Bilateral Trade, Shifting Power, and Interstate Conflict

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Abstract

Strong commercial ties promote peace as states shun the opportunity costs of economic disruption. However, trade also enriches and empowers states, rendering them more capable of enforcing long-term settlements. Given economic disruption does not last forever, countries can be incentivized to trade short-term economic losses for long-term political or territorial gains. This trade-off can restrict or even reverse the pacifying effect of commerce as it renders states incapable of committing to existing peaceful deals. I theorize such a commitment problem and demonstrate a scope condition of bilateral trade's pacifying effects. When two countries' relative efficiency of translating trade gains into military power is at the extremes, more bilateral trade can be peace-promoting. However, when the relative efficiency is in the mid-range, increasing bilateral trade can exacerbate commitment problems leading to a higher likelihood of costly conflict. I test the implications on the MID and the ICB data, finding supporting results.

Key words: trade and conflict, commitment problem, power shift, asymmetric dependence

Strong commercial ties can help promote peace as they bind nations in a mutually dependent relationship. As such, states are less likely to fight and risk the opportunity costs of economic disruption (Gartzke, Li and Boehmer 2001; Polachek and Xiang 2010). But history is also replete with cases where increasing bilateral trade can stoke (as well as reduce) conflict,[1] the relationship between the U.S. and China being a prominent recent example. Commercial interests and the related restraining effects were clearly behind the U.S. policy toward China in the 1990s. Yet in recent years we witness more tensions simmering on both sides, particularly as their trade talks stall. A special report by the *Economist* laments trade can no longer anchor the two's relationship and indicates that many strategists on both sides agree the likelihood of a limited conflict has become higher.[2] If trade promotes peace by increasing opportunity costs, then the profits of peace and potential economic losses of conflict are clearly much higher nowadays. The two countries' trade volume in 1990 was 3.6 times larger than in 1980. In contrast, their bi-

[1]In this paper, I focus on bilateral trade to investigate the theoretical foundation of commercial liberalism. See footnote 8 for extradyadic factors that could weaken trade's restraining effects. I focus on costly conflicts which involve the use of force. And the interpretations are probabilistic. See footnote 4 for examples. Finally, my discussion assumes countries as unitary actors and does not address the complexities of how domestic politics affect attitudes toward free trade (Mansfield and Mutz 2009; Autor, Dorn and Hanson 2016) or how economic competition can give rise to military conflict (Chatagnier and Kavaklı 2017).

[2]For details, see `https://www.economist.com/special-report/2019/05/18/trade-can-no-longer-anchor-americas-relationship-with-china` and `https://www.economist.com/special-report/2019/05/18/americas-military-relationship-with-china-needs-rules`, accessed on 15 Oct 2019. A recent study by the United States Studies Center at the University of Sydney points to a higher likelihood of China using "limited force to achieve a *fait accompli* victory" in the Indo-Pacific region. See `https://www.ussc.edu.au/analysis/averting-crisis-american-strategy-military-spending-and-collective-defence-in-the-indo-pacific`, accessed 15 Oct 2019. That said, a different interpretation of the recent China-U.S. trade conflict is that it is consistent with the existing literature's argument that trade can increase the probability of non-violent conflict while reducing the likelihood of costly conflict (Pevehouse 2004). This interpretation is not consistent with the above-mentioned reports and studies which suggest the two's likelihood of costly conflict has become higher. Another potential dissent is that the likelihood becomes higher because of the reduction of trade. But this cannot explain the security concerns that policymakers had toward China which gave rise to the trade conflict in the first place. See the following discussions for details.

lateral trade has expanded by over 100 folds from 1980 to 2010.[3] With such a dramatic increase in bilateral trade, if the rationale of peace via trade holds we should generally expect a lower likelihood of costly conflict (i.e. conflicts that involve the use of force).[4]

It is puzzling why the earlier relatively small increase of bilateral trade restrained while the later massive amount of increase cannot. In essence, this puzzle concerns the scope conditions of bilateral trade's pacifying effects, which are critically important for the theoretical development of commercial liberalism. It is also of vital importance to global peace because the results can only be disastrous if two great powers such as the U.S. and China cannot manage their rivalry despite extraordinarily strong commercial interests. One key reason for the recent conflict, as pointed out by the above report, is that concerns about security "mattered less when China exported tennis shoes and televisions rather than microchips." Projects such as Made in China 2025 worry the U.S. in that China's improvement in manufacturing capacity and technology can be transferred into expanded military power.[5] At the core of this growing tension from

[3]Measured relative to the U.S. GDP, the increase from 1980 to 2014 is over 20 folds. The increase in 1990 relative to 1980 is slightly over 2 folds. Data source and calculations can be found in the replication files.

[4]What I stress here is the likelihood becomes higher, instead of whether a war will definitely break out or not. For a prominent example where costly conflict did happen against the backdrop of increasing trade, refer to the First World War where German fought against her major trade partners (Britain, France, Russia, and the U.S.). For an example where war did not happen, see the relationship between the U.S. and Japan in the 1980s. As a side note, the former example is often used to challenge the rationale of liberal peace. Explanations of this outlier include countries that initiate the war traded little (Gartzke and Lupu 2012), rising tariffs stoked hostility (McDonald and Sweeney 2007), and pre-war substitution process reduced trade costs (Gowa and Hicks 2015). These studies focus on reduced costs. In comparison, my study focuses on the beneficial aspect and offers a different explanation where increased costs are associated with more conflict because the long-term benefits of using force also become higher.

[5]One of the key issues in the two countries' trade talk is whether China will eliminate the subsidies that the Chinese government provide for the Made in China 2025 industries. See `https://www.pbs.org/wgbh/frontline/article/made-in-china-2025-the-industrial-plan-that-china-doesnt-want-anyone-talking-about/`, accessed 15 Oct 2019. A recent column by the *New York Times* also claims, "We could look the other way when trade was just about toys and solar panels, but when it's about F-35s and 5G telecommunications, that's not smart." See `https://www.nytimes.com/2019/05/21/opinion/china-trump-trade.html`, accessed 15 Oct 2019.

tennis shoes to microchips is the connection between trade, wealth, and power.

One possible explanation is that different commodities have varying effects on conflict. Goenner (2010) shows that goods such as energy and non-ferrous metals are highly elastic (i.e. easier to find alternative markets) and are therefore less likely to reduce conflict (because the opportunity costs are weighted down). Akoto, Peterson and Thies (2019) suggest intra-industry trade improves a state's resilience toward economic coercion. Meanwhile, military power is also pointed out as an important moderator. Dorussen (2006) suggests the pacifying effects of trade are weaker for goods that are easily appropriable by force, such as chemical and metal industries. Goenner (2010) further indicates that strategic goods that can be plundered are more likely to stoke conflict, in particular, commodities such as energy, non-ferrous metals, and electronics.

These studies are important in emphasizing the need for disaggregating trade data. However, they do not directly explain why more bilateral trade can be peace-promoting when a country is making tennis shoes but conflict-stoking when it is producing microchips. After all, microchips are not more elastic (or easier to plunder) than tennis shoes. More importantly, most trade-conflict studies have focused more on the coercive impact of trade rather than the beneficial aspect, i.e. commerce can enrich and empower states over time (Gowa 1994; Gerace 2004). In particular, as a country consumes and produces more commodities with "dual use",[6] she also becomes more capable of and efficient in translating the benefits from commerce into military power (Fuhrmann 2008; Goenner 2011). As such, if states can more efficiently empower themselves via trade, then a stronger bilateral trade relationship can encourage the rising states to challenge their stronger yet declining (or staggering) counterparts. To slow or reverse this potential shift of bargaining power, the latter can be incentivized to coerce and demand more

[6]Dual use commodities are those that have both civil and military applications. Many countries apply restrictions on both the commodities and country origins of the traders. For example, the U.S. Department of Commerce is responsible for screening exports of dual use items as well as their shipment to certain countries. For details, see `https://www.bis.doc.gov/index.php/licensing/forms-documents/doc_download/91-cbc-overview`, accessed 15 Oct 2019.

concessions or even risk the outside option (i.e. war).

Such a rationale has been famously laid out by the hegemonic stability theory (Gilpin 1981) and the power transition theory (Organski 1958; Kugler and Lemke 1996). Admittedly, these theories focus on major power competition, particularly the competition between the hegemon and its immediate rising challenger. But the underlying rationale that uneven economic growth can result in persistent power shifts, which create further political and military tensions can also be applied to other regional or international rivalries (Lemke 2002). Formal studies show that this is essentially a commitment problem: with shifting bargaining power states cannot credibly commit to not exploit opponents in the future. Therefore, peaceful and Paretto-efficient deals today cannot be sustained (Powell 1999, 2006; Fearon 1995, 2004).

This line of reasoning is elided in trade-conflict studies. Granted, some earlier studies argued that if states can benefit more from a bilateral trade relationship, then it may create security dilemmas between trade partners (Grieco 1988, 1990). But the past three decades' studies have been mostly focusing on trade's pacifying effects, with the theoretical focuses placed on the costly aspect of trade interruption as well as its signaling function (Oneal and Russet 1997; Gartzke, Li and Boehmer 2001; Polachek and Xiang 2010). As such, the beneficial aspect of trade and the potential commitment problems that trade may exacerbate have been largely ignored. However, they point to an important scope condition under which different commodities can enrich and empower states unevenly and increased bilateral trade does not reduce the likelihood of costly conflict.

To fill this lacuna, I use a formal model to tease out the scope condition linking bilateral trade with a higher likelihood of costly conflict. Specifically, I find that bilateral trade can increase the odds of costly conflict when the two countries' relative level of efficiency in translating trade gains into military power is within a mid-range, bounded by their relative military capacities. To be clear, I define efficiency as the marginal effects of bilateral trade on a country's military power — the potential or realized increase of military power resulting from a unit's increase in bilateral trade. Roughly speaking, this term captures the idea that countries consum-

ing and producing more dual use products are more capable than those focusing on primary goods in translating gains from trade into military power (see more details in the empirical section). I use the term relative efficiency to refer to the efficiency ratio of two countries (i.e. the efficiency of state A divided by thereof state B). The above condition suggests when the relative efficiency is neither too small nor too large, increasing bilateral trade can exacerbate commitment problems, thereby rendering fighting a better option for both sides. The intuition is that increasing bilateral trade can shift the existing power balance between two states, depending on their relative efficiency. When the shift is too small or too large, states have fewer incentives to fight. However, when the marginal shift is at a mid-range, it could give rise to a dangerous situation where both sides find it optimal to fight. This mirrors the argument proposed by MacDonald and Parent (2018) who contend that shallow shifts of power are not menacing enough while deep declines are hard to reverse. It is the moderate shifts that are particularly challenging to leaders and are therefore more likely to stoke conflict.

To fix ideas, it helps to think of the effects of a unit's increase in bilateral trade on the likelihood of costly conflict and how these effects change as we gradually increase the level of relative efficiency. There are three implications of the above theory, which suggests the effects of bilateral trade are contingent upon the relative efficiency and that these conditional effects follow an inverted-U curve. First, when the relative efficiency is low, the marginal effects of a unit's increase in bilateral trade are negative. The smaller the relative efficiency, the lower the likelihood of costly conflict. Second, as the level of relative efficiency increases, the pacifying effects of bilateral trade decrease. The negative association between a unit increase of trade and the likelihood of costly conflict diminishes toward zero and ultimately turns positive as the relative efficiency increases and reaches the mid-range. Finally, as the relative efficiency increases further and travels out of the mid-range the association becomes negative again. Using countries' strategic trade data to proxy their efficiency in translating trade gains into military power, I test the above hypotheses on both the Militarized Interstate Dispute (MID) and the International Crisis Behavior (ICB) data. I find strong support for the first two hypotheses and suggestive

evidence for the last one.

This paper makes a number of contributions. First, it provides an explicit scope condition for bilateral trade's pacifying effects. For the majority of dyads, commitment problems may not be an issue at all and increasing bilateral trade should be peace-promoting. However, the paper shows that for some dyads the impact could be the opposite: more bilateral trade can increase the likelihood of costly conflict. Second, it furthers the trade-conflict studies by demonstrating the need and importance of considering the interplay between trade and power shifts. Relatedly, it bridges the literature of commercial liberalism with the hegemonic stability theory, the power transition theory, and formal studies of commitment problems. Hegemonic stability and power transition theories highlight the connection between wealth and power and formal studies of commitment problems show how shifting bargaining power can render fighting a better option. This paper brings both insights to the attention of trade-conflict research. Finally, it has important implications for studies of major power competition and strategic rivalries. For example, consider the recent rise of China. With the advance of globalization and China's economic progress, the relative efficiency between China and the U.S. is shifting toward the condition where increasing bilateral trade can stoke costly conflict. This study suggests that holding the existing military balance constant, the best way to avoid costly conflict is to encourage technology competition and innovation which can propel the relative efficiency to travel out of the danger zone in a peaceful manner. This policy implication is not limited to hegemonic competition as it can also be applied to other strategic rivalries such as India and Pakistan which have also witnessed higher military as well as trade tensions in recent years.

1 When Bilateral Trade Does (or Does not) Pacify

Trade-conflict studies show that stronger economic ties can help promote peace (Oneal and Russet 1997; Hegre, Oneal and Russett 2010). This is because interstate conflict disrupts normal economic exchange, thereby generating ex ante incentives for states to avoid the opportunity

costs (Polachek and Xiang 2010). In addition, stronger economic ties can alleviate the problems of incomplete information, as states that are willing to endure (or risk) higher costs can better signal their resolve (Morrow 1999; Gartzke, Li and Boehmer 2001). Both opportunity costs and signaling theories are predicated on the assumption that costly conflict brings economic losses, which has received more empirical support in recent decades (Anderton and Carter 2001; Long 2008; Glick and Taylor 2010).[7] Therefore, it appears reasonable to assume all else equal as the bilateral trade volume increases, the costs of conflict also increase and the prospect of peace will be improved.

However, strong bilateral economic ties do not always restrain states and promote peace. There are two relevant scope conditions in existing studies that could help explain the puzzle.[8] First, asymmetric dependence may lessen or even reverse the pacifying effects of commerce. If one side will suffer more economic losses, then the opponent has stronger incentives to exploit its restraint and demand more at the bargaining table. As such, asymmetric dependence exacerbates economic vulnerability and intensifies the exertion of coercive policies (Barbieri 1996; Crescenzi 2003; Peterson 2011). Relatedly, it could sabotage credible communication and compound the problems of incomplete information (Gartzke and Westerwinter 2016). Second, different commodities can have heterogeneous effects. Some goods have weaker pacifying effects because they are easily appropriable (Dorussen 2006) or that they are highly elastic and states can find alternative markets for them more easily (Goenner 2010). From a slightly different angle, Goenner (2010) argues strategic goods that can be easily plundered can stoke conflict.

These two scope conditions, however, cannot fully explain why trade has stronger pacify-

[7]For studies that challenge the pacifying effects of trade, see Barbieri (1996); Keshk, Pollins and Reuveny (2004); Kim and Rousseau (2005). For studies that question the economic costs of conflict, see Morrow, Siverson and Tabares (1998); Barbieri and Levy (1999); Ward and Hoff (2007).

[8]Existing studies have identified a number of other scope conditions of trade's pacifying effects, including third-party trade (Crescenzi 2003; Peterson 2011; Kinne 2014) and the overall trade networks (Dorussen and Ward 2010; Kinne 2012; Peterson 2018). These factors, however, are not directly related to this paper's focus on bilateral trade.

ing effects when the gap between countries' manufacture and technology capacity is larger. As this gap becomes smaller, it is conceivable that economic dependence can also become less asymmetric. The existing studies of different commodities' heterogeneous effects cannot explain why some manufactured goods (e.g. microchips and 5G equipment) that are neither easily appropriable nor highly elastic can give rise to potential costly conflict. After all, the costs of disrupting trade of these goods are most likely higher given the lack of close substitutes. Finally, given their focuses, these studies also cannot capture one critical force that drives the power competition rationale. Trade enriches countries and helps increase economic and technology efficiency, but with different rates. These asymmetric rates of benefits appear to be one of the driving forces behind the tension of power competition.

2 Trade, Wealth, and Power

To capture this underlying tension and further the trade-conflict studies, we need to strengthen the link between trade, wealth, and power. Instead of focusing solely on the costs and coercive effects of trade, some earlier studies have highlighted the possible beneficial aspect. Specifically, trade gains can translate into military spendings, which increase the attractiveness of costly conflict as states expect a higher likelihood of winning by force (Gowa 1994; Gowa and Mansfield 1993). Meanwhile, the opponents also benefit from the dyadic trade relationship. The "relative gains" argument, therefore, argues if a state gains more from the bilateral trade relationship, they can build up a stronger military power, thereby creating security dilemmas (Grieco 1988, 1990).

The argument that uneven gains from trade can stoke conflict resonates with the above-mentioned scope condition of asymmetric dependence. However, it is unclear why uneven gains would not tilt the playing field further, rendering it less necessary or profitable for states to use force. For instance, if the stronger party can more efficiently channel her gains into military power, then it can augment the existing deterrence effect resulting in fewer incidences of

conflict. Formal studies show that states do not care about the opponent's military power per se. Instead, they worry about what the adversary can do with the power: the risk of being forcefully taken away what they have (Powell 1991). Powell famously coins it as the shadow of power (Powell 1999). Essentially, it is a commitment problem: as the bargaining power changes over time states cannot credibly promise to not exploit an opponent in the future. As such, peaceful and Pareto-efficient deals today cannot be sustained.

The change of bargaining power over time is elided in trade-conflict studies, as the two primary theories in the field (i.e. opportunity costs and costly signaling) are modeled without explicitly accounting for the potential shift of power. Yet, it is critically important if we seek to strengthen the link between trade, wealth, and power. First, since there is a time lag between gaining from trade, spending more on arms, and improving military power (Monteiro and Debs 2016), states can be incentivized to use force today to avoid unfavorable bargaining situations tomorrow. Second, the shift of bargaining power is further compounded by the fact that economic costs due to conflict do not last forever. While one may argue about factoring in the long-term impact on market and development, a strong case can be made about the phoenix effect: states tend to bounce back to pre-conflict development level (Cerra and Saxena 2008; Kugler et al. 2013; Miguel and Roland 2011).[9] As such, economic disruption due to conflict can be tolerable when the potential benefits of long-term settlements are attractive enough. In other words, states can have the incentive to trade short-term economic losses for the potential benefits of long-term settlements.

The importance of how expectations about future economic dependence affect states' strategic calculations is highlighted by a couple of recent studies. The trade expectations theory (Copeland 2015) argues if states have positive expectations of future trade, then they will strive to keep the benefits of commerce and avoid the opportunity costs of economic disruption. However, if states have negative expectations, namely they will be cut off from trade and invest-

[9]Note that trade disruption largely brings material losses, instead of human capitals. As such, the recovery rates are expected to be higher and faster. See Barro and Sala-i Martin (2004); Serneels and Verpoorten (2015).

ment, then to avoid future economic decline and loss of bargaining power, they will find the use of force today more attractive. Building on this rationale, Monteiro and Debs (2016) show that stronger states may fear weaker states' economic growth and impose constraints on the latter's access to markets and resources, resulting in economic hold-up problems. If stronger states cannot credibly commit to grant weaker ones the access, then weaker states may find war a better choice to eliminate the hold-up.

This focus on commitment problems and shifting bargaining power parallels the hegemonic stability and power transition theories, which both highlight the impact of different rates of economic growth (Organski 1958; Organski and Kugler 1980; Gilpin 1981; Kugler and Lemke 1996). Admittedly, these theories focus heavily on the power competition between a hegemon and its ordinal and rising challenger. And the empirical evidence for preventive wars could be limited (MacDonald and Parent 2018). However, both theories showcase that the economic causes of power shifts are inherently tied with the (potential) use of force. Also, the rationale does not have to be limited to hegemony competition since other regional or international rivalries may also be concerned that an adversary could become too strong in the future (Lemke 2002). If strategic rivalries' military power changes at different rates, then commitment problems could kick in and peaceful Pareto-efficient deals today may not be attractive for one or both parties tomorrow.

In the context of economic interdependence, there are two possible mechanisms that can generate such commitment problems: (a) states may become more reliant on an adversary economically in the future and hence worry about having to concede on important issues due to increased vulnerability and (b) economic benefits from trade can translate into military power which increase a state's capacity to enforce long-term settlements. Monteiro and Debs (2016), as mentioned previously, have made important contributions in theorizing how states' worries about economic coercion in the future can make fighting attractive today. In this paper, I focus on the second mechanism: whether and when can bilateral trade generate incentives to fight for fear of unfavorable military situations in the future.

The aforementioned studies suggest in examining this mechanism we need to incorporate three moving parts together: (a) commerce can enrich and empower states over time; (b) states differ in their efficiency in translating trade gains into military power; (c) the prospect shift of military power due to the change of bilateral trade can affect the current likelihood of costly conflict. To account for these three parts, I introduce a commitment model which builds on Fearon (2004).[10] This model is useful in that it teases out the underlying commitment problems and provides an intuitive scope condition of bilateral trade's pacifying effects.[11] It also resonates with Fearon (2018)'s argument that the pacifying effects of economic interdependence are not monotonic and that the specific scope condition is bounded by the existing military balance.

3 The Model

Two states, 1 and 2, bargain over a disputed good over time. Time proceeds in a successive manner, with each period denoted as t = 0, 1, 2, 3, ... Each period the disputed good produces some benefits normalized as 1. Both states discount future payoffs at a rate of $1-\delta$. There can be two kinds of stage, peace or war, for each period. The game begins with a peace period, where Nature randomly chooses one state to make an offer. For simplicity, let state 1 be the first mover

[10] One main theoretical challenge of modeling the effects of economic forces is that they are most likely slow and incremental. This stands in stark contrast to the condition of large and rapid shifts identified by Powell (2006). Indeed, Powell stresses that power shifts due to different rates of economic growth are unlikely to satisfy the requirement of being large and rapid (Powell 1999, 2004). Recently, however, Krainin (2017) shows that the sufficient condition identified by Powell can be extended. Specifically, small and slow shifts in the distribution of power can also cause preventive wars. Moreover, since my focus is not on the size of power shift that generates the commitment problem but on the marginal effects of bilateral trade, the different conditions identified by Powell and Krainin are less of a concern here.

[11] Powell (2004) shows if the aggregate of the outside option of one state (i.e. war) today and the other thereof tomorrow is greater than what they can bargaining over in one period, then the dyad will resort to the inefficient use of power. Krainin (2017) relaxes the inefficient condition by considering slower but persistent shifts in more periods. If we add the parameter of bilateral trade in both conditions, more trade will exacerbate the commitments problems only when it increases one state's capacity of winning, a result similar to the scope condition I identify in the following section. See Appendix A for details.

chosen by Nature and assume he proposes μ for himself and $1-\mu$ for state 2. If the opponent accepts it, the two divide the benefits as proposed. If the opponent rejects it, neither state gets any benefits and the game proceeds to a war stage. At the war stage, state 1 can choose to fight or back down. The former choice results in war while the latter allows the two states to return to a peace period with state 2 reaping the benefits of the disputed good for one period.

When the two states fight, the disputed good is assigned by the costly lottery of war, with three possible outcomes: state 1 wins with probability α, state 2 wins with probability β, and stalemate with probability $1-\alpha-\beta$. The former two outcomes end the game with the winner keeping the good in all future periods while the stalemate outcome allows the two states to return to a peace period (with no one winning the good) and resume bargaining. The outcomes of the costly conflict are determined by the contest success function of the two sides' military power. Specifically, denote the existing military power as m_i, where $i \in 1,2$. In addition, each state can translate part of the wealth from trade into military power. Write the bilateral trade as b and each state's efficiency of translating gains from trade into military power as e_i. Finally, write a positive term that affects the likelihood of stalement as ϕ. The probabilities of the three outcomes can be written as follows.

$$\begin{aligned} \alpha &= \frac{m_1 + be_1}{m_1 + be_1 + m_2 + be_2 + \phi} \\ \beta &= \frac{m_2 + be_2}{m_1 + be_1 + m_2 + be_2 + \phi} \\ 1-\alpha-\beta &= \frac{\phi}{m_1 + be_1 + m_2 + be_2 + \phi} \end{aligned} \tag{1}$$

Regardless of the outcome, both states have to pay economic and military costs when a war breaks out. The military costs are one-period losses written as c_i. The economic costs, proportional to the bilateral trade b, can last r_i periods.

Finally, at a peace period Nature randomly introduces a shock $\sigma > 0$ to state 1's probability of winning. For simplicity, assume further the probability of stalemate is exogenous to the shock. When there is a positive shock, state 1 wins the war with probability $\alpha + \sigma$, loses with $\beta - \sigma$.

When the shock is negative, state 1 wins with $\alpha - \sigma$ and loses with $\alpha + \sigma$. Write the probability of a negative shock as ϵ.[12]

4 War Equilibrium

The solution of this game is of Markov Perfect Equilibrium (MPE). Given my interest, I focus on the war equilibrium.

Proposition 1. *If conditions* (R1) *and* (R2) *below are satisfied, then there is a war MPE where state 1 always demands all the disputed good and state 2 rejects when the shock does not favor state 1 ($\sigma < 0$) and accepts when it does ($\sigma > 0$). If state 2 rejects, state 1 chooses to fight.*

$$D_1 \equiv -b\frac{1-\delta^{r_1}}{1-\delta} - c_1 + \frac{\alpha-\sigma}{1-\delta} + \frac{\gamma\sigma(1-\epsilon)}{1-\delta+\delta\epsilon} > 0 \tag{R1}$$

$$D_2 \equiv -b\frac{1-\delta^{r_2}}{1-\delta} - c_2 + \frac{\beta+\sigma}{1-\delta} > 0 \tag{R2}$$

Proof. Write state 1's payoff as V_1^p at the peace stage and V_1^w at the war stage. Similarly, write state 2's payoffs as V_2^p and V_2^w. The Bellman equations can be written as follows.

$$\begin{aligned}
V_1^p &= \epsilon(0+\delta V_1^w) + (1-\epsilon)(1+\delta V_1^p) \\
V_1^w &= -b\frac{1-\delta^{r_1}}{1-\delta} - c_1 + \frac{\alpha-\sigma}{1-\delta} + \gamma(0+\delta V_1^p) \\
V_2^p &= \epsilon(0+\delta V_2^w) + (1-\epsilon)(0+\delta V_2^p) \\
V_2^w &= -b\frac{1-\delta^{r_2}}{1-\delta} - c_2 + \frac{\beta+\sigma}{1-\delta} + \gamma(0+\delta V_2^p)
\end{aligned} \tag{2}$$

[12]The likelihood of random shocks captures the status of rising or declining power and relates to the power transition theory. If ϵ is increasing (decreasing), we can view state 1 as a declining (rising) power, as he expects more negative (favorable) shocks in the future.

The above equations give us the following payoffs for each state at different stages.

$$
\begin{aligned}
V_1^p &= \frac{\epsilon\delta(-b\frac{1-\delta^{r_1}}{1-\delta} - c_1 + \frac{\alpha-\sigma}{1-\delta}) + (1-\epsilon)}{1-(1-\epsilon)\delta - \epsilon\gamma\delta^2} \\
V_1^w &= -b\frac{1-\delta^{r_1}}{1-\delta} - c_1 + \frac{\alpha-\sigma}{1-\delta} + \gamma\delta V_1^p \\
V_2^p &= \frac{\epsilon\delta(-b\frac{1-\delta^{r_2}}{1-\delta} - c_2 + \frac{\beta+\sigma}{1-\delta})}{1-(1-\epsilon)\delta - \epsilon\gamma\delta^2} \\
V_2^w &= -b\frac{1-\delta^{r_2}}{1-\delta} - c_2 + \frac{\beta+\sigma}{1-\delta} + \gamma\delta V_2^p
\end{aligned}
\tag{3}
$$

To prove that the above MPE can be supported, consider the following one-step deviations. First, if state 1 chooses to demand anything less at a peace stage, his payoff will only be reduced given state 2's strategies. Second, if state 1 chooses not to fight at a war stage, then his payoff is 0. This deviation is not desirable if $V_1^w > 0$, which gives us R1. Third, if state 2 chooses to reject the deal when the shock favors state 1, then her payoff is reduced since she is gets nothing at the peace stage and fights at a lower probability of winning at the war stage. Finally, if state 2 chooses to accept the deal when the shock favors her, she gets 0. This deviation is not desirable if $V_2^w > 0$, which gives us R2. □

5 Comparative Statics

How does bilateral trade affect the two conditions of the war equilibrium? To examine this, differentiate D_1 and D_2 with respect to b.

$$
\begin{aligned}
\frac{\partial D_1}{\partial b} &= \frac{1}{1-\delta}\left(\frac{1-\sigma(1-\epsilon)(1-\delta)}{1-\delta+\delta\epsilon}\frac{\partial\alpha}{\partial b} - \frac{\sigma(1-\epsilon)(1-\delta)}{1-\delta+\delta\epsilon}\frac{\partial\beta}{\partial b} - (1-\delta^{r_1})\right) \\
\frac{\partial D_2}{\partial b} &= \frac{1}{1-\delta}(\frac{\partial\beta}{\partial b} - (1-\delta^{r_2}))
\end{aligned}
\tag{4}
$$

Recall the main focus of this paper is to investigate the scope condition of economic interdependence's pacifying effect. To put it differently, I seek to study when does a larger b lead to a higher likelihood of costly conflict. If $\frac{\partial D_2}{\partial b} > 0$, then we know $\frac{\partial\beta}{\partial b} > 1-\delta^{r_2} > 0$. Additionally, if

$\frac{\partial D_1}{\partial b} > 0$, then $\frac{\partial \alpha}{\partial b} > \frac{\sigma(1-\epsilon)(1-\delta)}{1-\sigma(1-\epsilon)(1-\delta)} \frac{\partial \beta}{\partial b} + 1 - \delta^{r_1} > 0$. From Equation (1) we know

$$\begin{aligned} \frac{\partial \alpha}{\partial b} &= \frac{m_2 e_1 - m_1 e_2 + \phi e_1}{(m_1 + b e_1 + m_2 + b e_2 + \phi)^2} \\ \frac{\partial \beta}{\partial b} &= \frac{m_1 e_2 - m_2 e_1 + \phi e_2}{(m_1 + b e_1 + m_2 + b e_2 + \phi)^2} \end{aligned} \tag{5}$$

If both equations are positive, then we have the following condition where increased bilateral trade can exacerbate commitment problems and increase the likelihood of costly conflict.

$$\frac{m_1}{m_2 + \phi} < \frac{e_1}{e_2} < \frac{m_1 + \phi}{m_2} \tag{F1}$$

When this condition is satisfied, increasing bilateral trade by one unit can further exacerbate the commitment problems. Intuitively, Equation (F1) reveals there is an opening window for costly conflict to break out: when the two sides' relative efficiency of translating gains from trade into military power is neither too small nor too big.[13] When the condition is satisfied, increasing trade can shrink the existing gap in military power. As this gap becomes smaller, rising countries become more optimistic and declining (or staggering) states find it more compelling to use force. As such, the effects of bilateral trade are contingent upon both sides' efficiency in translating trade gains into military power.

To fix ideas, I focus on examining the effects of a unit's increase in bilateral trade on the likelihood of costly conflict (the predicted effects of increasing trade are shown toward the end

[13]Strictly speaking, this conditional impact is further conditioned by the existing military balance. It is conceivable for some extreme values of military balance, the condition is unlikely to be met. This would suggest the following discussions on the theory's implications and empirical examinations should further consider the conditional effects of existing power gap. I choose not to take this route because empirically it further complicates the model (requiring four-way interactions) without much value added — under the much complicated model one can pick a value of military balance that satisfy the condition showing similar conditional effects. Relatedly, the primary theoretical implication that when the relative efficiency is within a mid-range, more bilateral trade can stoke conflict still holds. Finally, in the empirical section I focus on examining dyads where commitment problems are possible to kick in. I also control for the existing power ratio to alleviate the above concerns.

of the empirical discussions). That is, the increase of trade of held constant at a unit while the level of relative efficiency is increased from a low value toward the higher end. The theory suggests the effects on costly conflict are negative when the relative efficiency is small. As the relative efficiency increases and reaches the above scope condition, a unit increase of biltaral trade is associated with a higher likelihood of costly conflict. Finally, as the relative efficiency increases further, the effects become negative again. That is, as the relative efficiency increases, the effects of increasing bilateral trade by a unit follows the shape of an inverted U.

Hypothesis 1. *When the two sides' relative efficiency of transtranslating trade gains into military power is at the lower end ($\frac{e_1}{e_2} < \frac{m_1}{m_2+\phi}$), a unit's increase of bilateral trade is associated with a reduction of the likelihood of costly conflict.*

Hypothesis 2. *The negative association identified in Hypothesis 1 diminishes toward zero as the relative efficiency increases and will be reversed (a unit's increase of bilateral trade is associated with an increase of the likelihood of costly conflict) if Equation* (F1) *is satisfied.*

Hypothesis 3. *The positive association identified in Hypothesis 2 diminishes toward zero as the relative efficiency increases further and will ultimately be negative again if the requirement of Equation* (F1) *is violated ($\frac{e_1}{e_2} > \frac{m_1+\phi}{m_2}$).*

6 Research Design

To test the above hypotheses, I need a sample of countries where it is possible for commitment problems to kick in. That is, of all the country pairs in the world, we know some dyads are definitely unlikely to be concerned about the opponents getting too stronger in the future and hence not willing to maintain the peaceful status quo today. For instance, big and powerful countries typically will not be worried by small and distant countries posing military threats in the future. Relatively smaller countries will not be concerned about the above commitment problems unless they are strategic rivals. Therefore, I choose a sample of directed dyad years where the countries are rivals or are both major powers. This is different from the conventional

choice of political relevant dyads which include all contiguous countries and dyads with at least one major power (Lemke and Reed 2001) since I seek to focus on conflicts driven by commitment problems. That said, I also rerun the tests using political relevant dyads and the results are substantially similar.

I identify the rivalry status using the updated Peace and Rivalry data by Goertz, Diehl and Balas (2016). The peace scale from the data has five different values 0 (serious rivalry), .25 (lesser rivalry), .5 (negative peace), .75 (warm peace), and 1 (security community). I code a dyad year as a rivalry if the peace scale is either 0 or .25. In addition, within a given year, the relationship can turn from peace to rivalry (or vice versa). Given my purpose, I use the peace scale at the end of the year. That is, if a dyad is turning from peace to rivalry (rivalry to peace), I identify that dyad year as a possible sample where countries should (not) be worried about opponent's threats in the future. For major power status and contiguity, I use the Direct Contiguity Data (Version 3.2) by Stinnett et al. (2002) and the major powers data by the Correlates of War project.[14]

The hypotheses in the previous section require testing: (a) the conditional effect of relative efficiency and (b) whether this conditional effect first increases from negative to positive (Hypothesis 2) and then diminishes from positive to negative (Hypothesis 3). Therefore, I specify a logit model with the following formula.

$$\begin{aligned}\text{logit}(\Pr(\text{Costly Conflict})) = \beta_0 &+ \beta_1 \text{Trade} + \beta_2 \text{Relative Effeciency} \\ &+ \beta_3 \text{Trade} \times \text{Relative Effeciency} \\ &+ \beta_4 \text{Relative Effeciency}^2 \\ &+ \beta_5 \text{Trade} \times \text{Relative Effeciency}^2 \\ &+ \sum_{i=1}^{k} \alpha_i \text{Control}_i + \epsilon\end{aligned} \tag{E1}$$

[14]Correlates of War Project, 2017. "State System Membership List, v2016." Online, `http://correlatesofwar.org`.

where the probability of costly conflict is predicted by the interaction between bilateral trade and relative efficiency as well as the interaction between bilateral trade and the quadratic term of relative efficiency (plus the control variables). Roughly speaking, Hypothesis 1 suggests β_1 should be negative. Hypothesis 2 suggests β_3 should be positive. And Hypothesis 3 suggests β_5 should be negative.

6.1 Dependent Variable

Given my theory, I need an outcome variable that captures costly conflict between states. Therefore, I choose to use the Militarized Interstate Dispute (MID) data. Given the potential issues with the MID data, I use a version of MID data by Gibler, Miller and Little (2016) which revise the original data by dropping cases that do not meet the MID coding rules and make hundreds of either major or minor changes to the disputes. Using this dataset, I code a dyad year as experiencing costly conflict when the hostility level of a dispute is above or equal to 4 (use of force). In the robustness checks, I also use the International Crisis Behavior (ICB) data (Brecher et al. 2017). This dataset has a variable (viol) that captures the extent of violence by an actor. When the value is above 1 (no violence) for either actor, I code the dyad year as experiencing a costly conflict. To avoid spurious correlation by time, I lead this variable by 1 year (equivalent to lagging the covariates by 1 year).

6.2 Independent Variables

My key independent variables are dyadic trade and the relative efficiency of translating trade gains into military power. For dyadic trade, I use the data by Barbieri and Keshk (2012), which reports dyadic trade data from 1870 to 2014. Many trade conflict studies use trade divided by GDP to captures a state's economic dependence. This is reasonable since their focus is on capturing the economic losses. Given my theory focuses on the beneficial aspects of dyadic trade (translating trade gains into military power), I choose to use dyadic trade data for my main models. That said, I also rerun the model using trade divided by GDP and the results are sub-

stantially similar. Given the skewness of the dyadic trade data, I log transform the trade variable (plus 1 to avoid logging 0).

In terms of the relative efficiency variable, I need a variable that can proxy states' capacity, not the actual policies, to translate trade gains into military power. That is, this efficiency variable needs to be able to capture how much a country's military power changes in response to a unit's increase in bilateral trade. Broad concepts that capture a country's national power or "economic potential for war" are not appropriate since they include other factors such as labor force that are not correlated with bilateral trade (Gerace 2004). Additionally, they also miss how embedded a state is in the global trade networks, especially for the types of goods that can directly affect a state's military power.

In comparison, recent trade conflict studies have demonstrated the usefulness of using disaggregated trade data. Commodities that are strategically important can serve as a proxy to measure the efficiency variable. Given strategic goods often have dual uses, countries that consume and produce more strategic goods can more efficiently utilize the gains from trade (Fuhrmann 2008; Goenner 2010). For instance, countries that can produce more and better electrical machinery are also more capable of producing advanced weaponry than states that can only produce primary products. Goenner (2010) identifies strategic commodities as including energy, non-ferrous metals, chemicals, electronics, nuclear materials, and armaments. Under each of these categories, Goenner further identifies subcategories that are important to economic and military securities.

Using Gonner's categorization and the UN Comtrade data, I identify and aggregate each country's strategic import and export by year. I then weigh the import and export values by their respective trade network centrality measurements following Zeng (2019).[15] Finally, I add these weighted import and export values by year to proxy a country's efficiency. For each dyad

[15]Specifically, Zeng (2019) uses the closeness measurement and weighs the trade networks by trade volume. I use the import or export values of strategic goods to weigh the respective trade networks. That said, I also rerun the models without weighing by the centrality measurement and the results are substantially similar. See the appendix for details.

year, I divide state 1's efficiency by state 2's (plus 1 to avoid dividing 0). I then log transform this ratio in the same way as the dyadic trade data. This measurement is used to proxy the relative efficiency variable. In the robustness checks, I also weigh efficiency by the wealth of each country, proxied by their GDP per capita.

For control variables, I use the Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database (1949-2018)[16] to measure states' military power. If a state can spend proportionally more in the military today, then it stands to reason that the power balance can tilt at least marginally toward its side tomorrow. Using both sides' military spending, I construct a power shift variable in the same way as the relative efficiency variable (log transform the ratio of two states' military expenditure).

I choose to use military expenditure rather than the conventional CINC index given it lines closer with the endogenous power growth due to accumulation of wealth (Debs and Monteiro 2014).[17] I do not include the military personnel variable which is included in the CINC index because it does not necessarily reflect a state's efficiency in translating trade benefits. Also, while a large army could reflect military power, a leaner military force could be an indication of military modernization especially in recent decades (e.g. China has been downsizing its army in recent years). In comparison, military spending could be a better indication of a state's improving military technology and capacity since more advanced weapons typically require higher investment.

In the main model, I use the military spending data in a given year to construct the power shift variable. One could argue that the time lag between investment and power shift shall be longer. In this regard, I also use the accumulated military spending over the past three years to

[16]Data from the Stockholm International Peace Research Institute (SIPRI), `https://www.sipri.org/databases/milex`, accessed 11 Dec 2019.

[17]Debs and Monteiro (2014) categorize the six components of the CINC index into two types. The exogenous components are total and urban population, energy consumption, and iron and steel production. The endogenous ones are military personnel and spending.

reconstruct the power shift variable.[18] The results are substantially similar and are shown in the appendix.

I also control for the minimum distance between two countries using the CShapes package (v0.6) in R (Weidmann, Kuse and Gleditsch 2010) since geographic distance affects both trade and the effectiveness of military power. I control for the alliance status between countries given allies tend to have more stable trade relations and that alliance can help alleviate concerns over commitment problems. I use the formal alliance data (v4.1) by Gibler (2009) and code two countries as allies if they have signed a defense pact, neutrality, or non-aggression treaty. I exclude ententes given they only obligate members to consult and require the least commitment.

7 Results

Table 1 presents the results of logistic regressions. Model 1 uses only the rivalry and major power sample and Model 2 uses political relevant dyads. We see that the coefficient estimate for the dyadic trade variable is negative and statistically significant across both models, providing strong support to Hypothesis 1. In addition, the interaction term of dyadic trade and relative efficiency is positive and significant, adding support to Hypothesis 2. Finally, the interaction term of dyadic trade and the square of relative efficiency is negative and across the models, providing additional evidence for Hypothesis 3.

That said, interpreting the regression results only by the coefficient estimates could be misleading (Brambor, Clark and Golder 2006). As such, I plot the marginal effects of dyadic trade in Figure 1 using the results from Model 1. This figure shows the marginal effect of increasing the value of dyadic trade by 1 million U.S. dollars when increasing the relative efficiency from its lowest value to the highest. The y-axis denotes the odds ratio of costly conflict, which is a mono-

[18] It should be noted that this variable is only a proxy of states' expectation and I do not mean to suggest trade in a given year could affect previous years' military spending. This distinction is important especially when I apply mediation analysis to examine trade's impact on power shift, which is then viewed as a mediator.

Table 1: Logit regression with 95 percent confidence intervals: 1962-2009

	Costly Conflict	
	(1)	(2)
log Trade	-0.185^{***}	-0.208^{***}
	$(-0.302, -0.068)$	$(-0.296, -0.120)$
log Trade × Efficiency	0.298^{***}	0.277^{***}
	(0.086, 0.509)	(0.126, 0.429)
log Trade × Efficiencyˆ2	-0.093^{***}	-0.072^{***}
	$(-0.158, -0.028)$	$(-0.116, -0.027)$
Efficiency	-1.929^{***}	-1.391^{***}
	$(-2.939, -0.919)$	$(-2.100, -0.681)$
Efficiencyˆ2	0.595^{***}	0.405^{***}
	(0.253, 0.936)	(0.177, 0.633)
Power shift	0.285^{***}	0.085^{***}
	(0.220, 0.350)	(0.038, 0.132)
Distance	-0.186^{***}	-0.327^{***}
	$(-0.226, -0.147)$	$(-0.355, -0.299)$
Alliance	-0.299^{***}	-0.052
	$(-0.522, -0.075)$	$(-0.224, 0.119)$
Constant	-0.371	-1.983^{***}
	$(-0.903, 0.161)$	$(-2.374, -1.593)$
Observations	2,800	41,647
Log Likelihood	−1,154.939	−2,928.382
Akaike Inf. Crit.	2,327.879	5,874.764
Note:		*p<0.1; **p<0.05; ***p<0.01

tonic transformation of the probability of conflict. When the odds ratio is greater (smaller) than 1, more dyadic trade increases (decreases) the likelihood of conflict. I find support for the hypotheses: more dyadic trade is pacifying when the relative efficiency is small and this effect diminishes and is reversed when the relative efficiency increases. As the relative efficiency continues to rise to its higher-end, the marginal effect appears to be diminishing toward zero but the confidence interval expands. It should be noted that marginal effects for relative efficiency at the mid-range are only marginally significant.

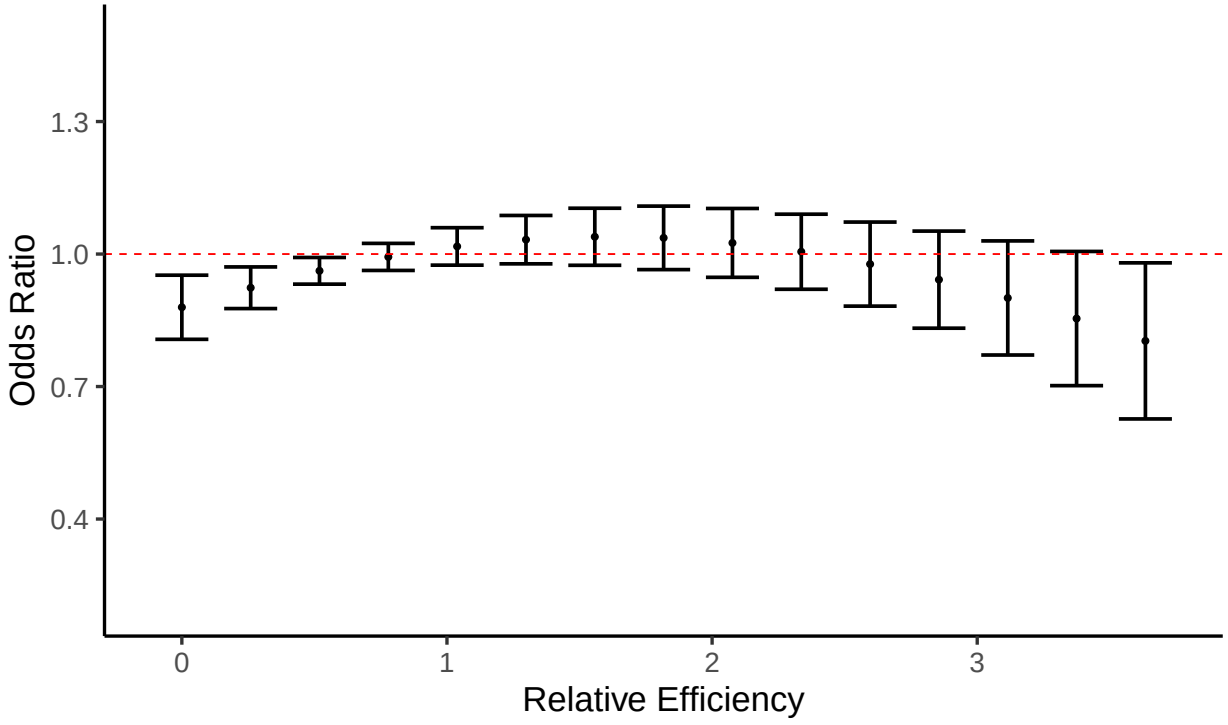

Figure 1: Marginal effects of relative efficiency when increasing bilateral trade by 1 million US dollars from Model 2, with 95% confidence intervals. Note that the x-axis denotes the relative efficiency and the y-axis the odds ratio of costly conflict. The increase of bilateral trade is held constant at 1 million US dollars.

To more substantially demonstrate the effects of dyadic trade, I switch gears and plot the impact of increasing bilateral trade on the probability of costly conflict in Figure 2 using the results from Model 1. Holding all other covariates at their means, I plot the effect of increasing dyadic trade from its lowest to highest values when the relative efficiency is low (with a value of 0.3) in the left panel; when the relative efficiency is around its 75th percentile (with a value

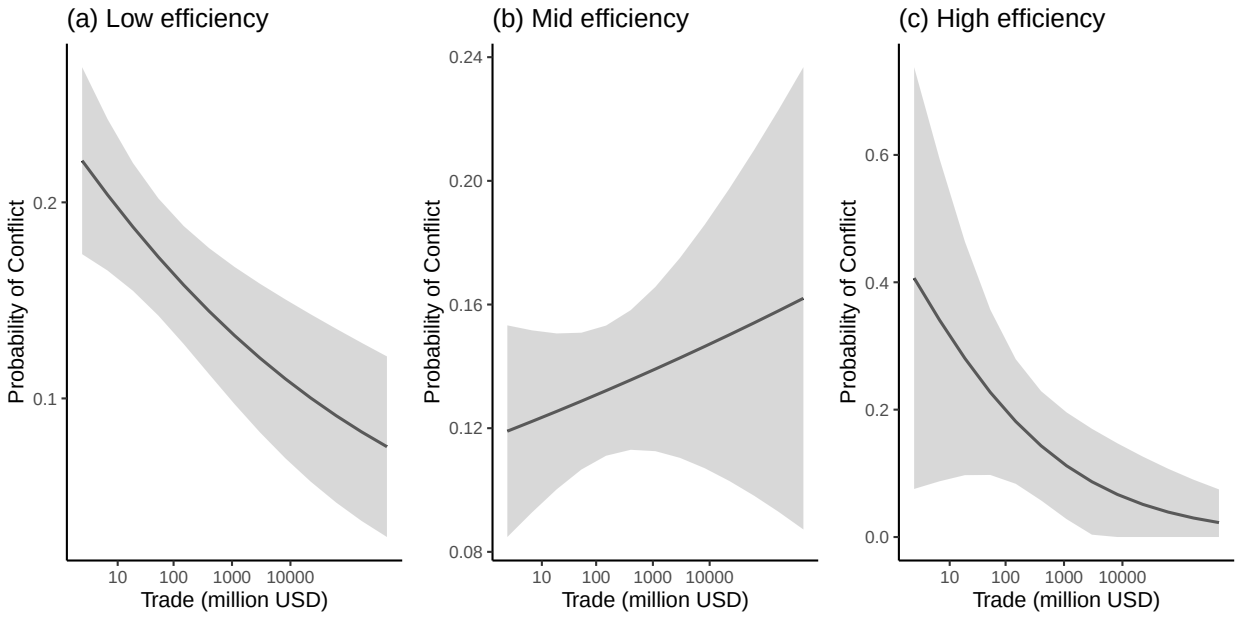

Figure 2: Predicted probabilities of costly conflict when increasing the level of bilateral trade from Model 2, with 95% confidence intervals. Panel (a) shows the results when the relative efficiency level is low, around its 1st quartile; panel (b) when the relative efficiency is around its 3rd quartile; and panel (c) when the relative efficiency is around its maximum. The other covariates are held at their means.

of 1.1) in the middle panel; and when the relative efficiency is around its maximum (with a value of 3.5) in the right panel. As we increase dyadic trade from its minimum to the maximum, the probability of conflict decreases from around .2 to around .1 when the relative efficiency is small. In comparison, when the relative efficiency is held around a mid-range, more dyadic trade can increase the likelihood of costly conflict from around .12 to around 0.16. Finally, there is evidence that when the relative efficiency is sufficiently high, increasing bilateral trade can reduce the likelihood of costly conflict.

7.1 Mediation analysis

The model suggests relative efficiency affects the prospect of conflict by changing states' expectations about future power shifts, which are proxied by the ratio of a dyad's military spending. One could argue that controlling for power shift may not be sufficient since it could also play the role of a mediator. That is, there can be two channels for bilateral trade to affect conflict,

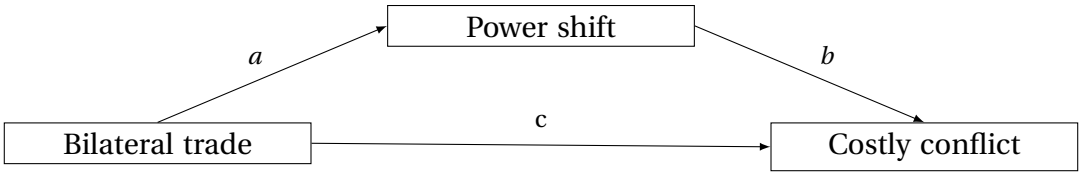

Figure 3: Bilateral trade's effects on costly conflict.

as shown in Figure 3. There is one direct channel where trade affects states' calculations over the immediate costs and benefits of using force (denoted by c) and the other indirect channel where the effects of trade are mediated by expectation about power shift (denoted by a and b). To examine these two channels, I apply mediation analysis. If both channels can be modeled by linear equations, then the mediated effects can be represented by a*b. However, this approach could be misguided as bilateral trade's impact on costly conflict is modeled by logistic regressions (Imai, Keele and Tingley 2010). Therefore, I choose to use the mediation package (v4.5) in R which allows me to examine both the mediated and direct effects in the case of nonlinear models.[19]

In addition to the previous logistic regression in Equation (E1), I need to specify a model for bilateral trade's impact on the mediator (i.e. power shift). I specify a linear regression model given the power shift variable is continuous and approximately normally distributed. I interact trade and relative efficiency in the same way as the logistic regression model (without additional controls):

$$\begin{aligned} \text{Power shift} = \beta_0 &+ \beta_1 \text{Trade} + \beta_2 \text{Relative effeciency} \\ &+ \beta_3 \text{Trade} \times \text{Relative effeciency} \\ &+ \beta_4 \text{Relative effeciency}^2 \\ &+ \beta_5 \text{Trade} \times \text{Relative effeciency}^2 + \epsilon \end{aligned} \tag{E2}$$

This way, Equation (E2) can be used to estimate bilateral trade's impact on the mediator (a

[19]Tingley, D., T. Yamamoto, L. Keele and K. Imai (2013). Mediation: R Package for Causal Mediation Analysis (R Package Version 4.4). URL http://CRAN.R-project.org/package=mediation.

in Figure 3) and Equation (E1) can be used to estimate the mediator's impact on costly conflict (b in Figure 3).[20] The analysis provides additional support to my theory. To save space, I leave the table in the Online appendix and show here the average mediated and direct effects in Figure 4. The figure shows the results when the relative efficiency variable is held at the first and third quartile (the same values as in Figure 2 panel (a) and (b)).[21] When relative efficiency is low, increased bilateral trade invariably reduces the likelihood of costly conflict, as shown by the gray dashed lines. The average mediated effect is around -0.005 while the direct effect is around -0.016. In contrast, when relative efficiency is at the mid-level, the mediated effect turns positive (around 0.005) as shown by the solid yellow line. The direct pacifying effect of increased bilateral trade also becomes statistically insignificant. Taken together, the mediation analysis suggests when relative efficiency enters the mid-range, the pacifying effect of increased bilateral trade is reversed and this reversed effect can be attributed to the impact of the mediator — expectation about future power shift.

7.2 Robustness checks

In addition to the above models, I perform robustness checks by: (a) including yearly fixed effects; (b) without leading the outcome variable; (c) using the ICB data; (d) excluding the control variables; (e) using the operationalization of trade divided by GDP instead of dyadic trade; (f) weighing efficiency by states' GDP per capita; (g) using efficiency without weighing by trade network centrality. The results are substantially similar and are shown in the appendix.

[20] Excluding the mediator (i.e. power shift) in the logistic regression will allow us to estimate the total effect, which is composed of the mediated and direct effects.

[21] For illustration purpose, I do not plot the effects for high efficiency as the confidence interval becomes too wide. Separate plots for each efficiency category are available in the Online appendix.

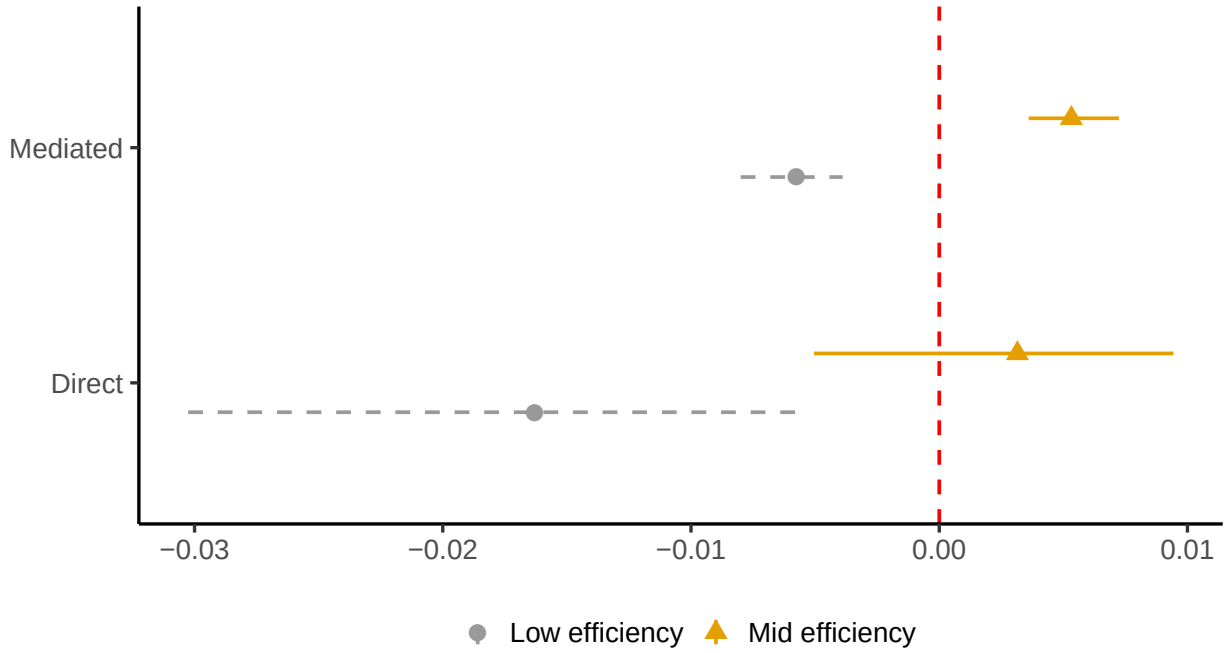

Figure 4: Average mediated and direct effects, with 95% confidence intervals.

8 Conclusion

I have argued and shown that bilateral trade can enrich and empower both countries, exacerbate commitment problems, and ultimately increase the likelihood of costly conflict. The effects are contingent upon the two countries' relative efficiency in translating trade gains into military power. Specifically, when the relative efficiency is within a mid-range bounded by existing military balance, more bilateral trade is associated with a higher likelihood of costly conflict. When the relative efficiency is either too small or too large, the predictions of commercial liberalism still hold: more bilateral trade can enhance the prospect of peace.

This theory is important because it helps reconcile the existing commercial peace rationale with cases that it struggles to explain, which is partly due to the focus on the costly aspect of trade and the neglect of shifting bargaining power. If trade only adds to the existing costs of conflict, then increasing trade should invariably lead to a lower likelihood of costly

conflict either via the coercive or signaling mechanism (Zeng 2019). By introducing the connection between trade, wealth, and power over time, this paper shows that the benefits from trade should not be neglected because they can exacerbate commitment problems and overwhelm the coercive restraint, resulting in a higher likelihood of costly conflict. Additionally, the paper also helps align the commercial peace theory with recent empirical advances on disaggregating trade and studying its heterogeneous effects. It is worth pointing out that while some argue strategic commodities can have smaller pacifying effects, some argue it could be the opposite — more strategic trade can stoke conflict. This paper offers a theoretical explanation and shows that the effects of strategic trade are not monotonic and are contingent upon opponents' strategic trade.

The results in this paper also have implications on another scope condition of trade's pacifying effects. Following a similar logic, it stands to reason that when asymmetric dependence is at the extremes, states will find it less necessary or profitable to fight. Under this condition, more bilateral trade can enhance, rather than dampen, the prospect of peace. That said, an additional complication is that increasing bilateral trade can amplify or lessen the existing asymmetry. In particular, if reduced asymmetric dependence lowers a state's bargaining power in the future, then it may find the use of force today a more attractive option (Monteiro and Debs 2016).

The paper focuses on bilateral trade. Future studies can explore how third-party trade generates commitment problems (Peterson 2011). In addition, although the possibility of destroying or capturing an opponent's strategic commodities is not formally examined here, it is another important mechanism that may restrain trade's pacifying effects (Dorussen 2006; Goenner 2010). For instance, Japan's occupation of Southeast Asia during the Second World War was in part due to the concern of securing strategic resources. That being said, although formal studies generally theorize costly conflict as bargaining breakdown due to either private information or commitment problems, the latter has not received much attention in trade-conflict studies. This paper suggests such neglect could be problematic even when we assume away asymmetry and extradyadic trade.

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