

# Trade Dependence and Militarized Interstate Disputes

Does trade dependence reduce conflict between states? Debate remains over the role and significance of economic interdependence in promoting peace: different scholars have found that dependence increases, decreases, and has no significant effect on the likelihood of conflict between states. However, this research has generally relied on a broad measure of bilateral trade dependence. This paper will delve deeper into the effect of this economic relationship by exploring product-level dependence. If states' decision to escalate tensions with rivals depends on their expected cost from trade disruptions, we should measure the true cost of this disruption. Rarely, if ever, do we see states threaten to or impose total trade embargoes. Rather, states impose trade bans on specific products that maximize the cost borne by their opponent while minimizing the cost to their own economy. Using this more disaggregated measure of trade dependence and a binary logistic regression model, I find that this dependence does not have a significant effect on the likelihood of militarized disputes between states.

The commercial peace theory maintains that trade fosters peace between states because it makes conflict more costly. When a state is deciding whether to initiate conflict against another state, they weigh the benefits they expect to derive against the costs they expect to incur. When the benefits outweigh the costs, conflict begins. Commercial peace theory is a simple extension of this bargaining theory of conflict: the inevitable trade disruptions caused by conflict increase the costs states face, which decreases the likelihood that the benefits will outweigh the costs and conflict will begin, *ceteris paribus*.

Another approach to this question, introduced by Barbieri (1996), argues that higher levels of trade dependence increase the likelihood that a dyad will engage in conflict. Peace between dyads is most likely to occur between equal partners: those states that are mutually dependent on trade with one another. As the dyad become less equal, both the more dominant and less dominant partner have incentives to weaken their trade partner through conflict.

This debate over the role played by, and significance of, bilateral trade dependence in conflict mitigation remains unsettled. Recent scholarship on the topic has begun exploring whether this ambiguity is the product of measurement error (Chen 2021; Chatagnier and Kavaklı 2017). Within international relations scholarship, measures of trade dependence have been defined at a broad level, predominantly using a measure introduced by Oneal and Russett (1997) that explores total trade between two states relative to their gross domestic product (GDP) (Chen 2021; Flores-Macías and Kreps 2013; Gartzke and Westerwinter 2016; Kinne 2012; Lupu and Traag 2013; Pevehouse 2004). However, a more disaggregated approach to trade dependence is worth exploring. We are interested in understanding how trade dependence can deter conflict. Rarely (if ever) do states threaten to sever their entire trade relationship with another state. Rather, we regularly see states threaten or enact trade bans on particular products. In fact, states aim to inflict the greatest harm on their rival whilst minimizing the costs they will face. A broad understanding of trade dependence does not capture the real threat a potential aggressor faces. A more accurate measure of this factor is product-level trade dependence. Asymmetries at this level have been used as a foreign policy mechanism to deter or punish rival states.

Before we explore this dynamic, let us step out in detail the process we seek better understand. First, tensions between two states build. This could be for a number of reasons, including historical animosity, a diplomatic

spat over a regional or global issue, or domestic political interests prompting a controversial bilateral foreign policy. The threatened state issues a formal request to the initiating state to change or reverse their policy actions. The initiating state refuses: the incentives for enacting the controversial policy continue to outweigh the cost of a soured relationship with the threatened state. The threatened state responds by threatening to adopt punitive policies towards the initiator, including trade embargoes on specific products on which the initiator depends. Here, the initiator's expected costs from pursuing this policy change: they know that if they continue along this path they will likely face economic costs in the form of trade disruptions. Does this deter them? Many scholars would ask: how costly is this disruption? This paper will answer this question. If the costs are great, the initiator may attempt to deescalate tensions. Alternatively, they may accept the short-term pain of trade disruptions to reduce their long-term dependence on their rival trade partner. What do we observe?

We will look at whether the initiator state escalate the conflict to a militarized interstate dispute. International relations scholarship uses this broad measure of conflict to include actions that sit below invasion or war. This is often the precursor to full-scale interstate war. States use these actions as an extreme signal of their intent to escalate a dispute to war, hoping to deter their opponent. We are interested in the relationship between trade dependence and this pre-cursor to war. Certainly, if two states are at war with one another, we should expect trade to nearly, if not entirely, cease between them. However, we should not expect trade to entirely cease between states when they are still circling each other, hoping to achieve their most desired policy outcome and avoid war. Tying a measure of the entire trade relationship to whether or not states initiate militarized interstate disputes against each other misses this important distinction. This paper seeks to address this.

## **Trade dependence and militarized conflict**

Returning to our motivating question: does trade dependence deter states from initiating militarized conflict against each other? The commercial peace theory argues that trade dependence increases the expected cost of initiating conflict against a trade partner, decreasing the expected net benefits derived from such an action and, therefore, reducing the likelihood a state will initiate conflict. This leads to the following testable

hypothesis:

H1: As product-level trade dependence between two states increases, the likelihood that a state will initiate militarized conflict against its trade partner decreases.

The alternative hypothesis argues that increasing trade dependence by one state on another leads to increased incentives for conflict. This leads to an alternative testable hypothesis:

H2: As product-level trade dependence between two states increases, the likelihood that a state will initiate militarized conflict against its trade partner increases.

## **Research design**

### **Scope**

This analysis focuses on all directed state dyads in 2014. This includes 37,442 observations. We are interested in whether or not a trade dependent state initiates conflict against another state. This is a directed question. We need to know whether the potential initiator is dependent on their opponent, not simply whether either partner has a dependence on the other.

The narrow timeframe included in this analysis is driven by data constraints. I only have access to complete trade and militarized interstate dispute data for 2014. A natural first step for extending this analysis is including a broader timeframe.

### **Dependent variable**

My dependent variable focuses on the onset of militarized interstate disputes (MIDs), or events in which one or more states threaten, display, or use force against another state or states. If state  $i$  initiated a MID against state  $j$  in a given year, this variable is coded 1. Otherwise, it receives a value of 0.

The data come from version five of Palmer et al's (2022) Militarized Interstate Dispute data collection. This dataset includes all known MIDs from 1816-2014, recorded at the participant level. In 2014, 67 MIDs were

initiated.

### **Independent variables of interest**

My primary independent variable of interest is bilateral trade dependence. This paper introduces a novel measure of this dependence. Rather than looking at the balance of trade in total imports, exports, or trade value, I measure dependence in trade of specific products. This more fine-grained approach to measuring trade dependence allows us to examine more precisely the potential costs an initiator expects to incur if they escalate a dispute to a MID.

To do this, I adopt the classical structure proposed by Oneal and Russett (1997) but adapt it to trade in each product. I use bilateral annual export and import data provided by UN Comtrade. Commodities are grouped according to the standard two digit harmonized system. For example, all live animals, including horses, bovines, swine, sheep, and goats, are grouped together into a category called *animals - live*. My theory assumes a degree of substitution within this group. It would be interesting to explore the level of granularity required to meaningfully make this assumption. Sadly, this is difficult to test because we lose data completeness as we increase granularity.

Formally, my measure of trade dependence is defined as the total imports and exports from state  $i$  to (or from) state  $j$  for a given commodity in a given year relative to state  $i$ 's GDP for that year.

$$r_{ij,p,t} = \frac{m_{ij,p,t} + x_{ij,p,t}}{GDP_{i,t}}$$

Where  $j$  is the trade partner and  $p$  is the product. This value is measured for each year,  $t$ .

In 2014, product-level trade dependence ranged from 0% to 34%, with an average level of trade dependence of 0.10%. The most dependent pairing is between Seychelles and United Arab Emirates: Seychelles's trade in mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes with United Arab Emirates amounts to 34% of Seychelles's GDP in 2014.

States trade in a large number of commodities. For each directed state dyad, we get the same number of

measures of dependence as products traded between them. We need to reduce this to a single measure of dependence. I use the product with the highest value of dependence between states  $i$  and  $j$ . State  $j$  will strategically select the product or products that maximize the cost state  $i$  should expect to incur in retaliation for escalating tensions. The trade in a product on which state  $i$  is most dependent is a good candidate for this strategic threat or imposition of a trade embargo.<sup>1</sup>

This measure allows me to focus on trade in goods that are critical to the potential initiator. I argue that this better represents the true cost they expect to incur if they escalate tensions with a trade partner to a MID.

## Control variables

Following other literature exploring this question, I include several control variables. I include a binary variable accounting for whether the dyad includes states that share a land border. I also include two variables providing each state's level of democracy.

## Results

Let's look at the relationship between the predicted probability that state  $i$  will initiate a MID with state  $j$  for a given level of product-level trade dependence. First, I will compare the relationship between MID initiation and product-level and broad, total trade dependence. I will then include traditional controls for a state's decision to initiate a MID against a rival to see whether trade dependence is a significant factor in this complex decision.

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<sup>1</sup>I tested five options for this aggregation: the minimum, the 25th percentile, the average, the 75th percentile, and the maximum level of trade dependence between two states. Let's first discuss the logic of the extremes: the minimum and maximum values. The minimum value represents the lowest possible cost state  $j$  could threaten to impose on state  $i$  in a given year. If this is relatively high, state  $i$  is probably very trade dependent on state  $j$ . This should be a very strong measure of dependence. However, state  $j$  is unlikely to threaten to stop trade in this commodity. Remember, they aim to impose the greatest possible cost on state  $i$  whilst minimizing the cost to themselves. Perhaps a better candidate is trade in the most dependent commodity. To qualify these measures, I also tested intermediate measures of dependence: the 25th, 50th, and 75th percentiles of trade dependence across all traded commodities. These measures perhaps better capture the dynamics at play with the extreme measures whilst allowing state  $j$  to minimize the cost it bears and also to select a number of commodities to disrupt, not just one. I found that the maximum, 75th percentile, and average measures of trade dependence were statistically significant to initiation of MIDs. In fact, the average measure of trade dependence produced the strongest effect on MID initiation. However, I am not sure that these abstracted measures of trade dependence are in the spirit of my theory or question. I hope to provide a more specific measure of trade dependence. I select the maximum value for theoretical reasons. Happily, I find a statistically significant relationship that I can explore.

First, let us compare the relationship between MID initiation and product-level trade dependence compared to the relationship estimated using the more traditional, broad measure of trade dependence.

**See Appendix for Table 1**

I used a binary logistic regression model to predict the probability that state  $i$  initiates a MID against state  $j$  for a given level of trade dependence. Using product-level trade dependence, I find that increasing dependence by one percentage point **increases** the odds that state  $i$  will initiate MID against state  $j$  by 1.21 on average. This relationship is highly statistically significant. This more fine-grained measure of trade dependence predicts a stronger relationship between conflict and trade dependence than the more traditional and broad-based approach. Using total trade dependence, I find that increasing dependence by one percentage point increases the odds that state  $i$  will initiate a MID against state  $j$  by 1.11 on average.

*Figure 1* illustrates the different predicted probabilities that state  $i$  will initiate a MID against state  $j$  for each possible level trade dependence between no dependence (0 percent) and total dependence (100 percent).<sup>2</sup>

**See Appendix for Figure 1**

It is worth noting that product-level trade dependence predicts a much more aggressive relationship between conflict and trade dependence: the point at which MIDs are predicted to be more likely than not is at 33% for product-level trade dependence and 64% for total trade dependence.

Moving from these base models to ones that incorporate traditional controls for MIDs and trade relationships, we learn that the relationship between conflict and trade dependence is not significant.

**See Appendix for Table 2**

For both product-level and total trade dependence, the odds that state  $i$  will initiate an MID against state  $j$  remain greater than one; however, the statistical significance of this relationship drops well below traditional thresholds. Significant determinants of conflict include contiguity and state  $i$ 's level of democracy. I find that state  $i$  is less likely to initiate a MID against a state with which it shares a land border, on average holding all else constant. I also find that as state  $i$  becomes more democratic, it is less likely to initiate a

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<sup>2</sup>Any prediction made for a level of trade dependence above 34% for product-level dependence and 60% for total trade dependence is an out of sample prediction.

MID against state  $j$ . Interestingly, I find that state  $j$ 's level of democracy does not appear to be a significant factor in state  $i$ 's decision to initiate a MID.

Focusing on product-level trade dependence, let us explore the effect of moving from no trade dependence to the average product-level trade dependence of 0.10%. Following Hanmer and Kalkan (2013), I calculate the effect of this change setting all other variables to their observed values. I continue to find that moving from no trade dependence to the average level of trade dependence does not change the likelihood that state  $i$  will initiate a MID against state  $j$ . However, this result is not statistically significant.

What does this mean for policymakers and conflict scholars? First, I suspect that these results suffer from three empirical issues. First, the lack of complete bilateral, product-level trade data over time represents a major hurdle to conducting this analysis. I will continue to explore options to efficiently access these data. Second, my measure of trade dependence continues to not account for the networked nature of global trade markets. I am developing a more complex model of product-level trade dependence that accounts for indirect linkages (as advocated by Chen (2021)) and alternative partners. Without accounting for the whole network in which two states operate, we miss important factors in their calculations of their vulnerability to one another. Finally, my measure of trade dependence does not sufficiently account for the cost state  $j$  faces in disrupting trade in state  $i$ 's most dependent product. State  $j$  should attempt to maximize the cost to state  $i$  of initiating a MID whilst minimizing the cost it will face. Rather than simply using the product that will impose the greatest harm on state  $i$  in my analysis, I need to include a measure of the optimal choice for state  $j$ . I am working to incorporate this in my more complex model.

In terms of substantive effects, I find that trade dependence does not matter to a state's decision to escalate conflict against a rival. If true, this is an important finding. Scholars and policymakers make many assumptions about a state's level of vulnerability on the global stage when deciding important foreign policy, including controversial foreign policy. Various power dynamics constrain or promote bold policy action. If states hope to reduce their vulnerability to conflict, they should not focus on developing a rival's economic dependence on them.



## Appendix

### Regression results

Table 1: Base models

Characteristic	OR	95% CI	p-value	OR	95% CI	p-value
(Intercept)	0.00	0.00, 0.00	<0.001	0.00	0.00, 0.00	<0.001
Trade dependence, product-level	1.21	1.12, 1.30	<0.001			
Trade dependence, total trade				1.11	1.07, 1.14	<0.001

Table 2: Controlled models

Characteristic	OR	95% CI	p-value	OR	95% CI	p-value
(Intercept)	0.00	0.00, 0.00	<0.001	0.00	0.00, 0.00	<0.001
Trade dependence, product-level	1.07	0.94, 1.16	0.2			
Contiguous	67.4	40.3, 114	<0.001	68.3	40.5, 116	<0.001
Democracy, state i	0.10	0.03, 0.30	<0.001	0.11	0.04, 0.31	<0.001
Democracy, state j	1.85	0.66, 5.23	0.2	1.78	0.63, 5.05	0.3
Trade dependence, total trade				1.01	0.97, 1.05	0.5

### Comparison of product-level and total trade dependence results

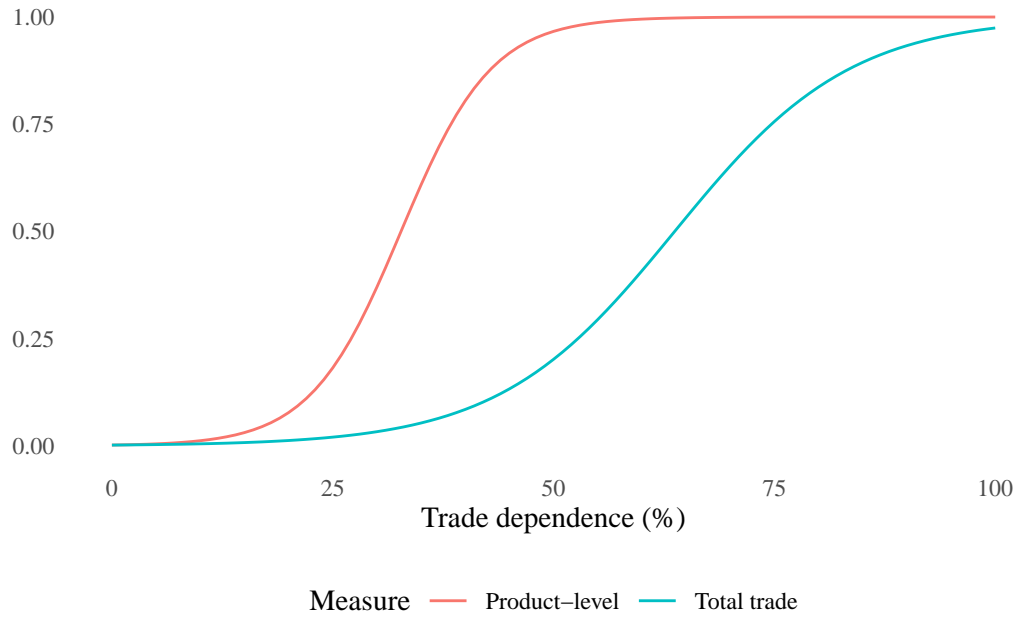


Figure 1: Predicted probability of MID given product-level trade dependence

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