A \cup B) \\ \sigma_{a_1}\sigma_{a_2}\left(-\rho_{I_{a_1} I_{a_2}} + \frac{-P(A)P(B) + P(A) + P(B)}{\sigma_{a_1}\sigma_{a_2}}\right) &= P(A \cup B) \end{aligned}$$

This final line indicates that the probability of a target meeting the condition for an interior solution $P(A \cup B) = P(a_1 < 4/5 \cup a_2 < 4/5)$ is decreasing in the correlation coefficient $\rho_{I_{a_1} I_{a_2}}$. In other words, when the issue weights are anti-correlated there is a better chance of an enforcement limited strategy ultimately proving successful. This is true regardless of the underlying joint distribution of weights on compliance (so long as its moments exist).

To summarize, this section claimed that enforcement limited strategies are more successful when seeking to influence two compatible issues. Two issues are compatible if the target is unlikely to choose noncompliance on both issues simultaneously. In an extension of the previous model I showed that, when faced with the enforcement limited strategy γ, 1) the target will choose nonzero compliance when the harmonic mean of the weights a_1 and a_2 is less than 8/5, 2) an upper bound on the harmonic mean is $2\min\{a_1, a_2\}$, 3) the probability that $\min\{a_1, a_2\} < 4/5$ is decreasing in the correlation of the two events $a_1 < 4/5$ and $a_2 < 4/5$. This last statement illustrates the conclusion that an enforcement limited strategy has a better chance of success when the two issues are compatible, meaning that the correlation between a_1 and a_2 is negative (more precisely, when the correlation in the two events $a_1 < 4/5$ and $a_2 < 4/5$ is negative).

E Extension for Arbitrary Number of Issues

This section of the appendix extends the simple model to account for an arbitrary number of issues. The purpose of this extension is to illustrate that the model can accommodate real world applications such as trade agreements where it is common for many issues to be linked to a program of economic coercion.

A few notational changes need to be made to accomodate an arbitrary number of issues. The vector $\boldsymbol{\alpha} = [\alpha_1, \ldots, \alpha_J]$ is the **compliance vector** representing the target's compliance on each issue. The issue specific punishment functions are still normally tied to a single issue, but now the total punishment function takes a compliance vector as its argument.

E.1 Proof of Proposition 1 for Arbitrary Number of Issues

First we need to show the following two lemmas. Under what conditions is the total punishment function ϕ consistently enforceable?

E.1.1 Lemma 2

Lemma 2 *The total punishment function ϕ is consistently enforceable if $\sum_j \phi_j(\alpha_j) \leq 1$ for all α_j. Equivalently, the function is consistently enforceable if no dollar of trade is conditioned on more than one issue.*

Proof of Lemma 2: The proof is by construction. Rewriting the total leverage with respect to an arbitrary issue j:

$$\begin{aligned}\max_{\alpha_j} \phi(\boldsymbol{\alpha}) - \min_{\alpha_j} \phi(\boldsymbol{\alpha}) &= \max_{\alpha_j} \left(\min \left\{ \sum_t \phi_t(\alpha_t), 1 \right\} \right) - \min_{\alpha_j} \left(\min \left\{ \sum_t \phi_t(\alpha_t), 1 \right\} \right) \\ &= \max_{\alpha_j} \left(\min \left\{ \phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t), 1 \right\} \right) - \min_{\alpha_j} \left(\min \left\{ \phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t), 1 \right\} \right)\end{aligned}$$

Now we invoke the lemma's condition that $\sum_k \phi_k(\alpha_k) \leq 1$. Then:

$$\begin{aligned}\max_{\alpha_j} \phi(\boldsymbol{\alpha}) - \min_{\alpha_j} \phi(\boldsymbol{\alpha}) &= \max_{\alpha_j} \left(\min \left\{ \phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t), 1 \right\} \right) - \min_{\alpha_j} \left(\min \left\{ \phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t), 1 \right\} \right) \\ &= \max_{\alpha_j} \left(\phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t) \right) - \min_{\alpha_j} \left(\phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t) \right) \\ &= \phi_j(0) + \sum_{t \neq j} \phi_t(\alpha_t) - \phi_j(1) - \sum_{t \neq j} \phi_t(\alpha_t) \\ &= \phi_j(0) - \phi_j(1)\end{aligned}$$

The above expression is not a function of any compliance level except for α_j, so the total punishment function is consistently enforced. ■

E.1.2 Proof Extension – Generalized Punishment Functions

Note that a slightly limited version of the above proof can be extended to an even more general class of punishment functions. Let an issue specific punishment function be defined as $\phi_j : \mathbb{R}^J \to \mathbb{R}$ which is a nondecreasing function in all its arguments. This issue specific

punishment function can also include cases where the compliance levels are not separable. For example, the issue specific punishment function $\phi_1(\alpha_1, \alpha_2) = 1 - \alpha_1 - \alpha_2 - \alpha_1\alpha_2$ is now permitted.

Let $\sum_k \phi_k(\alpha_k) = \xi_j(\boldsymbol{\alpha}) + \xi_{-j}(\boldsymbol{\alpha})$ be a partition of the total punishment function where ξ_j is the the sum of all issue specific punishment functions where the issue j appears and ξ_{-j} is the sum of issue specific punishment functions where it does not. Rewriting the total leverage with respect to an arbitrary issue j:

$$\begin{aligned}
\max_{\alpha_j} \phi(\boldsymbol{\alpha}) - \min_{\alpha_j} \phi(\boldsymbol{\alpha}) &= \max_{\alpha_j} \left(\min \left\{ \sum_t \phi_t(\alpha_t), 1 \right\} \right) - \min_{\alpha_j} \left(\min \left\{ \sum_t \phi_t(\alpha_t), 1 \right\} \right) \\
&= \max_{\alpha_j} \left(\min \left\{ \xi_j(\boldsymbol{\alpha}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} \right) - \min_{\alpha_j} \left(\min \left\{ \xi_j(\boldsymbol{\alpha}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} \right) \\
&= \min \left\{ \xi_j(0, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} - \min \left\{ \xi_j(1, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\}
\end{aligned}$$

There are two cases. First, let $\sum_k \phi_k(\alpha_k) > 1$ for some $\boldsymbol{\alpha}$. In that case there exists a compliance vector $\boldsymbol{\alpha}$ such that $\xi_j(0, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}) > 1$. In that case:

$$\min \left\{ \xi_j(0, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} - \min \left\{ \xi_j(1, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} = 1 - \xi_j(1, \boldsymbol{\alpha}_{-j}) - \xi_{-j}(\boldsymbol{\alpha})$$

Thus, the total leverage is absolutely a function of compliance on issues other than j because $-\xi_{-j}$ appears in the expression. This term, unless it is empty, will ensure that the total leverage is increasing in compliance on other issues.

Second, consider the case that $\sum_k \phi_k(\alpha_k) \leq 1$. Then:

$$\begin{aligned}
\min \left\{ \xi_j(0, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} - \min \left\{ \xi_j(1, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}), 1 \right\} &= \xi_j(0, \boldsymbol{\alpha}_{-j}) + \xi_{-j}(\boldsymbol{\alpha}) - \xi_j(1, \boldsymbol{\alpha}_{-j}) - \xi_{-j}(\boldsymbol{\alpha}) \\
&= \xi_j(0, \boldsymbol{\alpha}_{-j}) - \xi_j(1, \boldsymbol{\alpha}_{-j})
\end{aligned}$$

The above expression is potentially increasing in variables other than α_j. However, we

know that each term in $\xi_j(\alpha_j, \boldsymbol{\alpha}_{-j})$ is nonincreasing in $\boldsymbol{\alpha}_{-j}$. Thus, the only way that the expression is increasing in compliance of issues other than j is when $\xi_j(0, \boldsymbol{\alpha}_{-j})$ is decreasing in its arguments faster than $\xi(1, \boldsymbol{\alpha}_{-\boldsymbol{j}}$. More precisely, the function is not consistently enforceable in this case if, for all $\boldsymbol{\alpha}_{-j}$ and $\boldsymbol{\alpha}'_{-j}$ such that $\boldsymbol{\alpha}'_{-j}$ is strictly greater in at least one component, $\xi_j(0, \boldsymbol{\alpha}_{-j}) - \xi_j(0, \boldsymbol{\alpha}'_{-j}) > \xi_j(1, \boldsymbol{\alpha}_{-j}) - \xi_j(1, \boldsymbol{\alpha}'_{-j})$. In all other cases the function is consistently enforceable. ■

E.1.3 Lemma 3

Now we must investigate the other direction of the implication. Does a consistently enforced total punishment function necessarily require $\sum_k \phi_k(\alpha_k) \leq 1$ for all α_k?

Lemma 3 *If the total punishment function ϕ is consistently enforceable then it must be that $\sum_j \phi_j(\alpha_j) \leq 1$ for all α_j.*

Proof of Lemma 3:

Suppose not. Then there must exist some $\alpha_j = \bar{\alpha}$ such that $\phi_j(\bar{\alpha}) + \sum_{t \neq j} \phi_t(\alpha_t) > 1$ where the issue specific punishment functions ϕ_j are part of a consistently enforceable total punishment function.

Because we know that $\phi_j(\bar{\alpha}) + \sum_{t \neq j} \phi_t(\alpha_t) > 1$ we can conclude that $\max_{\alpha_j} \left(\phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t) \right) > 1$. At this point there are two cases. If $\min_{\alpha_j} \left(\phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t) \right) < 1$ then the total leverage with respect to the issue j is

$$\begin{aligned} \max_{\alpha_j} \phi(\boldsymbol{\alpha}) - \min_{\alpha_j} \phi(\boldsymbol{\alpha}) &= \max_{\alpha_j} \left(\min \left\{ \sum_t \phi_t(\alpha_t), 1 \right\} \right) - \min_{\alpha_j} \left(\min \left\{ \sum_t \phi_t(\alpha_t), 1 \right\} \right) \\ &= 1 - \phi_j(1) - \sum_t \phi_t(\alpha_t) \end{aligned}$$

which is a contradiction because the total leverage with respect to issue j depends on compliance with the other issues and thus is not consistently enforceable.

In the second case we have that $\min_{\alpha_j} \left(\phi_j(\alpha_j) + \sum_{t \neq j} \phi_t(\alpha_t) \right) \geq 1$. In this case the total leverage is always zero because $\sum_{t \neq j} \phi_t(\alpha_t) > 1$. But this means that the total leverage is

indeed a function of some other compliance value, since it is always possible to reduce at least one compliance value such that $\sum_{t \neq j} \phi_t(\alpha_t) < 1$. ■

The interpretation of Lemmas 2 and 3 is that a total punishment function is consistently enforceable if and only if no dollar of trade is conditioned on more than one issue. The intuition is that interrupting a dollar of trade as a penalty for noncompliance on one issue means that dollar cannot be interrupted as a penalty for noncompliance on other issues. If the punishment function does not allow any trade to be tied to more than one issue then the enforcement of conditionality on one issue cannot undermine leverage over other issues.

Proof of Proposition 1 Suppose not. Let the issue specific punishment function ϕ_i exhibit maximum leverage and be a component of the total punishment function ϕ which is consistently enforceable. By definition of maximum leverage it must be that $\phi_i(0) - \phi_i(1) = 1$. Since all issue specific punishment functions are bounded on the unit interval it must be that $\phi_i(0) = 1$ and $\phi_i(1) = 0$. By Lemma 2 the total punishment function is consistently enforceable if and only if $\sum_t \phi_t(\alpha_t) \leq 1$ for all α_t. But since $\phi_i(0) = 1$ then there must exist a compliance vector such that $\phi_i(0) + \sum_{t \neq i} \phi_t(\alpha_t) = 1 + \sum_{t \neq i} \phi_t(\alpha_t) \geq 1$. If the inequality holds with equality then $\sum_{t \neq i} \phi_t(\alpha_t) = 0$ for all α_t where $\alpha_i = 0$. If $\phi_t = 0$ for all t and α_t with $t \neq i$ then the sender is only exerting influence on issue i. Therefore, unless i is the only issue tied to conditionality, there is a contradiction because ϕ must not be consistently enforceable. ■

E.2 Proof of Proposition 4

Enforcement limited program designs are effective when trade is very important to the target. If the target always prefers no punishment (free trade) to full punishment (no trade) regardless of its chosen compliance on every issue then there will exist a total punishment function consisting only of maximum leverage issue specific punishment functions that elicits full compliance. The formal statement is given in Proposition 4. The target complies because it is so dependent on trade that no amount of noncompliance can overcome the costs of

punishment.

Proposition 4 *Let $U_t(\boldsymbol{\alpha}; \phi(\boldsymbol{\alpha}))$ be the target's utility function such that $U_t(\boldsymbol{\alpha}; \phi(\boldsymbol{\alpha}) = 1) < U_t(\tilde{\boldsymbol{\alpha}}; \phi(\tilde{\boldsymbol{\alpha}}) = 0)$ for all $\boldsymbol{\alpha}$ and $\tilde{\boldsymbol{\alpha}}$. Then there exists an enforcement limited total punishment function ϕ consisting only of maximum leverage strategies which elicits full compliance from the target.*

Proof: Suppose not. Then every total punishment function ϕ consisting of all maximum leverage functions ϕ_j does not elicit full compliance from the target on at least one issue. Let this issue be denoted i such that the target's optimum choice of $\alpha_i < 1$. Issue specific punishment functions are nonincreasing, which means that $\phi_i(\alpha_i) \geq 0$. Therefore, the total punishment must be $\phi(\boldsymbol{\alpha}) \geq 0$ where α_i is a component of $\boldsymbol{\alpha}$. Because every issue has the maximum leverage property it is possible to choose α_i and a vector $\boldsymbol{\alpha}_{-i}$ such that $\phi_i(\alpha_i) = 0$. Since $U_t(\boldsymbol{\alpha}; \phi = 1) < U_t(\tilde{\boldsymbol{\alpha}}; \phi = 0)$ it must be that α_i is not optimal since choosing 1 instead of α_i on issue i in combination with the compliance vector $\boldsymbol{\alpha}_{-i}$ would have yielded higher utility. Note that the total punishment function ϕ is not consistently enforceable by Lemma 2. ■