Economic Dependence, Political Leverage, and War

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Abstract

Conventional theory holds that the opportunity cost of lost trade deters states from fighting. In contrast, policymakers frequently voice concerns that trade will lead to economic dependence, exploitation, and even war. If trade is empirically associated with peace, why do policymakers have these concerns? We address this question by analyzing a dynamic model of trade and war, incorporating the idea that states may become economically dependent on one another over time. We present three main findings. First, we find that economic dependence provides leverage in political disputes, and this leverage may create incentives for war. Second, we argue that dynamic shifts in economic dependence are necessary but not sufficient to cause war. Finally, we show that careful economic policy anticipates these problems, allowing states to avoid war. This provides an explanation that reconciles the concerns of policymakers and the rarity of wars driven by economic dependence.

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Introduction

The relationship between economic exchange and conflict has been an enduring point of debate among both policymakers and scholars of international relations. For centuries, conventional wisdom holds that trade partners are less likely to wage war against one another (Crescenzi 2003; Doyle 1997; Kant 1939; Oneal and Russett 1999a; Rosecrance 1986*b*; Smith 1937). The logic of this argument is straightforward: the opportunity cost of lost trade makes war unattractive (Polachek 1980). Other mechanisms have been proposed as well. For example, another line of argument maintains that trade resolves uncertainty, removing a source of bargaining friction that would otherwise cause war (Gartzke, Li and Boehmer 2001).

However, in practice policymakers and policy analysts often worry that economic dependence carries risks including, but not limited to, war. For example, both China and Taiwan view their dependence on one another as a major vulnerability. Taiwan's reliance on the Chinese economy has raised concern among Taiwanese public and government officials, prompting Taiwan to launch a New Southbond Policy with the goals of diversifying trade to South Asia, Australia and New Zealand. Many policymakers and analysts view China's dependence on Taiwanese semiconductor chips as a "silicon shield" that deters China from military unification,[1] whereas others argue that such dependence would embolden China to invade the island in order to get rid of its dependence on Taiwan's semiconductor sector.[2] Moreover, the U.S. is currently adopting a de-risking strategy to reduce both its own dependence on China for critical goods as well as the leverage this dependence provides China in negotiations with the West.[3]

Concerns about the downsides of trade are well-founded, as illustrated by historical examples of trade partners who have turned to war against one another over economic disputes.

[1] https://www.cfr.org/task-force-report/us-taiwan-Relations-in-a-new-era

[2] https://www.gisreportsonline.com/r/china-taiwan-silicon-shield/

[3] https://www.foreignaffairs.com/united-states/us-chinese-economic-relationship-changing-not-vanishing

For example, in 1941, Japan launched an attack on multiple countries in Southeast Asia because of concerns about deepening dependence on those countries for raw materials. In another example, concerns over a deteriorating trade relationship led the British to attack China in the opening salvo of the 1856 Second Opium War.

Though wars of economic dependence such as these examples may be infrequent, the fact that policymakers are clearly worried about them suggests a disconnect between theory and practice. If key decision-makers' views of the trade-war nexus were consistent with the opportunity cost or informational mechanisms discussed above, they would not be concerned that trade might lead to war. Rather, they would view trade as singularly peace-enhancing, and would not voice concerns that trade may lead to dependence, exploitation, and conflict. This tension suggests that capitalist peace arguments may paint an incomplete picture of the policymaking logic that determines observed patterns of trade and war. The fact that wars driven by economic conflict are relatively rare does not necessarily imply that policymakers' concerns are ill-founded. Rather, and as we argue in this paper, the rarity of these conflicts may be the result of careful policy planning specifically designed to allow states to engage in trade without incurring a risk of war.

To reconcile the observations that (i) policymakers are often concerned that trade will lead to conflict and (ii) conflicts driven by trade are infrequent, we need a model that explains both patterns. How can trade increase the risk of war? How can policymakers manage trade partnerships while maintaining peace by anticipating and avoiding the perceived downsides of trade? This paper aims to address both questions by developing a theory of economic dependence and conflict. Our theory details the conditions under which international trade might increase the risk of war, delivering insights about how policymakers can avoid these risks through careful management of trade relationships. Thus, our argument delivers insights into leaders' concerns about dangerous dependence as well as the policy levers they use to avoid economic exploitation and war.

We present our argument by analyzing a dynamic model of trade and conflict. The key

distinguishing feature of our model is that trade may lead states to become economically dependent on one another, and that this dependence may increase over time. This modeling choice directly reflects the concerns of policymakers; the longer states trade, the more likely they are to become dependent on goods or revenue provided by their trading partners. In turn, this may provide their trading partners with leverage in negotiations over disputed political issues. Importantly, and consistent with the conventional wisdom connecting trade to peace, our model also incorporates the premise that trade generates benefits, some of which may be lost if war occurs. Therefore, our analysis does not stack the deck in favor of war. Rather, when war occurs in equilibrium it does so in spite of its opportunity costs, not because we have assumed these well-known benefits away. Strikingly, an anticipated increase in the opportunity cost of fighting caused by dynamic shifts in economic dependence is the key cause of war in our model. This brings nuance to existing opportunity cost arguments; in our model static increases in the opportunity cost of war are peace-enhancing, but dynamic increases may trigger war. This connects our argument to an influential literature that points to dynamic commitment problems as one of two primary causes of war (Powell 2006).

Our analysis produces three key findings. First, we derive the conditions under which the classic commercial peace result holds. To do this, we begin by analyzing the relationship between economic dependence and political leverage. In our model, dependence affects the cost of fighting - trade partners pay adjustment costs of finding alternative trade partners if they lose access to markets through war. In peacetime, these costs drive states' payoffs for fighting and, in turn, determine what settlements they can get in negotiation over political disputes. This force connects dependence to bargaining outcomes, and is an important driver of our results. In keeping with existing work on dynamic bargaining, we find that if economic dependence is stable over time, then peace prevails. An important implication of this is that dynamic changes in economic dependence are necessary but not sufficient to create a risk of war. When there is no threat of exogenous trade disruption and no anticipated increase in future adjustment costs, states coexist peacefully despite the fact that they can leverage one

another's economic dependence to extract concessions in bargaining over political disputes.

Our second result finds that dynamic shifts in economic relationships can cause conflict. Both dynamic shifts in dependence and exogenous disruptions of trade may cause conflict. When there is an anticipated surge in economic dependence, states know that future dependence will translate into leverage for their opponents in future political disputes. When the expected increase in dependence is sufficiently large, even large short-term political concessions cannot prevent war. Therefore, states fight to avoid dangerous dependence. Similarly, if there is a risk of trade disruption due to exogenous factors, states may fight to gain access to trade benefits that they stand to lose. Importantly, our analysis establishes scope conditions for war. War only occurs if it does not destroy too much of the economic value states would otherwise lose. In line with previous scholarship, this highlights the opportunity cost of war as an important factor in trade-conflict dynamics.

Our third result provides an explanation for why wars driven by economic dependence are rare. The logic underlying our argument is simple: trade relationships are not fixed, but rather the product of endogenous policy choices. Accordingly, if states anticipate that a trade relationship would lead to dependence and war, they have an incentive to sever trade to maintain peace. This complements existing arguments that focus on states' future expectations about trade (e.g. Copeland (1996)). Trade termination does not necessarily lead to war because trade severance, by preventing extortion, can be a force for peace. We develop this argument by studying a variety of tools that states may use to alter their trading relationships. Each of these policies serves either to reduce adjustment costs or slow the growth of economic dependence. Therefore, our analysis produces policy implications for how states can manipulate their trade policy to achieve positive political and economic outcomes.

While our results show that war from growing dependence is possible, it is important to note that the conditions are restrictive. This suggests that we should expect such wars to be empirically rare. Specifically, dependence alone does not cause war. Rather, it is the

anticipation of an increase in dependence that does the trick. Further, even when states anticipate becoming dependent in the future, war is not guaranteed. Leaders often have incentives to sever trade, appease each other through bargaining concessions, or manipulate the depth and rate of deepening dependence to avoid war. Factors related to opportunity costs further restrict the conditions for war. If opportunity costs are high enough, then war will not occur regardless of the magnitude of the shift in future dependence. Wars from dependence occur only when the magnitude of the expected increase in dependence is large, dependence accumulates quickly, and the pacifying opportunity cost mechanism doesn't bite.

Nevertheless, the conditions required for war in our model are empirically plausible. Dependence is rarely static, and opportunity costs of foregone trade may not always bite because states that fight in fact often continue to trade (Barbieri and Levy (1999)). Further, when the conditions that we identify as favorable for war arise, factors beyond the policymakers' control may prevent them from adopting pacifying economic mitigation policies. As we detail with a sequence of illustrative case studies, anticipation of deepening trade or expectations of future costly breakdown of economic relations may cause states to erupt into armed conflict.

To be clear, we are not the first to offer a possible explanation for how trade might cause war. There is a long-standing argument that economically interdependent states are vulnerable to the actions and relative gains of their trading partners, and that these concerns may create a security dilemma that drives conflict (Baldwin (1985); Waltz (1979); Gilpin (1981); Mearsheimer (2001)). In another line of thinking, scholars argue that competition for scarce resources or market access may escalate to war (Levy and Ali (1998); Choucri and North (1975); Chatagnier and Kavaklı (2017), Gent and Crescenzi (2021)).

We depart from these theories in several ways. First, our theory shows that the capitalist peace theories offer powerful mechanisms that in fact account for the vast majority of pacifistic economic relationships. Simply put, the opportunity cost mechanism is supported by a large body of empirical evidence. Any theory of economic dependence and conflict,

therefore, must account for these peace-inducing forces.

Second, actors have alternatives short of fighting that further stack the deck against arguments that trade is dangerous. States that fear becoming dangerously dependent on their trade partners can sever or restrict their economic relationship. They can also resolve many political differences through bargaining. Our theory accounts for these options to identify the trade-offs that decision-makers consider when choosing strategies for reducing economic dependencies.

Third, we account for temporal dynamics. Currently, existing formal theories of the trade-war nexus largely ignore the dynamic calculations of actors.[4] In reality, when making strategic decisions about trade policy and bargaining with opponents over differences, leaders consider how their decisions today might affect future well being and, importantly, they also project how factors might change in the future. Specifically, leaders anticipate whether they are becoming more economically dependent over time and whether growing dependence means they might become politically more vulnerable in the future. They also consider how stable and reliable their trade relationship will be going into the future and whether continuing to invest in a trade relationship that might, for multiple reasons, end up putting them through a costly economic break down for reasons beyond their control.

Our formal theory advances a line of thought that points to future expectations over the costs and benefits of trade as an important factor. Copeland (1996) is, to our knowledge, the first scholar to treat economic conflict as a primarily dynamic phenomenon. However, there are important differences, and our analysis complements and advances the insights of Copeland in a number of ways. First, Copeland's dynamic perspective largely focuses on the negative expectation about future trade driven by exogenous factors. Though we incorporate exogenous factors into our model, our primary focus is on the case in which

[4]A notable exception, which we discuss below, is Monteiro and Debs (2020). The key difference is that Monteiro and Debs focus on shifts in military power, while we focus on shifts in the economic environment and assume that military power is static. Though economic and military power are related, our approach allows us to isolate the effect of economic incentives, holding all else constant as discussed in Paine et al..

trade decisions are endogenously determined. Our model not only recovers that unexpected exogenous disruption of trade can lead to war, but also details the conditions under which endogenous behavior can and cannot ameliorate conflict due to anticipated changes in the economic environment. Second, we argue that endogenous decisions to restrict or cut off trade can be peace-enhancing. Specifically, we argue that a decision to restrict trade in the present can serve to allay states' concerns about future economic dependence, reducing the risk of war. In contrast, Copeland treats states' endogenous decisions to cut off trade as a source of negative trade expectations that may cause war. Third, Copeland's theory does not focus on the opportunity costs of war, and is consequently more pessimistic about the effect of trade on the probability of war. Our theory takes these opportunity costs as an important constraint, and identifies the scope conditions that allow for war even when it comes at a high opportunity cost.

Overall, our theory has implications for the understanding of economic dependence as a cause of war. This study builds on existing arguments that draw a distinction between trade and dependence. An important, and to our knowledge the first, exploration of this idea can be found in Crescenzi (2003). Crescenzi draws a distinction between these two concepts, arguing that interdependence arises when states have difficulty locating alternative trading partners or are unable to easily adapt their own modes of production to new trade relationships. Both of these factors serve to increase a state's *exit costs* - the costs associated with a damaged trade relationship. An important implication is that trade does not imply a high level of interdependence. Crescenzi offers a compelling argument that interdependence, rather than mere trade, is the connective tissue that binds economics and conflict. Our own focus on dependence, and the political leverage that states may extract from it, builds on these insights. We contribute to this line of thinking by highlighting the dangers of temporal shifts in dependence, arguing that these dynamic changes are an important mechanism connecting economic dependence to bargaining failure and war.

The mechanism causing war in our model is most similar to the economic commitment

problem in Monteiro and Debs—peace can be inefficient relative to war due to the relationship between military and economic power. Our model places dependence at the forefront, studying how dynamic changes in the opportunity cost of fighting shape patterns of trade and war. In contrast, Monteiro and Debs focus on a hegemonic state's unilateral power to disrupt the challenger's economic growth. As such, our model is designed to focus on the consequences of economic dependence, while Monteiro and Debs focus on the endogenous relationship between economic growth and military power under hegemony. These studies are closely related, and offer distinct, but not mutually exclusive treatments of trade-war dynamics. Thus, we view our study as complementary to the analysis of Monteiro and Debs.

Another closely related paper is Ruggiero (N.d.), who structurally estimates the effect of economic networks and power asymmetry on conflict. In this way, the paper's focus is similar to that of Monteiro and Debs (2020), drawing a connection between trade and miltary power. Ruggiero finds that though the effect of trade is pacifying, that this effect is small on average. This finding is consistent with our model, which points to the risks of trade. In fact, our findings provide a possible mechanism that, though distinct from the one in Ruggiero (N.d.), may provide an explanation for the empirical finding that the pacifying effect of trade is weak.

Another important contribution of our model is in detailing a new mechanism for how bilateral economic dependence can cause war under complete information. Our finding contrast with that of Martin, Mayer and Thoenig (2008), which finds that decreases in bilateral economic dependence raise the probability of war. The key difference is that in our model there is no private information about the total opportunity cost of war. The consequence of this is that, in our model, present levels of economic dependence is bargained away, and the risk of war does not decrease with economic dependence. Instead, we show that it is the anticipation of growing future economic dependence causes present bargaining failure due to the loss of bargaining leverage in future political disputes. Previous study shows that trade allows disputants to credibly communicate resolve through costly signaling, therefore pacify-

ing interstate relationships (Gartzke, Li and Boehmer 2001). By illustrating the provocative effect of economic dependence and its connection with commitment problems, we show that war may still arise even assuming that trade resolves uncertainty in relationships that might lead to conflict.

Finally, our theory helps address the mixed empirical findings on trade and conflict. Many empirical studies report a negative relationship between bilateral trade (in different forms) and the frequency of war between trading pairs (Mansfield 1995; Oneal and Russett 1999a; Polachek, Robst and Chang 1999). However, a positive relationship is also found in some studies (Barbieri 1996, 2002). Our results identify the conditions under which economic dependence causes war while also providing an explanation for why such wars are rarely observed. This suggests that an important task for future quantitative empirical work is to measure and incorporate the dynamic nature of trade dependence, as our model points to temporal dynamics as the key factor connecting trade and war.

Model

Two countries, whom we refer to as State 1 and State 2, repeatedly bargain over a disputed policy. The interaction occurs over an infinite number of periods indexed by $t = 1, 2, 3....$ In each period, the interaction is characterized by a commonly observed state-variable $s_t \in \{T, NT\} \times \{L, H\}$. The value of s_t represents whether State 1 and State 2 are trading (T) or not (NT), and whether their dependence on their trade partner is low (L) or high (H). In every round of bargaining, States obtain extra economic benefits when they maintain an economic relationship (T). Both the sequence of actions in each period and states' per-period payoff depend on the value of s_t. We assume that State 1 and State 2 have an economic partnership at the outset of the bargaining, and their economic dependence has not shifted yet, so $s_1 = \{T, L\}$.

In a period in which $s_t = \{T, L\}$, both states have the option to continue or sever their

existing economic partnership. If either state chooses to sever the relationship, then the economic partnership is terminated and states incur a one-time adjustment cost a_i due to their dependence on the economic partnership, and $s_{t'} = \{NT, L\}\ \forall t' > t$. If both states choose to continue the relationship, then the economic partnership is extended into the next period. States discount future period-payoffs by a common factor $\delta \in (0, 1)$, and we normalize states' dynamic payoffs by $1 - \delta$.

In all cases, bargaining over the disputed policy follows trade decisions. State 1 makes an offer $x_t \in [0, 1]$ and State 2 chooses to accept or reject. If State 2 accepts, then both states receive the bargaining payoff of the disputed policy. In particular, both states also obtain an extra benefit γ from the economic partnership only if $s_t = \{T, \cdot\}$. State 1 receives $\mu_1(x_t, \{T, \cdot\}) = \gamma + x_t$ and State 2 receives $\mu_2(x_t, \{T, \cdot\}) = \gamma + 1 - x_t$. In $s_t = \{NT, \cdot\}$, neither state receives the economic benefit, with State 1 receiving $\mu_1(x_t, \{NT, \cdot\}) = x_t$ and State 2 receiving $\mu_2(x_t, \{NT, \cdot\}) = 1 - x_t$. Finally, the game enters period $t + 1$, where with probability $d > 0$ that there will be an increase in states' economic dependence, and their adjustment costs become $a_i' > a_i$ in all future periods.

If State 2 rejects, then states receive their war payoff in the current and all future periods. We incorporate the idea that war has important effects on the benefits states can capture from their trade relationship, or lack thereof. We model one important feature of the connection between war and economic outcomes. We use $\beta \in [0, 1)$ to parameterize the proportion of an existing trade relationship that is not negatively affected by fighting. It also captures the idea that states may continue trading, reaping β proportion of the economic benefit γ even though war has broken out. In the following section, we ground this parameter and offer further interpretation. Finally, states pay one-time adjustment costs depending on whether their economic dependence has increased ($\{\cdot, H\}$) or not ($\{\cdot, L\}$). Formally, the war payoffs in each state of the world are as follows.

First, the war payoff in $s_t = \{T, L\}$ is :

$$w_i^{T,L} = p_i - c_i + \beta\gamma - (1-\delta)a_i \tag{1}$$

where a_i is replaced with a_i' in $s_t = \{T, H\}$.

Second, the war payoff in $s_t = \{NT, L\}$ is:

$$w_i^{NT,L} = p_i - c_i - (1-\delta)a_i \tag{2}$$

where a_i is replaced with a_i' in $s_t = \{NT, H\}$.

Gathering all this together, we can write each player's dynamic payoff. Let σ be a (pure) strategy profile, and with a slight abuse of notation, let $x_t(\sigma)$ be the offer made under σ in period t. Further, let $W_t(\sigma)$ be the probability of war in period t under σ. With this, State i's dynamic payoff under strategy profile σ is:

$$(1-\delta)\sum_{t=1}^{\infty}\delta^{t-1}[W_t(\sigma)w_i(s_t) + (1-W_t(\sigma))\mu_i(x_t(\sigma), s_t)]. \tag{3}$$

Key Features of the Model

Aligned with existing research on the correlation between economic dependence and conflict, it is widely acknowledged that peaceful commerce fosters tangible benefits for states Norman (1933); Rosecrance (1986*a*). In our model, we extend this understanding by incorporating an additional dimension: the notion that states not only enjoy the economic benefits of a harmonious economic relationship but may also leverage the economic benefit for advantageous bargaining outcomes. However, it is important to note that when this peaceful commerce is disrupted by war or endogenous decision-making, the economic benefits from commerce are lost. Thus, our model aligns with the fundamental principles outlined in commercial peace theory (Mansfield 2021; Mansfield and Pollins 2001; McMillan 1997; Polachek and Xiang 2010; Polachek 1980).

We expand upon existing scholarship by introducing the premise that war has the po-

tential to considerably reduce trade between states, albeit without complete cessation. This assumption finds support in historical cases where states simultaneously conducted trade and engaged in conflicts (Giltner 1997; Levy 1998). For instance, during the Eighty Years' War (1565-1648) between the Netherlands and Spain, trading activities persisted despite the hostilities (Howard 2009, p. 44). Similarly, both World Wars (Grinberg 2021; Higham 1983; Loftus and Aarons 1997) and the First Kashmir War (1947-49) between India and Pakistan (Murshed, Ward and Dorussen 2011; Naqvi, Schuler and Richter 2007) witnessed instances of trading with adversaries.[5] Additionally, it is worth note that states engage in trade through both direct channels and indirect means involving neutral intermediaries. Even if direct trade experiences a substantial decline during wartime, belligerent states often continue to engage in significant indirect trade (Barbieri and Levy 1999; Grinberg 2021).

Both liberal and realist theories regarding economic interdependence and war traditionally assume that trade between belligerent states is completely severed during wartime. However, recent research challenges this assumption by positing that a state may choose to sustain trade with the enemy during war if such trade does not contribute to the enemy's ability to win the war or if discontinuing trade would undermine the state's long-term security (Grinberg 2021). Empirical studies investigating the economic consequences of war have yielded mixed findings concerning the impact of conflict on economic exchange. Mansfield (2021) demonstrates that trade between states at the systemic level tends to decrease during wars involving major powers. Conversely, Barbieri and Levy (1999) contend that war does not consistently result in reduced trade levels between states. Moreover, studies show that wars can cause large shifts in interstate commerce instead of a wholesale breakdown of trade. In World War I, belligerents privilege trade between allies and expand trade with neutral states, such that the welfare losses of war are much lower than theories convention-

[5]More examples of trading with the enemy include the Seven Years' War, the War of 1812, and the Crimean War (Levy 1998), and the War of Bosnian Independence between Yugoslavia and Croatia (Andreas 2004).

ally assume (Gowa and Mansfield 1993; Gowa and Hicks 2017). In our model, we introduce the parameter β to measure the proportion of trade benefits that belligerents retain during wartime. Our approach allows for flexibility in states' commercial policies during wartime, assuming that the level of trade can vary between complete autarky and unaffected trade.

Moving forward, we solidify the concept of economic dependence by examining the costs that states incurred during the transitional phase from lost trade ties to the establishment of new ones. The trade-related cost of war is closely related to the cost of substitution processes triggered by war. When existing trade breaks down, states can decrease efficiency losses during trade rerouting process if they can increase trade with allies or when traded products are homogenous and replaceable (Gowa and Hicks 2017). In our model, we incorporate the adjustment costs that arise following trade severance (Waltz 1979).

These costs can be attributed to two primary factors. Firstly, there is the investment of time and capital that states must make to identify alternative markets and suppliers. Depending on the availability of substitutes, this process of switching can result in inefficiency costs for firms and agents. Secondly, there are economic implications associated with the relocation that occurs after securing alternative economic partners. States must engage in negotiations, establish new business contracts, develop fresh supply chains, and potentially adapt to varying production standards and technologies. To illustrate, let's consider the European gas market, where Russia currently serves as the primary gas supplier for several central and eastern European countries. When these nations begin exploring alternative pipeline gas suppliers, they inevitably face a decline in gas flows. Additionally, constructing new pipelines entails extensive planning, bureaucratic approval processes, and significant investments over the course of several years. Consequently, transitioning to alternative gas suppliers can impose substantial short to medium-term costs on many European countries (Gent and Crescenzi 2021, p. 132-133).

Finally, we introduce the parameter d, denoting the rate at which states gradually become more reliant on their economic relationship, with $d > 0$. The theories of commercial

peace and dependence theory offer divergent predictions concerning the impact of heightened economic dependence on interstate dynamics. Commercial liberalism argues that as states become increasingly economically interdependent through trade, their incentive to engage in warfare diminishes due to the escalating costs associated with conflict. Conversely, dependency theory suggests that increased economic dependence can be exploited by opposing states for coercive purposes, leading to frictions and potential escalation towards conflicts. In our model, we capture the dynamic nature of economic dependence through the parameter d, which represents the rate at which states experience an amplification in adjustment costs from a_i to $a_i^{'}$. A higher value of d indicates a greater likelihood of both states encountering elevated adjustment costs when considering trade severance in the subsequent period.

It is also worth highlighting a force that is not included in our baseline model to clarify the scope restrictions of our analysis. Specifically, our model abstracts away from wars of conquest such as those studied by Gent and Crescenzi (2021). Formally, this amounts to our assumption that the costs of war are higher than its benefits.[6] As such, our analysis does not provide insight into wars of conquest. Instead, our interest is in potential conflicts that might arise *when* and *because* states are trading with each other and, as a result, there exist opportunity costs for fighting that create disincentives for conflict. In the final section of our discussion of the results, we describe the results of an extension of the model that allows for conquest. The qualitative results of our analysis carry over to this extension.

Equilibrium Analysis

As is standard in the analysis of dynamic games, we study stationary, Markov perfect equilibrium (MPE) (Maskin and Tirole 2001). In this context, MPE amounts to subgame perfect equilibrium with two additional requirements: that states condition their behavior in period t only on the state variable s_t and that they use the same strategies in any t, t' such that

[6]While this is true from a static perspective, as we argue below war may occur for reasons related to a dependence-driven commitment problem.

$s_t = s_{t'}$.[7]

To begin, we characterize how bargaining behavior is shaped by economic dependence. For our first two results, we focus on equilibrium behavior when states do not sever trade on the path of play.[8] This allows us to establish a baseline understanding of how dependence shapes patterns of bargaining and fighting before moving on to the broader question of whether states, anticipating the effects of dependence, choose to trade at all.

Our first result focuses on two forces - one static and one dynamic. First, we demonstrate that dependence leads states to make political concessions. The logic of this result is tied to the classic logic of bargaining. As a state becomes more economically dependent, its outside option of war becomes worse because it anticipates the need to pay adjustment costs, and therefore it is willing to concede more in bargaining. Second, we show that dynamic considerations also come into play, but in the opposite direction. When a state anticipates that it will grow more dependent in the future, it receives concessions in the present. The intuition for this is also straightforward. Because a state anticipates future dependence, it must be compensated in the present lest it fight in order to prevent this dependence from occurring. The following result formally demonstrates these forces.

Lemma 1. *In any equilibrium in which neither state severs trade on the path of play,*

1. *in a period in which State 2 is highly dependent, $s_t = \{T, H\}$, the highest demand State 2 is willing to accept, denoted x_{TH}, is increasing in a_2'.*

2. *in a period in which State 2 is not highly dependent, $s_t = \{T, L\}$, the highest demand State 2 is willing to accept, denoted x_{TL}, is decreasing in a_2'.*

This result highlights the dynamic nature of the relationship between economic dependence and political concessions. The first part of the result focuses on the effect of economic

[7] Our qualitative results of importance hold across all equilibria, including those that relax the assumption of stationary play. A focus on stationary equilibria simplifies the presentation of the results significantly.

[8] In the next section we analyze the conditions under which states sever trade to avoid war.

dependence in the *present*, when a further increase in dependence is not on the horizon. Under these conditions, State 2 knows that its dependence entails adjustment costs in the event of war. Accordingly, in equilibrium dependence correlates with political concessions. The extent of State 2's dependence directly correlates with the magnitude of the concessions made to State 1—an increase in $a_2^{'}$ results in greater concessions. The higher State 2's post-shift dependence, denoted as a_2', the greater the political concessions State 1 can extract from State 2. Consequently, post-shift economic dependence exposes State 2 to political vulnerability. Importantly, this depends on an environment of *stable* dependence, as is the case in a period in which $s_t = \{T, H\}$, when dependence has already increased and will not increase further.

In contrast, if dependence is expected to increase over time, as is the case in a period in which $s_t = \{T, L\}$, State 1 is compelled to make political concessions to State 2. In this case, higher anticipated *future* dependence, $a_2^{'}$, enables State 2 to secure more favorable concessions from State 1. Why is this? Anticipating an increase in its economic dependence, State 2 is fully aware of the political concessions it will need to make once it becomes more economically dependent in the future. Thus, State 2 has an incentive to demand more in the present period to compensate it for the anticipated loss of bargaining power following the shift in economic dependence. State 1, desiring to maintain the trade relationship and to secure a stronger bargaining position in the future, is compelled to concede to State 2's demands. The disparity between State 2's future and present economic dependence, denoted as $a_2' - a_2$, determines the extent of political concessions State 1 needs to make to State 2. In sum, an anticipated increase in dependence in the *future* allows State 2 to extract additional concessions in the *present*.

With the relationship between economic dependence and political concessions detailed, we now turn to one of the main questions: when can economic dependence lead to war? We find that a high level of anticipated *future* economic dependence creates an incentive for war. The following result establishes this formally.

Proposition 1. *Suppose that σ is an equilibrium in which neither state severs trade on the path of play in any period.*

If

$$a_2^{'} > \frac{(1-\beta)\gamma + p + c_2 + (1-\delta+\delta d)a_2}{\delta d} \equiv \overline{a}_2^{'}$$

or, equivalently

$$d > \frac{(1-)\gamma + p + c_2 + (1-\delta)a_2}{\delta(a_2' - a_2)} \equiv \overline{d}$$

then under σ State 2 rejects all offers in a period in which $s_t = \{T, L\}$.

As this result shows, if the dynamic shift in dependence is sufficiently high, State 2 will reject any offer made in a period in which it is (i) trading with its partner and (ii) its current level of dependence is low. Therefore, dynamics are important; war due to economic dependence can only occur in our model as the result of an anticipated shift in a state's *future* dependence. As indicated in the proposition, both the size and speed of an increase in economic dependence, drive this finding.

The first factor that determines whether dependence leads to war is the size of the shift in dependence, represented by a_2'. State 2, recognizing the looming increase in its future adjustment cost, develops a preference for engaging in war before becoming further economically dependent on the relationship with State 1. This comes from the significant difference between the future adjustment cost, a_2', and the present adjustment cost, a_2. Lemma 1 shows that although its future economic dependence allows State 2 to extract some concessions on the political issue in the present, this bargaining advantage will vanish in the future once its dependence increases. At this point, State 2's outside option of war is worse because its adjustment cost has risen due to the increase in dependence. As is typical in bargaining models, this weakens its hand in political negotiations. When the potential shift in its adjustment cost is sufficiently large, State 2 prefers to engage in war and incur the lower adjustment cost a_2 in order to prevent State 1 from exploiting its future dependence. In this case, even conceding the entire issue in a period before increased dependence is not

sufficient to compensate State 2 for this anticipated loss. Knowing this, in equilibrium State 1 makes a non-serious offer, anticipating that State 2 will inevitably reject it.

The second factor is how quickly State 2's increased dependence on State 1 is expected to arrive, which is represented by the parameter d. The role of d is best understood as a consequence of the dynamics outlined in Lemma 1. Recall that an anticipated upward shift in dependence confers both a short-term advantage and a long-term disadvantage to State 2 in bargaining. As Lemma 1 illustrates, d gives State 2 some bargaining leverage over the political issue at present. However, once dependence increases State 2 loses this advantage, and must settle for worse outcomes in bargaining. A higher value of d implies that State 2 loses its temporary bargaining advantage more quickly. If d is sufficiently high, the permanent loss of bargaining power in the future outweighs the temporary gains from the concessions State 2 receives in the present.

In conclusion, Proposition 1 identifies growing economic dependence as a source of international conflict. This result hints of resonates with conclusions drawn by critics of commercial liberalism that economic dependence can manifest in tension and conflict when states exploit others' economic dependence to gain bargaining leverage and extract concessions. However, our model shows that economic dependence indeed provides states with bargaining leverage over the political dispute, but it does not create tensions and conflicts *ex ante*. It is the *expected increase* in economic dependence that drives states to fight to avert making undesirable political concessions in the future.

Why Economic Dependence Rarely Causes War

So far, we have found that dynamic shifts in economic dependence can cause war in equilibrium. However, wars of economic dependence are empirically rare. What accounts for this? The key insight, which we formally outline in this section, is that trade is not exogenous. Rather, states make decisions about the extent of their trade relationships. We deliver three results to study how states manage their trade relationships. First, we consider the choice of

whether to engage in trade at all. In the previous section, we studied equilibrium behavior when states do engage in trade. In contrast, this section considers equilibrium trade decisions. We show that if the opportunity cost of fighting is sufficiently high then states will break off trade to avoid war. Second, we consider a less extreme form of trade policy - limits on the extent of trade. We show that states may place limits on trade to reduce the extent and speed of an increase in dependence to avoid war in equilibrium. To do this, we study equilibrium how equilibrium welfare varies as a function of $\overline{a}_2'$ and d, showing that states generally mutually prefer values of these parameters that avoid war. Finally, we extend this welfare analysis to examine how a state's equilibrium welfare changes as a function of both their own and their opponent's dependence. Intuitively, states prefer to lower their own dependence while increasing their opponent's.

Our first result focuses on the decision to trade in the first place. As outlined in the previous section, trade may come at a great cost - a war to avoid increasing dependence. The following proposition shows that if war is sufficiently costly relative to the benefits of trade, states will forgo trade in the first place to maintain peace.

Proposition 2. *In equilibrium, if*

$$\beta < \frac{c_1 + c_2}{\gamma}$$

then State 1 severs trade in any period in which $s_t = \{T, L\}$.
Further, on the path of play the probability of war is 0.

This result provides one explanation for the rarity of wars of economic dependence. State 1 always chooses to sever trade when the opportunity cost of war, $1 - \beta$, is large enough. This behavior is driven by a tradeoff between the benefits of trade and the risk of war. On the one hand, by terminating trade, State 1 sacrifices the economic benefits derived from the trade relationship but gains the ability to focus entirely on optimizing its position in the political dispute. On the other, engaging in war while continuing to trade disrupts both the trade relationship and the political bargaining process. Although State 1 suffers losses

on the political bargaining front, it still retains a fraction of the economic benefits during wartime. If the destructive impact of war on economic activities, $1-\beta$, is sufficiently large, wartime economic benefits are not large enough to offset the cost of fighting. In this case, State 1 looks ahead, anticipating the inevitability of war. Consequently, State 1 severs trade to maintain peace.

Proposition 2 studies a blunt tool for avoiding war: severing a trade relationship entirely. In practice however, states have a variety of policy levers at their disposal for managing their trade relationships. Thought these tools vary, they all have the consequence of placing limits on either the extent or speed of an increase in economic dependence. In the following result, we consider the conditions under which

Proposition 3. *There exist $a^* > 0$ and $d^* > 0$ such that*

1. *if $a_2' = a^*$ or $d = d^*$ then the equilibrium probability of war is 0 and*
2. *State 1 and State 2's equilibrium utilities are weakly higher under a^* or d^* than under any $a_2' > a^*$ or $d > d^*$.*

Proposition 3 highlights another reason why commercial wars may not occur: if states have the ability to manipulate the extent or the speed of their future economic dependencies, war can be avoided. Importantly, States 1 and 2 prefer this peaceful limited trading relationship to one that would otherwise cause war. State 2's concern about being exploited by State 1 results from the potential increase in its economic dependence. Therefore, reducing the extent or the speed of the increase in economic dependence alleviates State 2's concerns about the consequence of becoming increasingly dependent on State 1. Even though higher levels of dependence benefit State 1 in the long-term, State 1 still prefers to place these limits because the alternative is a future that will not arrive, as State 2 will fight in the absence of these limits.

Lemma 1 shows that as a_2' or d decreases, the bargaining offer $1 - x^{T,L}$ acceptable to State 2 decreases as well, suggesting that State 2 demands less of the political issue at

present. Proposition 1 implies that as long as the extent or speed of the increase in economic dependence is sufficiently small, State 2 is willing to accept a settlement of the political issue at present to compensate for the loss of bargaining leverage thereafter. The reason is that when either parameter is small enough, State 2 is less concerned about the concessions to be made on the political issue after experiencing higher levels of reliance. Knowing that its bargaining position will improve in the future, State 1 is willing to compensate State 2 at the moment considering the leverage it will obtain from State 2's future economic dependence. As a result, there exists a division of the political issue over which states can bargain peacefully. In all, Proposition 3 provides additional support why we rarely observe wars of dependence. When states can manage the details of their trade relationships, they can fine-tune their trade policy to maximize the benefits of trade while minimizing the risk of war.

Our final result further unpacks the nuance of trade policy. It shows that, in the present, states prefer to decrease their own dependence while increasing their opponent's.

Proposition 4. *For values of*

$$a_i \in \left[\frac{a_2'\delta d - (1-\beta)\gamma + p + c_2}{1-\delta+\delta d}, a_2'\right),$$

in equilibrium

1. *States receive higher utilities by decreasing their own economic dependence a_i.*

2. *States receive higher utilities by increasing their opponents' economic dependence a_{-i}.*

We consider each point of the proposition in turn. First, states benefit by decreasing their own economic dependence, a_i. The intuition for this is straightforward - lower levels of current economic dependence correspond to higher payoffs of war in the present. In equilibrium, this translates to higher bargaining power and better outcomes in bargaining. However, states must be careful, as in a period in which economic dependence has not yet

increased, a decrease in current dependence serves to increase the size of the resulting shift in dependence that will occur in the future. This may cause war if the value of a_i drops below the lower bound given in the proposition. For the second point of the proposition, the logic is straightforward. Just as states benefit in bargaining by decreasing their own current dependence, they also benefit by increasing that of their opponent. Importantly, these shifts do not impact the probability of war. Prior to a shift in economic dependence, increasing an opponent's current dependence only serves to shrink the size of the anticipated shift, which has a pacifying effect. Once the shift has occurred, bargaining is guaranteed to be peaceful due to the standard logic of bargaining models, and so an increase in dependence does not carry a risk of war in this setting.

Introducing Exogenous Termination of Trade

In the baseline model where there is no possibility of the exogenous termination of the economic relationship, there is always peaceful bargaining after shifts in economic dependence. In contrast to the baseline model, we now consider the case when the probability that the economic relationship terminates exogenously, given by r is such that $r > 0$. As the following result shows, there can be war even without anticipated shifts in economic dependence. Rather, the expectation of exogenous termination of trade may be sufficient to cause war.

Proposition 5. *When r is positive, war occurs between trading states if:*

- *r and β are high enough.*

This can happen when the risk of exogenous termination of trade, r, is high enough. There are two forces driving the war incentive. First, a higher r makes State 2 more aggressive in the present bargaining over the political issue. Anticipating that it may lose the economic benefit if exogenous factors disrupt the economic relationship, State 2 will demands more political concessions to offset that risk. This in turn reduces State 1's payoff from the bargaining. Second, State 1 also suffers from the risk of exogenous termination of trade,

after which it will lose the economic benefit. When r is sufficiently high, both considerations drive State 1 to favor fighting because it can avoid making concessions to State 2 in the bargaining and retain a portion of the economic benefit during wartime.

The above analysis implies that for high risk of exogenous trade termination to cause war, a necessary condition is that the opportunity cost of commercial conflicts must be low enough—β is high enough. Otherwise, the high opportunity cost of war deters states from fighting regardless of the risk of exogenous trade termination, or State 1 chooses to sever trade to obtain a peaceful settlement of the political issue, consistent with Proposition 2. In all, states may fight while trading only if war's damage on economic benefits is not prohibitive.

Without anticipated shifts in economic dependence, economic interdependence deters states from fighting while trading. This is because states will incur the one-time adjustment cost a_i for initiating war and therefore terminating the economic relationship. When either state's adjustment cost is sufficiently high, there is no fighting regardless of the risk of exogenous trade termination. This is consistent with post-shift equilibrium outcome of the baseline model.

To sum up, Proposition 5 identifies a different source of conflict—that is, the possibility of losing the economic benefit due to exogenous disruptions. Similar to the baseline model, State 1 has to make concessions to State 2 in the bargaining. But the concession here is due to the risk of exogenous trade termination. Meanwhile, this risk exposes both states to the potential loss of economic benefit. Altogether, these forces increase the chance of war. However, if states have very large adjustment costs, or war will destroy a considerable amount of economic benefits, state will refrain from resorting to military forces while trading with each other.

Discussion

Our theoretical results hold relevance for global conflicts driven by economic motives. In this section, we utilize two case studies to illustrate how our theory explains the likelihood of trade relationships escalating into armed confrontations. Our goal is to demonstrate that the causal mechanisms identified by our model are valid in understanding these cases. Our theory demonstrates how two mechanisms, growing economic dependence (Proposition 1) and the anticipation of exogenous trade termination (Proposition 5), may, all else equal, cause war. The first case study about Japan's military advance into Southeast Asia in 1941 illustrates the first mechanism, showing how Japan's growing economic dependence on Southeast Asia for raw materials motivated its attack. The second case illustrates the second mechanism. We show how the anticipation of possible exogenous termination of trade with China during the Taiping rebellion in the 1850s caused the British to launch the Second Opium War. We rely on historical evidence from both primary and secondary sources, tracing the motivation and strategic reasoning of key decision makers.

Japan's Southeast Advance: Growing Economic Dependence

Japan's military occupation of Southeast Asia in the 1940s is an example of war caused by the anxiety of growing economic dependence. Japan had been attracted by the rich natural resources in Southeast Asia nations since early 1930s. However, its policy shift from trade to military force as a means of gaining access to these resources did not happen until the late 1930s. Japan's Southern Advance policy was driven by its growing economic dependence on Southeast Asia for supplying vital war materials.

Our formal model captures some key strategic features of this case. Japan had been importing raw materials such as oil, tin, and rubber from Southeast Asian countries in relatively small amounts since the early 1930s. Initially, Japan had multiple other sources for these products. However, with the outbreak of Japan's war with China in 1937 and

the economic blockade imposed by the United States and Britain, Japan began working to seek alternative suppliers of these supplies. Southeast Asian countries, especially Netherlands India and French Indochina, were rich in vital materials Japan needed for continuing its war. Thus, with an escalating war increasing demand for materials and fewer sources to supply these materials, Japan anticipated a large increase in its economic dependence on Southeast Asia countries in the coming years. In analyzing this case, we furnish evidence from the historical record from the timing of other countries' foreign policies to isolate Japan as well as from policy statements from Japanese elites that demonstrate it was the *anticipation* of an imminent rapid increase in its economic dependence – that is, an expected speedy increase in the magnitude of future adjustment costs that motivated Japan's attack.

Japan's deteriorating economic relationship with the U.S. in late 1930s began to limit Japan's access to resources to trading partners in Southeast Asia. In the mid 1930s, the United States supplied approximately 80% of Japan's oil and 75% of its scrap iron (Copeland 1996, p. 178). This changed significantly in 1938 when the US began to impose new trade restrictions on Japan, causing concern in Japan about a future of fighting a war with China without access to the stream of war supplies from the US. The first major restriction came in June 1938 when the US imposed a "Moral Embargo" against the shipment of aircraft and aerial armaments to Japan. The following year, the embargo specifically extended to the export of manufacturing equipment and technical information for the production of high-grade gasoline used for aviation fuel. In 1940, the US then terminated the Treaty of Commerce and Navigation with Japan[9] and ordered a complete embargo on the sale of aviation fuel, iron ore and scrap iron to Japan. Meanwhile, Britain and the US attempted to curb Japanese stockpiling of oil by withdrawing their oil tankers from the Japanese trade, and both governments pressured owners of the foreign-flag tankers still sailing for Japan to withdraw from the trade.[10] Through the spring of 1941, the shortage of commodities in

[9]Feis, Road to Pearl Harbor, 21-24; and Langer and Gleason, Challenge to Isolation, 157-15; Akira Iriye, The Road to Pearl Harbor, p. 177

[10]Medlicott, Economic Blockade, II, 68; Irvine H. Anderson. 1975, p.213; Hamilton to Welles, Jan. 23,

Japan became more and more serious.

All these measures – the "Moral Embargo", the abolition of Treaty of Commerce and Navigation, and the increasingly long embargo list – caused intense anxiety in Japan about the long-term prospect for accessing critical goods on the international market.[11] Japanese leaders began scrambling to secure alternative sources of supplies. Southeast Asia was the most accessible region for key raw materials beyond the United States market. Japan was desperate to secure steady access to materials needed to sustain its war. For example, it needed to source rubber for vehicle tires, tin for cans to prevent rations from spoiling, and oil as a source for aviation fuel. The restrictions imposed by the US and Britain increased the value of rubber, tin, coal, oil and foodstuffs from French Indochina, Malaysia, Burma and Dutch East Indies (Peattie, Myers and Duus 1996, p. 204). There was legitimate Japanese concensus that southeast Asia was the only alternative source of key supplies. While Japan had already been importing goods from Southeast Asia, the economic value of Southeast Asia was higher than before and, with Southeast Asia is the only source for these goods, the cost of losing the economic benefit promised by Southeast Asian resources was growing rapidly.

Proposition 1 shows that if there is a sufficiently speedy and large increase in State 2's economic dependence, then there is no peaceful settlement that can satisfy both states and the war will happen. Consistent with our theoretical analysis, Japan's concern about an increasing economic dependence on Southeast Asia for vital materials played the prominent role in its decision of military occupation.

Importantly, Japan's decision to advance to southeast Asia was made against backdrop of the escalating US economic warfare and every-harsher sanctions. That is, the decision to attack Southeast Asia was made as the US policies of economic isolation were taking

1941, file 894.24/1309, RG 59; Breckinridge to Admiral Land, March 26, 1941, in U.S. Dept. of State, Foreign Relations, 194 800.

[11]Goto Ken'ichi, "Kaigun nanshin ron to 'Indoneshia mondai'" [The navy's southward advance concept and the "Indonesian problem"], in Goto, ShÃ©wa-ki Nihon to Indoneshia, pp. 83-84

place, before Japan was fully dependent on Southeast Asia. This crucial point highlights a main contribution of our theory – that forward-looking leaders may attack in before sizable increases in future adjustment costs occur as they anticipate being vulnerable to external influence in the future.

Statements by Japanese elites are key to pinning down the timing of the decision to use force to secure resources in Southeast Asia. In August 1940, just after the US termination of the 1911 Treaty of Commerce and Navigation with Japan had taken effect and before its effect was fully felt, the Japanese Navy formulated the "Study of Policy toward French Indochina," containing the purpose of a southward advance: "...an American embargo on scrap iron and oil would be a matter of life or death to the empire. In that event the empire will be obliged to attack the Dutch East Indies to secure oil."[12] In early June 1941, Japan's Navy First Committee formulated the "Attitude to be Taken by the Imperial Navy in the Current Situation," asserting that petroleum, rice, oil and other essential war materials would be ensured after occupying southern French Indochina and seizing Dutch East Indies' oil resources. Later in the same month, the Japanese cabinet agreed on the "Policy on the Southern Region" that Japan deploy troops to southern French Indochina to acquire air bases and ports, and to prepare for the next stage of capturing Singapore and occupying the Dutch East Indies. The crucial decision came on July 2 1941 in the "Outlines of National Policies in View of the Changing Situation" that articulated the Japanese need to attain a position of self-sufficiency within the Greater East Asia Co-prosperity Sphere by pushing into the South even if doing so ultimately resulted in the use of force with the United States and Britain.[13] Japan and Dutch East India did not sever their trade because both sides recognize importance of this relationship during peace- and wartime: it provides Japan with

[12]Source Materials on Contemporary History, 10: Sino-Japanese War, 3

[13]See the explanation made by Navy Chief of Staff Nagano at the Imperial Conference, July 2 1941. a decoded July 14 intercept of a military message asserting that "after the occupation of French Indo-China, next on our schedule is ... the Netherlands Indies" (Canton to Tokyo, July 14, 1941, in Pearl Harbor Hearings, exhibit No 12, pp. 2-3.)

necessary materials in war, and it offers the Dutch continuous economic profits.

Many historical studies argue that the oil embargo imposed in August 1941 caused Japan to attack U.S. and Southeast Asia. However, we show that it was at most the last straw on Japan's commitment. The decision to annex Southeast Asia under its control by military means had been made before the de facto oil embargo[14] and as it became clear that future economic dependence on Southeast Asian countries for war materials was inevitable.

Second Opium War: Highly Probable Exogenous Trade Termination

The Second Opium War illustrates a second mechanism of war identified in the results from our formal model. Proposition 5 shows that the possibility of future exogenous termination of trade can drive states to fight even without a surge in economic dependence. At the conclusion of the First Opium War, Britain secured trade concessions and extra-territoriality of Hong Kong from the Qing government. Trade stabilized and Britain had already become heavily dependent on the import of Chinese tea and silk and export of opium to China. British taxes on the import of Chinese tea and silk comprised a significant proportion of the finances used by the British government.[15] Both goods were produced in large quantities in the Yangtze River basin in central China. Profits from opium trade was crucial to Britain's expansion of India (Wong 2002, p.378).[16] In addition, adjustment costs, a, were already high for each of these goods because there did not exist comparable substitute markets elsewhere.

Changes in adjustment costs, as in the previous case involving Japan's use of force in Southeast Asia, did not trigger renewal of conflict between the British and the Qing govern-

[14]Barnhart 1987, 239

[15]The revenue from tea customs on average was 24 percent of the total custom revenues in 1850s and 9 percent of the total government revenues. Abstract of British Historical Statistics, Mitchell 1971, pp. 392-93; India and China: Exports and Imports, 1859.

[16]By 1857–58, opium revenue was the second largest revenue of British India, comprising 21.65 per cent of its total gross revenue

ment. Instead, in the 1850s, the British government was concerned about the risk that its trade with China might be disrupted or terminated because of the Taiping Rebellion. In our model, we analyze the effect of possible future trade termination on decisions to go to war in the present. The result in Proposition 5 shows that if the risk of future exogenous trade termination, r, is sufficiently high, then leaders have incentives to bargain so aggressively in the present that war may pay if the expected costs of future termination are high enough ra. Like the first mechanism about growing dependence in which foreward looking actors choose to fight today, this result also shows that fighting today can be preferable to waiting until future bad economic outcomes are realized. This is a theoretical novelty of this particular result in our theory that countries may fight before possiblity losing trade in contrast to fighting in reaction to losing trade to try to recover foregone economic benefits. In this case, we provide evidence that Britain launched the Second Opium War to prevent future expected losses of valuable trade.

In early 1850s, there was a possibility that British economic interests in China might be disrupted by the chaotic and disturbing environment caused by Taiping Rebellion after 1853. Taiping Rebellion broke out in 1851 and reached its climax by capturing Nanking in 1853. The civil conflicts between Taiping forces and the government forces disrupted the trade in the Yangtze River valley and the Canton delta, two commercial centers at the time. To Britain, this event evolved into a highly possible, exogenous termination of trade.

The Taipings' occupation of the lower Yangtze area in 1853 starved Shanghai of tea and silk for export.[17] In September 1853, Shanghai was occupied by the Small Sword Society[18], which caused a complete demoralization among teamen, silkmen and brokers who stopped all further supplies of produce.[19] Teas were taken off the market immediately on arrival at high prices, and imports were still very light by the end of 1853.[20] In the first half of 1854,

[17](Fairbank 1964, p. 403); FO 17/200, "Confidential" to Bonham, enei, in Bonham to Malmesbury, Mar. 11, 1853; Latest Accounts from China, March 20, 1853, Christian Advocate and Journal , June 2, 1853.

[18]A rebel group self-claimed to have associations with Taiping

[19]Fearson to August Heard, Shanghai, September 7, 1853, Heard Papers, Vol. GL - 1, Baker Library.

[20]Circular of Bull, Nye, & Co., Shanghai, November 1, 1853, MSS. Edward Carrington II , Incoming

a large body of rebels had sacked one of the producing centers of green tea in the Yangtze Valley [21], and the military operations of the Taipings in Anhui province caused robberies of teamen and disturbances in tea districts (Teng 1969). There was even a growing disorder in the opium trade in the latter part of 1853. George Bonham, the British Plenipotentiary in China, reported that "even the opium market was upset and soon reduced to a barter basis." [22]

As Taiping forces advanced to the lower Yangtze valley and threatened to occupy Shanghai, Britain sensed an imminent danger to its commercial interests in China. Britain's primary concern was for the preservation of regular and orderly conditions of trade at Shanghai. John Bowring, British Superintendent of Trade since 1854, feared that the spread of disorder and smuggling, and also possible Chinese retaliation for the loss of the customs duties in the form of an interruption to the tea trade, could mean a serious loss of revenue to the British (Gregory et al. 1969, p. 28).[23] He was weary of preserving the trade at Shanghai when "the anarchy and disorder exceed all belief".[24] Rutherford Alcock, British consul at Shanghai, feared about a complete stoppage of trade at Shanghai—"unless some regularity can be established within the coming two or three most important business months...the trade of Shanghai will be diverted elsewhere."[25] By 1854, trade at Shanghai was conducted on a highly irregular basis due to China's civil struggle, which was regarded as being against the long-term interests of British trade on the China coast.

Between 1854 and 1856, the possibility of either the Chinese government or the Taiping rebels establishing a firm authority conducive to the interests of British trade had receded

Letters , 1852 - 53

[21]Smith, King, & Co., Monthly Market Report , March 30, 1854

[22]Morse, ch. xvii, Shanghai in the Rebellion, 1853-1859

[23]In 1854, three million sterlings of British revenue were concerned (Fairbank 1964, p. 405)

[24]Bowring Papers 1228/2, f.91, p.3

[25]Alcock's 32, Apr. 10, encl. in Bowring's 7, Apr.18, 1854; Wu to Alcock, May 22, 1854, end. in Bowring's 55, June 12, FO 97/100; FO 17/214 Bowring to Clarendon, June 5, 1854; note also FO 228/165 Alcock to Bowring, July 21, 1854, where Alcock felt that the state of affairs generally in China was becoming 'disastrous beyond all remedy'. FO 17/217 Bowring to Clarendon, Nov. 10, 1854.

further from what they had been in 1853-54. British officials saw "no indication whatever of any popular demonstration of sympathy with the views of the Insurgents, no commerce or traffic of any kind going on and no evidence of any properly organized form of government."[26] Witnessing the protracted civil struggle and the prolonged setback in trade, British naturally became increasingly impatient with the general state of affairs in China (Gregory et al. 1969, p. 70).[27]

Proposition 5 describes that there exists a positive probability of the exogenous termination of trade, states choose to fight to preclude the loss of economic benefits. In addition, the probability of war increases as the probability of the exogenous termination of trade becomes higher. Consistent with our theoretical prediction, the unwelcome prospect of a rebel relapse in 1856 eventually prompted a significant shift in British policy, and British government demonstrated a strong motivation to prevent its economic interests from vanishing behind the decision to escalate the Arrow Incident into a full-scale war.

When Taiping rebels again threatened important cities of Suzhou and Shanghai in mid-1856, the Chamber of Commerce at Shanghai worried that the fall of Suzhou as the main entry port for trade with the interior would have a serious effect upon Shanghai.[28] Trade at Shanghai did suffer badly – tea supplies from the interior were very uncertain and "even opium finds no purchasers".[29] Robertson, British consul in Shanghai, reported that the total cessation of trade was a real possibility when civil war was raging.[30] Meanwhile, British officials faced persistent non-cooperation of the Chinese local authorities in trying to remedy the chaotic situation. The Chinese local authorities refused to take appropriate measure to crackdown duty evasions. Bowring told Clarendon, the Foreign Secretary of Britain, that

[26]FO 17/214 Medhurst to Bowring, July 7, enc. in Bowring to Clarendon of same date.

[27]"Review of the Trade of Shanghai from beginning of January to th of June, 1854," Shanghai Almanac and Miscellany 1855

[28]FO 228/220 Robertson to Bowring (69), April 15 and July 12, 1856.

[29]FO 228/220 Robertson to Bowring (69), April 15, 1856; in Robertson to Bowring (72), April 15 and July 12, 1856; Robertson to Bowring, June 28, 1856.

[30]FO 228/220 Robertson to Bowring, June 28, 1856.

he feared the stagnation of British trade (Gregory et al. 1969, p. 70-72). Britain needed the tea and opium to sustain the British Empire, while the Qing government needed the tax and custom duties from exporting these commodities to crush the Taiping rebellion. Consequently, both sides still continued to trade with each other due to the huge economic benefits provided by this trade relationship.

One side was unlikely to be able and the other had proved quite unwilling to widen the openings for British trade with the most populous empire in the world (Gregory et al. 1969, p. 46). It was clear to the British government that China seemed both intractable and chaotic, and British commercial gains might become nearly worthless if the prevailing state of rebellion continued and spread (Gregory et al. 1969, p. 45). It was to prevent the crisis in China from developing to the point where Britain had either to govern the country herself in order to trade or not trade at all that prompted Britain to take independent action out of a frustrating and dangerous situation. In July 1856, Bowring reiterated that the success of any attempt to reform the existing treaties would depend upon the disposal of an adequate naval force in China,[31] as he had given his opinion the year before.[32] Clarendon was in fact preparing for such "action" to "avert the calamities and ruin" facing their interests in China just at the time when the Arrow affair was precipitating the crisis at Canton. He told the British Ambassador in Paris, that "it would be imprudent for Treaty Powers to remain in a state of listless indifference for much longer".[33] The means to revert the present policy of non-action and was to be a joint expedition to Peking of far greater strength than any previously made (Gregory et al. 1969, p. 75).

[31] "no becoming attention would be paid by the Chinese authorities to any representations which are not associated with a display of physical force"–Bowring to Clarendon, 3 July, 1856, F.O. 17/248; "I hope the three governments [that is, the three Treaty powers, Britain, France and the United States] will see that if they seriously intend to-extend our relations they must be prepared for very strong measures"–Bowring to Clarendon, 5 July 1856 (MSS. Clar. Dep. C. 57)

[32] Bowring to Clarenton, 13 Sept, 1855, F.O. 17/233

[33] FO 228/209 Clarendon to Bowring, Nov. 4, 1856; Clarendon to Cowley, Sept. 24, 1856; in Clarendon to Bowring, Nov. 8, 1856. This is before the message of Arrow Incident reached London

Obviously, Britain was using the Arrow Incident as a casus belli for launching the Second Opium War against China, and its underlying motivation was to protect its commercial interests under increasing perils that exposed British interests to certain danger (Costin 1968, p.201). As early as 1850, Bonham confessed that "our primary consideration in China being our commerce, we must have the means to defend it against any tendency to impede its legitimate development(Fairbank 1964, p. 376)."[34] In defending for the war against China, Clarendon argued that the Arrow quarrel entitled "Her Majesty's Government to insist upon such a revision of existing engagements as may put their relations with the Chinese Empire on a more satisfactory footing than at present."[35] Palmerston, the Prime Minister, in advocating for the use of force and defending for Bowring, elaborated that Bowring had aimed at expanding the market for British manufactures.[36] The message is now very clear, the British government was attempting to use military forces to nullify the negative impact of the exogenous termination of trade on its economic interests.

Extensions and Robustness

We also investigate a series of robustness checks, and show that our main findings still hold in those extensions. We describe these extensions briefly below and relegate formal presentations and extended discussion to corresponding sections in the Appendix.

Our first extension focuses on the state-absorbing property of war. In the baseline model, war disrupts trade permanently and states can not resume trade and obtain the full economic benefit after fighting. In reality, war may only temporarily halt the economic exchanges and states can recover the full benefit of trade after fighting, increasing the prospective for war. To capture this, we model war such that states receive their war payoff in the current and all subsequent periods with some probability, and with complementary probability states

[34]FO 16/166, Bonham's 46, Apr. 15, 1850.

[35]Clarendon to Elgin, Draft 7 (secret and confidential), 20 April 1857, FO17/274.

[36]Palmerston, 3 March 1857, Hansard, 3d series, v. 144, col. 1814.

receive war payoff in the current period then trade resumes in the next period. We find that this feature does not alter our qualitative results, but it does make presentation of the results more cumbersome. So we opt for the simpler specification in the text.

Our second extension incorporates conquest, including the idea that states may fight to recapture the lost economic resources and benefits after trade is terminated. We model this argument by adding a parameter that represents the degree that the trade benefit can be captured through military conquest even after the trade is lost, so the winning state can use force to recover some foregone benefits of trade. All substantive results in the main model still hold there. This extension also corroborates the theoretical argument presented by Gent and Crescenzi (2021): that war is profitable when there is an economic value in military conquest.

In our third extension, we show that our main results are not sensitive to the ultimatum bargaining protocol used in the baseline model. In reality, scholars and policy-makers often debate about the vulnerability and risks arising from relative or asymmetric economic dependence, which raises the question of whether our results hold in a more general setting when both states have the opportunity to make proposals in bargaining. To address this, we study bargaining with a random proposer, with both states have some chance of making a proposal in each period. We introduce a parameter of proposing power for each state, and our main findings still hold in the random proposer game. Further, this extension implies that wars occur under conditions of sufficiently high asymmetric economic dependence.

Conclusion

In conclusion, this paper has delved into the complex relationship between economic interdependence, bargaining leverage, and international conflict. By incorporating diverse theoretical perspectives into a comprehensive game-theoretic model, we have unveiled nuanced insights that contribute to our understanding of this intricate interplay.

Our analysis reaffirms the classic tenets of commercial peace theory by demonstrating that stable economic dependence tends to foster peaceful negotiations rather than conflict. This is evident when states perceive no imminent shifts in their economic reliance and anticipate the continuity of their economic ties. In such scenarios, the mutual benefits of sustained trade and the cost of disruption outweigh the temptation to exploit economic leverage for political gains.

However, our study has also underscored scenarios in which the dynamics of economic dependence can drive conflict. The prospect of impending substantial economic reliance or the risk of abrupt trade termination due to external factors can lead states to adopt a more confrontational stance. In these circumstances, even if short-term settlements appear favorable, the long-term implications of heightened dependence or significant trade losses motivate states to engage in conflict as a preventive measure.

Yet, our analysis also illuminates avenues for avoiding commercial conflict. The intentional termination of economic relationships to forestall extortion and conflict emerges as a viable strategy for states. Moreover, by moderating the rate of their economic dependence growth, states can mitigate concerns about future political exploitation, thereby enhancing the prospects for peaceful negotiations.

Ultimately, the findings presented herein carry significant policy implications. By understanding the nuanced interplay between economic interdependence, bargaining leverage, and conflict, states can make informed decisions about their trade policies to foster mutual cooperation and avoid the escalation of tensions. This research offers a multi-dimensional perspective that contributes to the ongoing discourse on the intricacies of international relations in an economically interconnected world.

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Appendix

Contents

A Proofs

A.1 Lemmas & Propositions in Main Text

Lemma 1. *In any equilibrium in which neither state severs trade on the path of play,*

1. *in a period in which State 2 is highly dependent, $s_t = \{T, H\}$, the highest demand State 2 is willing to accept, denoted x_{TH}, is increasing in a_2'.*

2. *in a period in which State 2 is not highly dependent, $s_t = \{T, L\}$, the highest demand State 2 is willing to accept, denoted x_{TL}, is decreasing in a_2'.*

Proof. We start by solving the game in $s_t = \{T, H\}$. We construct a Markov Stationary Perfect Equilibrium that assumes State 1 and State 2 trade with each other. In the bargaining stage, State 1 offers $(x_t^{T,H}, 1 - x_t^{T,H})$, if State 2 accepts, its receives continuation payoff

$$V_2^{T,H} = (1-\delta)(\gamma + 1 - x_t^{T,H}) + \delta V_2^{T,H}$$

implying $V_2^{T,H} = \gamma + 1 - x_t^{T,H}$. If State 2 rejects the offer, it receives war payoff

$$W_2^{T,H} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2'$$

State 2 accepts $x_t^{T,H}$ such that $V_2^{T,H} \geq W_2^{T,H}$, implying

$$x_t^{T,H} \leq (1-\beta)\gamma + p + c_2 + (1-\delta)a_2' \equiv \hat{x}_{T,H}$$

so $\hat{x}_{T,H} > 0$ obviously; $\hat{x}_{T,H} < 1$ when

$$a_2' < \frac{1 - p - c_2 - (1-\beta)\gamma}{1-\delta} \equiv a_2'^*$$

If State 1 offers $\hat{x}_{T,H}$, it receives continuation payoff

$$V_1^{T,H} = (1-\delta)(\gamma + \hat{x}_{T,H}) + \delta V_1^{T,H}$$

implying $V_1^{T,H} = \gamma + \hat{x}_{T,H}$. If State 1 makes a non-serious offer, it receives war payoff

$$W_1^{T,H} = p - c_1 + \beta\gamma - (1-\delta)a_1^{'}$$

State 1 offers $\hat{x}_{T,H}$ if and only if $V_1^{T,H} \geq W_1^{T,H}$, implying

$$c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1^{'} + a_2^{'}) \geq 0$$

which holds always.

Then, we solve the game in $s_t = \{T, L\}$. We construct a Markov Stationary Perfect Equilibrium that assumes State 1 and State 2 trade with each other. In the next period $t+1$, s_{t+1} transits to $\{T, H\}$ with probability d. In the bargaining stage, if State 2 accepts the offers $(x_t^{T,L}, 1 - x_t^{T,L})$, it receives the continuation payoff

$$V_2^{T,L} = (1-\delta)(\gamma + 1 - x_t^{T,L}) + \delta[dV_2^{T,H} + (1-d)V_2^{T,L}]$$

assuming $\hat{x}_{T,H} \in (0,1)$, then

$$V_2^{T,L} = \frac{(1-\delta)(\gamma + 1 - x_t^{T,L}) + \delta d[1 - p - c_2 + \beta\gamma - (1-\delta)a_2']}{1 - \delta(1-d)}$$

if State 2 rejects the offer, it receives war payoff

$$W_2^{T,L} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2$$

State 2 accepts $x_t^{T,L}$ such that $V_2^{T,L} \geq W_2^{T,L}$, implying

$$x_t^{T,L} \leq (1-\beta)\gamma + p + c_2 + (1-\delta)a_2 - \delta d(a_2' - a_2) \equiv \hat{x}_{T,L}$$

$\hat{x}_{T,L} > 0$ when

$$a_2' < \frac{(1-\beta)\gamma + p + c_2 + (1 - \delta + \delta d)a_2}{\delta d} \equiv \overline{a_2'}$$

$\hat{x}_{T,L} < 1$ when

$$a_2' > \frac{(1-\beta)\gamma + p - 1 + c_2 + (1-\delta+\delta d)a_2}{\delta d} \equiv \underline{a_2'}$$

When $a_2' \in (\underline{a_2'}, \overline{a_2'})$, $\hat{x}_{T,L} \in (0,1)$. If State 1 offers $\hat{x}_{T,L}$, it receives the continuation payoff

$$V_1^{T,L} = (1-\delta)(\gamma + \hat{x}_{T,L}) + \delta d V_1^{T,H} + \delta(1-d)V_1^{T,L}$$

implying

$$V_{1,t}^{T,L} = \gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2$$

if State 1 makes a non-serious offer, it receives war payoff

$$W_1^{T,L} = p - c_1 + \beta\gamma - (1-\delta)a_1$$

State 1 offers $\hat{x}_{T,L}$ if and only if $V_1^{T,L} \geq W_1^{T,L}$, which implies

$$c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1 + a_2) > 0$$

which holds always. This completes the proof. □

Proposition 1. *Suppose that σ is an equilibrium in which neither state severs trade on the path of play in any period.*

If

$$a_2^{'} > \frac{(1-\beta)\gamma + p + c_2 + (1-\delta+\delta d)a_2}{\delta d} \equiv \overline{a}_2^{'}$$

or, equivalently

$$d > \frac{(1-)\gamma + p + c_2 + (1-\delta)a_2}{\delta(a_2' - a_2)} \equiv \overline{d}$$

then under σ State 2 rejects all offers in a period in which $s_t = \{T, L\}$.

Proof. Lemma 1 shows that $\hat{x}_{T,L} < 0$ when $a_2' > \overline{a_2'}$. In this case, the most State 1 can offer State 2 is the whole political issue. If State 2 accepts the whole political issue, it receives the continuation payoff

$$V_2^{T,L} = \frac{(1-\delta)(\gamma+1) + \delta d[1 - p - c_2 + \beta\gamma - (1-\delta)a_2']}{1 - \delta + \delta d}$$

if State 2 rejects the whole political issue, it receives war payoff

$$W_2^{T,L} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2$$

State 2 prefers to accept $\hat{x}_{T,L}$ if and only if $V_2^{T,L} \geq W_2^{T,L}$, which implies that

$$\frac{(1-\beta)\gamma + p + c_2 + (1-\delta+\delta d)a_2}{\delta d} > a_2'$$

which contradicts the assumption that $a_2' > \overline{a_2'}$. Thus, State 2 rejects the whole political issue when its future economic dependence is sufficiently large. Thus, there is no peaceful bargaining when $a_2' > \overline{a_2'}$. This completes the proof. □

Proposition 2. *In equilibrium, if*

$$\beta < \frac{c_1 + c_2}{\gamma}$$

then State 1 severs trade in any period in which $s_t = \{T, L\}$.
Further, on the path of play the probability of war is 0.

Proof. We follow the result of Proposition 1, and solve states' decisions to trade or not. If State 2 severs trade, it receives the continuation payoff

$$V_2^{NT,L} = 1 - p - c_2 - (1-\delta)a_2$$

if State 2 extends trade, it receives the continuation payoff

$$V_2^{T,L} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2$$

since $V_2^{T,L} > V_2^{NT,L}$, State 2 always extends trade.

If State 1 severs trade, it receives the continuation payoff

$$V_1^{NT,L} = p + c_2 - (1-\delta)a_1$$

if State 1 extends trade, bargaining fails down and State 1 receives the war payoff

$$W_1^{T,L} = p - c_1 + \beta\gamma - (1-\delta)a_1$$

State 1 extends trade if and only if $V_1^{T,L} > V_1^{NT,L}$, which implies $c_1 + c_2 < \beta\gamma$; State 1 severs trade if $c_1 + c_1 > \beta\gamma$. This completes the proof. □

Proposition 3. *There exist* $a^* > 0$ *and* $d^* > 0$ *such that*

1. *if* $a_2' = a^*$ *or* $d = d^*$ *then the equilibrium probability of war is 0 and*
2. *State 1 and State 2's equilibrium utilities are weakly higher under* a^* *or* d^* *than under any* $a_2' > a^*$ *or* $d > d^*$.

Proof. Proposition 1 shows that as long as $a_2' < \overline{a_2'}$, states peacefully divide the political issue. When $a_2' > \overline{a_2'}$, State 2 rejects any offer and bargaining fails down.

Proposition 1 illustrates the condition of dangerous dependence in terms of $a_2^{'}$. Rearrange the condition of $\hat{x}_{T,L} > 0$ in terms of d

$$d < \frac{p + c_2 + (1-\beta)\gamma + (1-\delta)a_2}{\delta(a_2' - a_2)} \equiv \bar{d}$$

$\hat{x}_{T,L} > 0$ if and only if $d < \bar{d}$. This completes the proof.

□

Proposition 4. *For values of*

$$a_i \in \left[\frac{a_2'\delta d - (1-\beta)\gamma + p + c_2}{1 - \delta + \delta d}, a_2'\right),$$

in equilibrium

1. *States receive higher utilities by decreasing their own economic dependence a_i.*

2. *States receive higher utilities by increasing their opponents' economic dependence a_{-i}.*

Proof. Using the ultimatum bargaining game as the baseline model, we fix states' future economic dependence a_i', and investigate states' equilibrium utility as a function of a_2.

Rearrange the condition of war in terms of a_2. $\hat{x}_{T,L} < 0$ and war happens when

$$a_2 < \frac{\delta d a_2' - p - c_2 - (1-\beta)\gamma}{1 - \delta(1-d)} \equiv \underline{a_2}$$

$\hat{x}_{T,L} > 1$ and State 2 concedes the whole political issue when

$$a_2 > \frac{\delta d a_2' + 1 - p - c_2 - (1-\beta)\gamma}{1 - \delta(1-d)} \equiv \bar{a_2}$$

$\hat{x}_{T,L} \in (0,1)$ when $a_2 \in (\underline{a_2}, \bar{a_2})$.

When $a_2 > \bar{a_2}$, State 2 concedes the whole political issue to State 1, and State 2 receives

$$V_2^{T,L} = \frac{(1-\delta)\gamma + \delta d[1 - p - c_2 + \beta\gamma - (1-\delta)a_2']}{1 - \delta(1-d)}$$

As a_2 decreases below $\bar{a_2}$ and $\hat{x}_{T,L} < 1$, in equilibrium, State 2's bargaining payoff equals its war payoff

$$V_2^{T,L} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2$$

which decrease in a_2. To sum up, State 2 receives a higher equilibrium utility by decreasing a_2. Since State 2 is the offer-receiver in the ultimatum bargaining game, its equilibrium payoff is irrelevant to a_1. In extension A.3, we analyze a random-proposing game in which both states have the chance of proposing in each period. When State 2 is the offer-receiver in period t, it benefits from increasing State 1's adjustment cost a_1, since there is some chance that State 2 is the proposer in $t+1$ and therefore extract in a_1.

When $a_2 > \bar{a_2}$, State 1 obtains the whole political issue, and it receives

$$V_1^{T,L} = \frac{(1-\delta)(\gamma+1) + \delta d[\gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2']}{1-\delta(1-d)}$$

As a_2 decreases between $(\underline{a_2}, \bar{a_2})$ and $\hat{x}_{T,L} \in (0,1)$, in equilibrium, State 1 receives

$$V_1^{T,L} = \gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2$$

which increases in a_2. As a_2 decreases further below $\underline{a_2}$ and $\hat{x}_{T,L} < 0$, war happens and State 1 receives

$$W_1^{T,L} = p - c_1 + \beta\gamma - (1-\delta)a_1$$

which is lower than the payoff from peaceful bargaining. To sum up, State 1 receives a higher equilibrium utility by increasing a_2 as long as, in the next period, $a_2' - a_2$ is not large enough to cause war. Since State 1 is the offer-maker in the ultimatum bargaining game, its equilibrium payoff is irrelevant to a_1. In extension A.3, we analyze a random-proposing game in which both states have the chance of proposing in each period. When State 1 is the offer-maker in period t, it knows that in period $t+1$, there is some chance that it becomes the offer-receiver and State 2 extracts in a_1. Therefore, State 1 benefits from decreasing its own adjustment cost a_1 to the extent that $a_1' - a_1$ is not too large to cause war.

The following figure shows states' equilibrium utility in the ultimatum bargaining game as a function of a_2

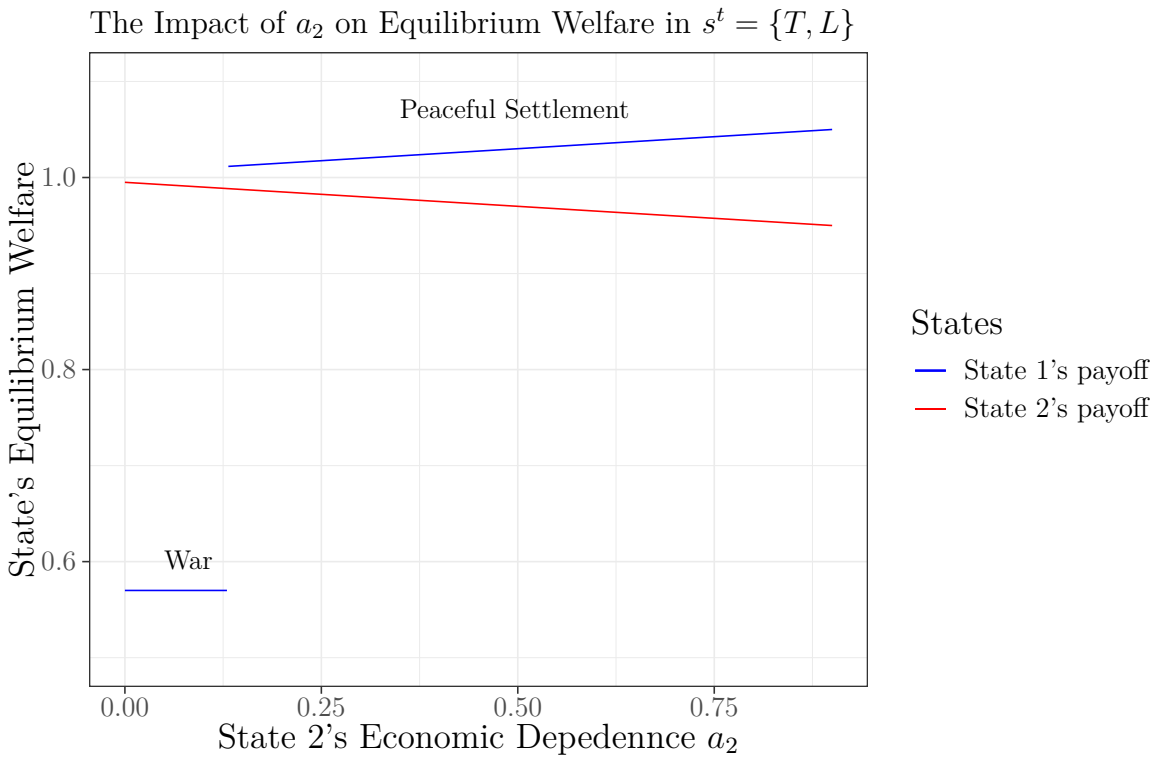

Figure B.1. States' equilibrium utility as a function of a_2 before increases in economic dependence

□

Next, I prove the results when there is a positive probability of an exogenous termination of trade. That is, there is probability $r > 0$ that the trade will be disrupted by Nature.

Proposition 5. *When r is positive, war occurs between trading states if:*

- *r and β are high enough.*

Proof. We solve the game after the increase in economic dependence, which corresponds to the case without anticipated increase in economic dependence. Suppose we are in the state $s_t = \{T, H\}$. We construct a Markov Stationary Perfect Equilibrium that assumes State 1 and State 2 trade with each other.

In the bargaining stage, State 1 offers $(x_t^{T,H}, 1 - x_t^{T,H})$. If State 2 accepts, it receives the continuation payoff

$$V_2^{T,H} = (1-\delta)(\gamma + 1 - x_t^{T,H}) + \delta[r(1 - p - c_2 - (1-\delta)a_2') + (1-r)V_2^{T,H}]$$

implying

$$V_2^{T,H} = \frac{(1-\delta)(\gamma + 1 - x_t^{T,H}) + r\delta[1 - p - c_2 - (1-\delta)a_2']}{1 - \delta(1-r)}$$

If State 2 rejects the offer, it receives the war payoff

$$W_2^{T,H} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2'$$

State 2 accepts $x_t^{T,H}$ such that $V_2^{T,H} \geq W_2^{T,H}$, which implies

$$x_t^{T,H} \leq p + c_2 + (1-\delta)a_2' + (1-\beta)\gamma - \frac{r\delta}{1-\delta}\beta\gamma \equiv \widehat{x}_t^{T,H}$$

$\widehat{x}_t^{T,H} > 0$ when

$$r < \frac{(1-\delta)[p + c_2 + (1-\delta)a_2' + (1-\beta)\gamma]}{\delta\beta\gamma} \equiv \bar{r}$$

$\hat{x}_t^{T.H} < 0$ when $r > \bar{r}$. $\hat{x}_t^{T.H} < 1$ when

$$r > \frac{(1-\delta)[p + c_2 + (1-\delta)a_2' + (1-\beta)\gamma] - 1}{\delta\beta\gamma} \equiv \underline{r}$$

$\hat{x}_t^{T.H} > 1$ when $r < \underline{r}$. $\bar{r} > \underline{r}$ obviously.

The condition for war is $r > \bar{r}$, $\bar{r}$ is a valid probability when

$$\beta > \frac{(1-\delta)[p + c_2 + (1-\delta)a_2' + \gamma]}{\gamma} \equiv \beta_*$$

since $\beta \in (0,1)$, β_* is a valid probability when

$$(1-\delta)[p + c_2 + (1-\delta)a_2'] < \delta\gamma \tag{B.1}$$

assuming this condition holds, which implies $a_2' < \frac{\delta\gamma - (1-\delta)(p+c_2)}{(1-\delta)^2} \equiv a_{2*}'$.

Then, when $\beta > \beta_*$ and $r > \bar{r}$, $\hat{x}_t^{T,H} < 0$ and there is no offer that State 2 will accept, bargaining fails down and war occurs. State 1 if severs trade, it receives $p + c_2 - (1-\delta)a_1'$; State 1 if extends trade, it receives $p - c_1 + \beta\gamma - (1-\delta)a_1'$. State 1 extends trade when $c_1 + c_2 < \beta\gamma$, State 1 severs trade when $c_1 + c_2 > \beta\gamma$.

To examine the condition of war when $\hat{x}_t^{T,H} \in (0,1)$. When $r \in (\underline{r}, \bar{r})$, $\hat{x}_t^{T,H}$ is guaranteed to be non-negative and State 2 will accept it. If State 1 offers $\hat{x}_t^{T,H}$, it receives the continuation payoff

$$V_1^{T,H} = (1-\delta)(\gamma + \hat{x}_t^{T,H}) + \delta[r(p + c_2 - (1-\delta)a_1') + (1-r)V_1^{T,H}]$$

implying

$$V_1^{T,H} = \frac{(1-\delta)(\gamma + \hat{x}_t^{T,H}) + r\delta[p + c_2 - (1-\delta)a_1']}{1 - \delta(1-r)}$$

If State 1 makes a non-serious offer, it receives the war payoff

$$W_1^{T,H} = p - c_1 + \beta\gamma - (1-\delta)a_1^{'}$$

State 1 prefers peaceful bargaining to fighting if and only if $V_1^{T,H} > W_1^{T,H}$, which implies

$$(1-\delta)[c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1' + a_2')] > r\delta(2\beta\gamma - c_1 - c_2)$$

it is easy to verify that State 1 always prefers bargaining if $\beta < \frac{c_1+c_2}{2\gamma}$; and if $\beta > \frac{c_1+c_2}{2\gamma}$, State 1 prefers bargaining when

$$r < \frac{(1-\delta)[c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1^{'} + a_2^{'})]}{\delta(2\beta\gamma - c_1 - c_2)} \equiv \hat{r}$$

and State 1 prefers fighting when $r > \hat{r}$.

The condition of war is $r > \hat{r}$. Since $r \in [0,1]$, $\hat{r}$ is a valid probability when

$$\beta > \frac{c_1 + c_2 + 2(1-\delta)\gamma + (1-\delta)^2(a_1^{'} + a_2^{'})}{2\gamma} \equiv \hat{\beta}$$

since $\beta \in (0,1)$, $\hat{\beta}$ is a valid probability when

$$c_1 + c_2 + (1-\delta)^2(a_1' + a_2') < 2\delta\gamma \tag{B.2}$$

assuming this condition holds, which implies $a_2' < \frac{2\delta\gamma - c_1 - c_2}{(1-\delta)^2} - a_1' \equiv \hat{a}_2'$.

Then, when $\beta > \hat{\beta}$ and $\max\{\hat{r}, \underline{r}\} < r < \bar{r}$, $\hat{x}_t^{T,H} \in (0,1)$, but State 1 is not willing to make the offer and risk the exogenous termination of trade. Instead, State 1 makes a non-serious offer, bargaining fails down and war occurs. State 1 extends trade when $c_1 + c_2 < \beta\gamma$, State 1 severs trade when $c_1 + c_2 > \beta\gamma$.

As long as $a_2' < \max\{a_{2*}^{'}, \hat{a}_2'\}$, war happens between trading states when $r > \min\{\hat{r}, \bar{r}\}$ and $\beta > \min\{\hat{\beta}, \beta_*\}$. This completes the proof. □

A.2 Extension: Non-absorbing War

In this extension, we study the case in which war is not state-absorbing. With probability π, states receive war payoff in the current and all subsequent periods; with probability $1-\pi$, states receive war payoffs in the current period, and trade resumes in the next period. We demonstrate that war only temporarily disrupts economic benefit does not increase the incentive of fighting.

We focus on the peaceful bargaining equilibrium, and show that neither player has incentive to one-shot deviation before increases in economic dependence.

Proposition A.1. *In $s_t = \{T, L\}$, $\pi < 1$ does not increase the probability of war.*

Proof. If State 2 accepts the offer $(x_t^{T,L}, 1 - x_t^{T,L})$, it receives the payoff

$$V_2^{T,L} = (1-\delta)(\gamma + 1 - x_t^{T,L}) + \delta[dV_2^{T,H} + (1-d)V_2^{T,L}]$$

where $V_2^{T,H} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2'$ by previous analysis, implying

$$V_2^{T,L} = \frac{(1-\delta)(\gamma + 1 - x_t^{T,L}) + \delta d V_2^{T,H}}{1 - \delta + \delta d}$$

If State 2 now rejects the offer, its payoff from the one-shot deviation is

$$W_2^{T,L} = \pi[1 - p - c_2 + \beta\gamma - (1-\delta)a_2] + (1-\pi)[(1-\delta)(1 - p - c_2 + \beta\gamma - (1-\delta)a_2) + \delta V_2^{T,L}]$$

State 2 has no incentive to the one-shot deviation if and only if $W_2^{T,L} \leq V_2^{T,L}$,

$$[1 - (1-\pi)\delta][1 - p - c_2 + \beta\gamma - (1-\delta)a_2] + (1-\pi)\delta V_2^{T,L} \leq V_2^{T,L}$$

implying

$$x_t^{T,L} \leq p + c_2 + (1-\beta)\gamma + (1-\delta)a_2 - \delta d(a_2' - a_2)$$

which holds as the same offer when $\pi = 1$, thus State 2 has no incentive to the one-shot deviation.

Suppose $a_2' \in (\underline{a_2'}, \overline{a_2'})$ such that $x_t^{T,L} \in (0,1)$. It is optimal for State 1 to offer $x_t^{T,L} = p + c_2 + (1-\beta)\gamma + (1-\delta)a_2 - \delta d(a_2' - a_2)$. State 1's continuation payoff is

$$V_1^{T,L} = \frac{(1-\delta)(\gamma + x_t^{T,L}) + \delta d V_1^{T,H}}{1 - \delta + \delta d} = \gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2$$

If State makes a non-serious offer, its one-shot deviation payoff is

$$W_1^{T,L} = \pi[p - c_1 + \beta\gamma - (1-\delta)a_1] + (1-\pi)[(1-\delta)(p - c_1 + \beta\gamma - (1-\delta)a_1) + \delta V_1^{T,L}]$$

State 1 has no incentive of one-shot deviation if and only if $V_1^{T,L} \geq W_1^{T,L}$, implying

$$c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1 + a_2) \geq 0$$

which holds obviously, State 1 has no incentive to deviate. This completes the proof.

□

A.3 Extension: Randomized Proposing Power

In this section, we study the extension that both states have the power to make proposal. In each period, with probability π, State 1 makes the offer; with probability $1-\pi$, State 2 makes the offer. We show how the proposing power coupled with economic dependence influence the bargaining leverage, the risk of war and the decision to sever trade.

We first show that there is always peaceful bargaining and trade when trade is severed and after the increases in economic dependence. Then, we investigate the conditions for war and trade severance before the increases in economic dependence.

Proposition A.2. *With randomized proposing power:*

- *States always peacefully bargain after the severance of trade.*
- *States always peacefully bargain and trade with each other after the increases in economic dependence.*

Proof. Suppose $s_t = \{N, 1\}$, in which State 1 is the proposer. In the bargaining stage, if State 2 accepts the offer $(x_t^N, 1-x_t^N)$, it receives the continuation payoff

$$V_2^N = (1-\delta)(1-x_t^N) + \delta[\pi V_2^N + (1-\pi)V_2^{N'}]$$
$$V_2^N = \frac{(1-\delta)(1-x_t^N) + \delta(1-\pi)V_2^{N'}}{1-\delta\pi}$$

where $V_2^{N'}$ is State 2's continuation payoff when State 2 is the proposer; if State 2 rejects the offer, it receives the war payoff

$$W_2^N = 1 - p - c_2$$

State 2 accepts any x_t^N such that $V_2^N \geq W_2^N$, implying $x_t^N \leq 1 - V_2^{N'} + \frac{(1-\delta\pi)(V_2^{N'}-1+p+c_2)}{1-\delta}$. In equilibrium, State 1 offers

$$\widehat{x_t^N} = 1 - V_2^{N'} + \frac{(1-\delta\pi)(V_2^{N'} - 1 + p + c_2)}{1-\delta}$$

in equilibrium, $V_2^{N'} \geq 1 - p - c_2$ always. Then it is easy to verify that $\widehat{x_t^N} > 0$ obviously, which implies State 2 will never reject State 1's offer, and there is always peaceful bargaining when State 1 is the proposer.

Suppose $s_t = \{N, 2\}$, in which State 2 is the proposer. In the bargaining stage, if State 1 accepts the offer $(x_t^{N'}, 1 - x_t^{N'})$, it receives the continuation payoff

$$V_1^{N'} = (1-\delta)x_t^{N'} + \delta[\pi V_1^N + (1-\pi)V_1^{N'}]$$
$$V_1^{N'} = \frac{(1-\delta)x_t^{N'} + \delta\pi V_1^N}{1-\delta(1-\pi)}$$

if State 1 rejects the offer, it receives the war payoff

$$W_1^N = p - c_1$$

State 1 accepts any $x_t^{N'}$ such that $V_1^{N'} \geq W_1^N$, implying $x_t^{N'} \geq p - c_1 + \frac{\delta\pi(p-c_1-V_1^N)}{1-\delta}$. In equilibrium, State 2 offers

$$\widetilde{x_t^N} = p - c_1 + \frac{\delta\pi(p - c_1 - V_1^N)}{1-\delta}$$

in equilibrium, $V_1^N \geq p - c_1$ always, implying $\widetilde{x_t^N} < 1$ obviously. Thus, State 1 will never reject State 2's offer, and there is always peaceful bargaining when State 2 is the proposer. This completes the proof that State 1 and State 2 always prefer bargaining after the severance of trade.

Next, suppose $s_t = \{T, H, 1\}$ in which State 1 is the proposer after the increase of economic dependence. In the bargaining stage, if State 2 accepts the offer $(x_t^{T,H}, 1 - x_t^{T,H})$, it receives the continuation payoff

$$V_2^{T,H} = (1-\delta)(\gamma + 1 - x_t^{T,H}) + \delta[\pi V_2^{T,H} + (1-\pi)V_2^{T,H'}]$$
$$V_2^{T,H} = \frac{(1-\delta)(\gamma + 1 - x_t^{T,H}) + \delta(1-\pi)V_2^{T,H'}}{1-\delta\pi}$$

where $V_2^{T,H'}$ is State 2's continuation payoff when State 2 is the proposer in $s_t = \{T, H, 2\}$; if State 2 rejects the offer, it receives the war payoff

$$W_2^{T,H} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2'$$

State 2 accepts any $x_t^{T,H}$ such that $V_2^{T,H} \geq W_2^{T,H}$, implying $x_t^{T,H} \leq p + c_2 + (1-\beta)\gamma + (1-\delta)a_2' + \frac{\delta(1-\pi)}{1-\delta}(V_2^{T,H'} - W_2^{T,H})$. In equilibrium, State 1 offers

$$\widehat{x_t^{T,H}} = p + c_2 + (1-\beta)\gamma + (1-\delta)a_2' + \frac{\delta(1-\pi)}{1-\delta}(V_2^{T,H'} - W_2^{T,H})$$

in equilibrium, $V_2^{T,H'} \geq W_2^{T,H}$ always, implying $\widehat{x_t^{T,H}} > 0$ obviously. Thus, State 2 will never reject State 1's offer. $V_2^{T,H'}$ depends on the equilibrium offer made by State 2 in $s_t = \{T, H, 2\}$, denote that equilibrium offer as $\widetilde{x_t^{T,H}}$.

Suppose $s_t = \{T, H, 2\}$ in which State 2 is the proposer after the increase of economic dependence. In the bargaining stage, if State 1 accepts the offer $(x_t^{T,H'}, 1 - x_t^{T,H'})$, it receives the continuation payoff

$$V_1^{T,H'} = (1-\delta)(\gamma + x_t^{T,H'}) + \delta[\pi V_1^{T,H} + (1-\pi)V_1^{T,H'}]$$
$$V_1^{T,H'} = \frac{(1-\delta)(\gamma + x_t^{T,H'}) + \delta\pi V_1^{T,H}}{1-\delta(1-\pi)}$$

if State 1 rejects the offer, it receives the war payoff

$$W_1^{T,H'} = p - c_1 + \beta\gamma - (1-\delta)a_1'$$

State 1 accepts any $x_t^{T,H'}$ such that $V_1^{T,H'} \geq W_1^{T,H'}$, implying $x_t^{T,H'} \geq p - c_1 - (1-\beta)\gamma - (1-\delta)a_1' - \frac{\delta\pi}{1-\delta}(V_1^{T,H} - W_1^{T,H'})$. In equilibrium, State 2 offers

$$\widetilde{x_t^{T,H}} = p - c_1 - (1-\beta)\gamma - (1-\delta)a_1' - \frac{\delta\pi}{1-\delta}(V_1^{T,H} - W_1^{T,H'})$$

in equilibrium, $V_1^{T,H} \geq W_1^{T,H'}$ always, implying $\widetilde{x_t^{T,H}} < 1$ obviously. Thus, State 1 will never reject State 2's offer.

From now on, we focus on the equilibria in which $\widehat{x_t^{T,H}} \in (0,1)$ and $\widetilde{x_t^{T,H}} \in (0,1)$. Assuming $\widetilde{x_t^{T,H}} \in (0,1)$ implies $V_2^{T,H'} = \gamma + 1 - p + c_1 + (1-\beta)\gamma + (1-\delta)a_1'$. Then,

$$\widehat{x_t^{T,H}} = p + \frac{\delta(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1'] + \frac{1-\delta\pi}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2']$$

assuming $\widehat{x_t^{T,H}} \in (0,1)$ implies $V_1^{T,H} = \gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2'$. Then,

$$\widetilde{x_t^{T,H}} = p - \frac{1-\delta(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1'] - \frac{\delta\pi}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2']$$

since $V_1^{T,H} > W_1^{T,H}$, State 1 is willing to offer $\widehat{x_t^{T,H}}$; $V_2^{T,H'} > W_2^{T,H'}$, State 2 is willing to offer $\widetilde{x_t^{T,H}}$.

As to trade decision in $s_t = \{T, H, 1\}$, if State 2 severs trade, it receives $1 - p - c_2 - (1-\delta)a_2'$; if State 2 extends trade, it receives $1 - p - c_2 + \beta\gamma - (1-\delta)a_2'$, thus State 2 always extends trade. If State 1 severs trade, it receives $p + c_2 - (1-\delta)a_1'$; if State 1 extends trade, it receives

$\gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2'$, thus State 1 always extends trade.

As to trade decision in $s_t = \{T, H, 2\}$, if State 2 severs trade, it receives $1-p+c_1-(1-\delta)a_2'$; if State 2 extends trade, it receives $\gamma + 1 - p + c_1 + (1-\beta)\gamma + (1-\delta)a_1'$, thus State 2 always extends trade. If State 1 severs trade, it receives $p - c_1 - (1-\delta)a_1'$; if State 1 extends trade, it receives $p - c_1 + \beta\gamma - (1-\delta)a_1'$, thus State 1 always extends trade. This completes the proof that State 1 and State 2 always peacefully bargain and trade after the increase in economic dependence.

$\widehat{x_t^{T,H}} \in (0,1)$ and $\widetilde{x_t^{T,H}} \in (0,1)$ implies the following condition

$$c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1' + a_2') < 1 - \delta \tag{B.3}$$

□

We next show that how the anticipation of increasing economic dependence influences the bargaining leverage, causes war and trade severance.

Proposition A.3. *Before the increase of economic dependence, there exists an equilibrium in which states peacefully bargain and trade with each other*

- $\widehat{x_t^{T,L}} = p + \frac{\delta(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1] + \frac{1-\delta\pi}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2] - \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)]$
- $\widetilde{x_t^{T,L}} = p - \frac{1-\delta(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1] - \frac{\delta\pi}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2] - \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)]$

Proof. Starting with $s_t = \{T, L, 1\}$ in which State 1 is the proposer. In the bargaining stage, if State 2 accepts the offer $(x_t^{T,L}, 1 - x_t^{T,L})$, it receives the continuation payoff

$$V_2^{T,L} = (1-\delta)(\gamma + 1 - x_t^{T,L}) + \delta[\pi d V_2^{T,H} + (1-\pi)d V_2^{T,H'} + \pi(1-d)V_2^{T,L} + (1-\pi)(1-d)V_2^{T,L'}]$$

$$V_2^{T,L} = \frac{(1-\delta)(\gamma + 1 - x_t^{T,L}) + \delta\pi d V_2^{T,H} + \delta(1-\pi)d V_2^{T,H'} + \delta(1-\pi)(1-d)V_2^{T,L'}}{1 - \delta\pi(1-d)}$$

where $V_2^{T,L'}$ is State 2's continuation payoff when State 2 is the proposer in $s_t = \{T, L, 2\}$; if State 2 rejects the offer, it receives the war payoff

$$W_2^{T,L} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2$$

State 2 accepts any $x_t^{T,L}$ such that $V_2^{T,L} \geq W_2^{T,L}$. From now on, assuming $\widehat{x_t^{T,H}} \in (0,1)$ and $\widetilde{x_t^{T,H}} \in (0,1)$. $V_2^{T,L'}$ depends on the equilibrium offer made by State 2 in $s_t = \{T, L, 2\}$, denote that equilibrium offer as $\widetilde{x_t^{T,L}}$.

We construct an equilibrium in which states peacefully bargain before the increase of economic dependence, and $\widehat{x_t^{T,L}} \in (0,1)$ and $\widetilde{x_t^{T,L}} \in (0,1)$. $\widetilde{x_t^{T,L}} \in (0,1)$ implies $V_2^{T,L'} =$

$\gamma + 1 - p + c_1 + (1-\beta)\gamma + (1-\delta)a_1$. Then

$$\widehat{x_t^{T,L}} = p + \frac{\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] + \frac{1-\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] - \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)]$$

by construction, $\widehat{x_t^{T,L}} \in (0,1)$. $\widehat{x_t^{T,L}} > 0$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < p + \frac{\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] + \frac{1-\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \bar{\Delta}$$

$\widehat{x_t^{T,L}} < 1$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] > p-1 + \frac{\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] + \frac{1-\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \underline{\Delta}$$

thus $\widehat{x_t^{T,L}} \in (0,1)$ if and only if $\underline{\Delta} < \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < \bar{\Delta}$. State 1 will receive $V_1^{T,L} = \gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2$ and is willing to offer $\widehat{x_t^{T,L}}$. It is easy to verify that both state prefer to trade with each other.

Then in $s_t = \{T, L, 2\}$, in which State 2 is the proposer. In the bargaining stage, if State 1 accepts the offer $(x_t^{T,L'}, 1 - x_t^{T,L'})$, it receives the continuation payoff

$$V_1^{T,L'} = (1-\delta)(\gamma + x_t^{T,L'}) + \delta[\pi d V_1^{T,H} + (1-\pi)d V_1^{T,H'} + \pi(1-d)V_1^{T,L} + (1-\pi)(1-d)V_1^{T,L'}]$$

$$V_1^{T,L'} = \frac{(1-\delta)(\gamma + x_t^{T,L'}) + \delta\pi d V_1^{T,H} + \delta(1-\pi)d V_1^{T,H'} + \delta\pi(1-d)V_1^{T,L}}{1-\delta(1-\pi)(1-d)}$$

if State 1 rejects the offer, it receives the war payoff

$$W_1^{T,L'} = p - c_1 + \beta\gamma - (1-\delta)a_1$$

State 1 accepts any $x_t^{T,L'}$ such that $V_1^{T,L'} \geq W_1^{T,L'}$. $\widehat{x_t^{T,L}} \in (0,1)$ implies $V_1^{T,L} = \gamma + p + c_2 + (1-\beta)\gamma + (1-\delta)a_2$. Then

$$\widehat{x_t^{T,L}} = p - \frac{1-\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] - \frac{\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] - \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)]$$

by construction, $\widetilde{x_t^{T,L}} \in (0,1)$. $\widetilde{x_t^{T,L}} > 0$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < p - \frac{1-\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] - \frac{\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \bar{\Delta}'$$

$\widetilde{x_t^{T,L}} < 1$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] > p-1 - \frac{1-\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] - \frac{\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \underline{\Delta'}$$

thus $\widetilde{x_t^{T,L}} \in (0,1)$ if and only if $\underline{\Delta'} < \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < \bar{\Delta}'$. State 2 will receive $V_2^{T,L'} = \gamma + 1 - p + c_1 + (1-\beta)\gamma + (1-\delta)a_1$ and is willing to offer $\widetilde{x_t^{T,L}}$. It is easy to verify that both states prefer to trade with each other.

Since $\bar{\Delta} > \bar{\Delta}'$ and $\underline{\Delta'} < \underline{\Delta}$. $\widehat{x_t^{T,L}} \in (0,1)$ and $\widetilde{x_t^{T,L}} \in (0,1)$ holds if and only if

$$\underline{\Delta} < \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < \bar{\Delta}'$$

where $\underline{\Delta} < \bar{\Delta}'$ implies

$$c_1 + c_2 + 2(1-\beta)\gamma + (1-\delta)(a_1 + a_2) < 1 - \delta \tag{B.4}$$

which obviously holds under the condition B.3. This completes the proof. □

Our next result shows that large increases in economic dependence causes war under trade, and states sever trade to maintain peaceful bargaining when the damage of war on economic benefit is sufficiently large.

Proposition A.4. *Before the increase of economic dependence, large increases in one's future economic dependence cause states to fight while trading.*

- *In $s_t = \{T, L, 2\}$, State 1 fights when $\delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < p - 1 - \frac{1-\delta+\delta\pi d}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1] - \frac{\delta\pi d}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2]$, State 2 will sever trade if $\beta < \frac{c_1+c_2}{\gamma}$.*
- *In $s_t = \{T, L, 1\}$, State 2 fights when $\delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] > p + \frac{\delta d(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_2] + \frac{1-\delta[1-(1-\pi)d]}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2]$, State 1 will sever trade if $\beta < \frac{c_1+c_2}{\gamma}$.*

Proof. I prove the first bullet point, showing that State 1 wants to fight due to its increasing economic dependence $a_1' - a_1$. The second bullet point follows a similar logic.

I construct an equilibrium in which $\widetilde{x_t^{T,L}} > 1$, meaning State 1 rejects any offer made by State 2 in $s_t = \{T, L, 2\}$. Then, $V_2^{T,L'} = 1 - p - c_2 + \beta\gamma - (1-\delta)a_2$. By previous analysis,

$$\widehat{x_t^{T,L}} = p + \frac{\delta d(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1] + \frac{1-\delta+\delta d(1-\pi)}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2] - \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)]$$

There only exists the equilibrium in which $\widehat{x_t^{T,L}} > 1$, implying

$$\delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < p - 1 + \frac{\delta d(1-\pi)}{1-\delta}[c_1 + (1-\beta)\gamma + (1-\delta)a_1] + \frac{1-\delta+\delta d(1-\pi)}{1-\delta}[c_2 + (1-\beta)\gamma + (1-\delta)a_2]$$

State 2 accepts any offer $x_t^{T,L}$, and State 1 offers $\widehat{x_t^{T,L}} = 1$ in $s_t = \{T, L, 1\}$. Then in $s_t = \{T, L, 2\}$, in which State 2 is the proposer. If State 1 accepts the offer, it receives the continuation payoff

$$V_1^{T,L'} = \frac{(1-\delta)(\gamma + x_t^{T,L'}) + \delta\pi d V_1^{T,H} + \delta(1-\pi)d V_1^{T,H'} + \delta\pi(1-d)V_1^{T,L}}{1 - \delta(1-\pi)(1-d)}$$

$\widehat{x_t^{T,L}} > 1$ implies

$$V_1^{T,L} = \frac{(1-\delta)(\gamma+1) + \delta\pi d V_1^{T,H} + \delta(1-\pi)d V_1^{T,H'} + \delta(1-\pi)(1-d)V_1^{T,L'}}{1-\delta\pi(1-d)}$$

plug in $V_1^{T,L'}$, yields

$$\frac{1-\delta+\delta d}{1-\delta}V_1^{T,L'} = \gamma + \delta\pi(1-d) + [1-\delta\pi(1-d)]x_t^{T,L'} + \frac{\delta\pi d}{1-\delta}(V_1^{T,H} - V_1^{T,H'}) + \frac{\delta d}{1-\delta}V_1^{T,H'}$$

if State 1 rejects the offer, it receives the war payoff

$$W_1^{T,L'} = p - c_1 + \beta\gamma - (1-\delta)a_1$$

State 1 accepts $x_t^{T,L'}$ such that $V_1^{T,L'} = W_1^{T,L'}$, implying

$$[1-\delta\pi(1-d)]\widehat{x_t^{T,L}} = p - \delta\pi(1-d) - \frac{1-\delta+\delta\pi d}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] - \frac{\delta\pi d}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] - \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)]$$

by construction, $\widehat{x_t^{T,L}} > 1$, implying

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < p - 1 - \frac{1-\delta+\delta\pi d}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1] - \frac{\delta\pi d}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \underline{\Delta_1}$$

In $s_t = \{T, L, 2\}$, if State 2 severs trade, it receives $1 - p + c_1 - (1-\delta)a_2$; if State 2 extends trade, it receives $1 - p - c_2 + \beta\gamma - (1-\delta)a_2$. State 2 extends trade if and only if

$$1 - p - c_2 + \beta\gamma - (1-\delta)a_2 > 1 - p + c_1 - (1-\delta)a_2 \rightarrow c_1 + c_2 < \beta\gamma$$

State 2 severs trade if and only if $c_1 + c_2 > \beta\gamma$. This completes the proof that there exists an equilibrium in which states fights in $s_t = \{T, L, 2\}$ and State 2 severs trade if $\beta < \frac{c_1+c_2}{\gamma}$; states peacefully bargain in $s_t = \{T, L, 1\}$.

□

Our last result shows that large increases in economic dependence can cause trade severance even if states peacefully bargain over the political issue.

Proposition A.5. *When $\beta < \frac{c_1+c_2}{\gamma}$, large increases in one's future economic dependence causes it to sever trade.*

- *In $s_t = \{T, L, 1\}$, State 1 extends trade when $\Delta^* < \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < \underline{\Delta}$; State 1 severs trade when $\underline{\Delta_1} < \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < \Delta^*$ even if states peacefully bargain.*
- *In $s_t = \{T, L, 2\}$, State 2 extends trade when $\bar{\Delta}' < \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < \Delta^{**}$; State 2 severs trade $\Delta^{**} < \delta d[\pi(a_2' - a_2) - (1-\pi)(a_1' - a_1)] < \bar{\Delta}''$ even if states peacefully bargain.*

Proof. I prove the first bullet point, showing that State 1 severs trade as its future economic dependence increases even if it obtains the whole political issue in $s_t = \{T, L, 1\}$. The second bullet point follows a similar logic.

I construct an equilibrium in which $\widehat{x_t^{T,L}} > 1$, such that State 2 accepts any offer in $s_t = \{T, L, 1\}$, and State 1 offers $\widehat{x_t^{T,L}} = 1$; $\widetilde{x_t^{T,L}} \in (0, 1)$, such that states peacefully bargain in $s_t = \{T, L, 2\}$.

By previous analysis, $\widehat{x_t^{T,L}} > 1$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < p-1+\frac{\delta(1-\pi)}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1]+\frac{1-\delta\pi}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] = \underline{\Delta}$$

Then, it is easy to verify that State 2 always extends trade. If State 1 extends trade, it receives the continuation payoff

$$V_1^{T,L} = \frac{(1-\delta)(\gamma+1)+\delta\pi d V_1^{T,H}+\delta(1-\pi)dV_1^{T,H'}+\delta(1-\pi)(1-d)V_1^{T,L'}}{1-\delta\pi(1-d)}$$

if State 1 severs trade, it receives $p + c_2 - (1-\delta)a_1$. State 1 prefers to extend trade if and only if

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] > p-1+c_2-\gamma-(1-\delta)a_1-\frac{\delta\pi d}{1-\delta}[c_1+c_2+2(1-\beta)\gamma+(1-\delta)(a_1+a_2)]+\frac{\delta(1-\pi)+\delta\pi d}{1-\delta}(c_1+c_2-\beta\gamma) \equiv \Delta^*$$

Then in $s_t = \{T, L, 2\}$, in which State 2 is the proposer. If State 1 accepts the offer, it receives the continuation payoff

$$V_1^{T,L'} = \frac{(1-\delta)(\gamma+x_t^{T,L'})+\delta\pi d V_1^{T,H}+\delta(1-\pi)dV_1^{T,H'}+\delta\pi(1-d)V_1^{T,L}}{1-\delta(1-\pi)(1-d)}$$

if State 1 rejects the offer, it receives the war payoff

$$W_1^{T,L'} = p - c_1 + \beta\gamma - (1-\delta)a_1$$

since assuming $\widehat{x_t^{T,L}} > 1$, plug in the recursive format of $V_1^{T,L}$ yields

$$\frac{1-\delta+\delta d}{1-\delta}V_1^{T,L'} = [1-\delta\pi(1-d)]x_t^{T,L'}+\frac{\delta\pi d}{1-\delta}(V_1^{T,H}-V_1^{T,H\prime})+\frac{\delta d}{1-\delta}V_1^{T,H'}+\gamma+\delta\pi(1-d)$$

State 1 accepts $x_t^{T,L'}$ such that $V_1^{T,L'} = W_1^{T,L'}$, implying

$$\widetilde{x_t^{T,L}} = \frac{p-1-\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)]}{1-\delta\pi(1-d)}+1-\frac{(1-\delta+\delta\pi d)[c_1+(1-\beta)\gamma+(1-\delta)a_1]}{(1-\delta)[1-\delta\pi(1-d)]}-\frac{\delta\pi d[c_2+(1-\beta)\gamma+(1-\delta)a_2]}{(1-\delta)[1-\delta\pi(1-d)]}$$

by assumption $\widetilde{x_t^{T,L}} \in (0,1)$. $\widetilde{x_t^{T,L}} < 1$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] > p-1-\frac{1-\delta+\delta\pi d}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1]-\frac{\delta\pi d}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \underline{\Delta_1}$$

$\widetilde{x_t^{T,L}} > 0$ implies

$$\delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < p-\delta\pi(1-d)-\frac{1-\delta+\delta\pi d}{1-\delta}[c_1+(1-\beta)\gamma+(1-\delta)a_1]-\frac{\delta\pi d}{1-\delta}[c_2+(1-\beta)\gamma+(1-\delta)a_2] \equiv \bar{\Delta_1}$$

It is easy to verify that $\underline{\Delta_1} < \underline{\Delta}$ obviously, and $\underline{\Delta} < \bar{\Delta_1}$ holds under assumption B.1. Thus, $\widehat{x_t^{T,L}} > 1$ and $\widetilde{x_t^{T,L}} \in (0,1)$ hold if and only if

$$\underline{\Delta_1} < \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < \underline{\Delta}$$

It is easy to verify that $\Delta^* < \underline{\Delta}$ obviously, and $\Delta^* > \underline{\Delta_1}$ implies $\beta < \frac{c_1+c_2}{\gamma}$. Then in $s_t = \{T, L, 1\}$, when $\beta < \frac{c_1+c_2}{\gamma}$, $\underline{\Delta_1} < \Delta^* < \underline{\Delta}$, State 1 extends trade when

$$\Delta^* < \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < \underline{\Delta}$$

State 1 severs trade when

$$\underline{\Delta_1} < \delta d[\pi(a_2'-a_2)-(1-\pi)(a_1'-a_1)] < \Delta^*$$

it is easy to verify that in $s_t = \{T, L, 2\}$, both states prefer to trade with each other. This completes the proof that State 1 severs trade as its future economic dependence becomes sufficiently large, even if it peacefully bargains with State 2.

□