Appendix for "Naval Power, Merchant Fleets and the Impact of Conflict on Trade"

This appendix presents additional substantive results, the results of a series of robustness tests, and summary statistics.

Alternative specifications for conflict

Tables A1, A2, and A3 replicate Table 1, using different definitions and coding for conflict. Specifically, in Table A1 we recode *Third-Party Conflict* and *Dyadic Conflict*, using version 2 of the Gibler-Miller-Little MID data.[1] Similar to the main text, we include only relatively major military interstate disputes that resulted in more than a hundred fatalities. The results in Models A1-1, A1-2, and A1-4 are in line with those in the main text, as the interaction terms in all three models are positive and significant. Conversely, *Third-Party Conflict* × *Exporter's Merchant Fleet* in Model A1-3 is statistically insignificant.

In Table A2 we extend our definition of conflict to investigate whether our hypotheses are supported when focusing on less intense forms of conflicts. Accordingly, instead of coding only relatively major MIDs, *Third-Party Conflict* and *Dyadic Conflict* refer to all fatal MIDs, namely to every MID that according to COW caused at least one battle death. The interaction terms in all models are positive and significant, again supporting both hypotheses.

Table A3 presents models in which *Third-Party Conflict* and *Dyadic Conflict* are coded in the form of ordinal variables. Specifically, the conflict variables range from 0 to 5, where

[1] Douglas M. Gibler, Steven V. Miller and Erin K. Little, "An Analysis of the Militarized Interstate Dispute (MID) Dataset, 1816–2001," *International Studies Quarterly* 60, no 4 (December 2016): 719–730.

0=no conflict, 1= MIDs that caused between 1 and 25 total military fatalities, 2= MIDs that caused between 26 and 100 total military fatalities, 3= MIDs that caused between 101 and 500 military fatalities, 4 = MIDs that caused between 501 and 999 military fatalities, and 5 = MIDs that caused 1,000 or more military fatalities. Again, the results in all models are robust for this specification.

Table A1. Using Gibler-Miller-Little MID data

	(A1-1)	(A1-2)	(A1-3)	(A1-4)
Third-Party Conflict	-.32***	-.417***	-.113	-.593***
	(.081)	(.117)	(.082)	(.117)
Dyadic Conflict	-1.702***	-1.604***	-1.575***	-1.185***
	(.31)	(.404)	(.314)	(.397)
Importer's Naval Power		-.005		
		(.015)		
Exporter's Naval Power				-.036**
				(.015)
Third-Party Conflict ×		.034***		
Importer's Naval Power		(.01)		
Third-Party Conflict ×				.049***
Exporter's Naval Power				(.01)
Importer's Merchant Fleet	-.035***			
	(.007)			
Exporter's Merchant Fleet				
			.003	
			(0.006)	
Third-Party Conflict ×	.019***			
Importer's Merchant Fleet	(.005)			
Third-Party Conflict ×			.004	
Exporter's Merchant Fleet			(.005)	
Constant	-9.436***	-12.23***	-9.571***	-8.311***
	(.405)	(.75)	(.395)	(.708)
N	525966	249390	527761	250767
R-squared	.198	.233	.217	.29

Table A2. Including all Fatal MIDs

	(A2-5)	(A2-6)	(A2-7)	(A2-8)
Third-Party Conflict	-.48***	-.381***	-.527***	-.46***
	(.068)	(.097)	(.068)	(.1)
Dyadic Conflict	-.818***	-.671**	-.705***	-.547*
	(.252)	(.305)	(.253)	(.283)
Importer's Naval Power		-.007		
		(.015)		
Exporter's Naval Power				-.036**
				(.015)
Third-Party Conflict ×		.035***		
Importer's Naval Power		(.008)		
Third-Party Conflict ×				.041***
Exporter's Naval Power				(.008)
Importer's Merchant Fleet size	-.037***			
	(.007)			
Exporter's Merchant Fleet size			-.001	
			(0.006)	
Third-Party Conflict ×	.035***			
Importer's Merchant Fleet size	(.005)			
Third-Party Conflict ×			.037***	
Exporter's Merchant Fleet size			(.005)	
Constant	-9.437***	-12.24***	-9.536***	-8.339***
	(.406)	(.751)	(.395)	(.71)
N	525966	249390	527761	250767
R-squared	.198	.232	.217	.289

Table A3. Using an Ordinal DV

	(A3-9)	(A3-10)	(A3-11)	(A3-12)
Third-Party Conflict	-.169***	-.179***	-.134***	-.233***
	(.027)	(.039)	(.027)	(.04)
Dyadic Conflict	-.374***	-.399***	-.334***	-.3**
	(.099)	(.123)	(.097)	(.121)
Importer's Naval Power		-.004		
		(.015)		
Exporter's Naval Power				-.034**
				(.015)
Third-Party Conflict ×		.014***		
Importer's Naval Power		(.003)		
Third-Party Conflict ×				.019***
Exporter's Naval Power				(.003)
Importer's Merchant Fleet size	-.037***			
	(.007)			
Exporter's Merchant Fleet size			.001	
			(0.006)	
Third-Party Conflict ×	.011***			
Importer's Merchant Fleet size	(.002)			
Third-Party Conflict ×			.009***	
Exporter's Merchant Fleet size			(.002)	
Constant	-9.449***	-12.24***	-9.555***	-8.334***
	(.406)	(.75)	(.395)	(.707)
N	525966	249390	527761	250767
R-squared	.198	.233	.218	.29

Non-directed dyadic specification for third-party conflict

In our baseline analysis in the main test, we coded *Third-Party Conflict* in the form of a directed-dyadic variable: one set of estimations explores the effect of conflict between *State a* and *State c* on *State a*'s imports from *State b*. The other explores the effect of conflict between *State b* and *State c* on *State b's* exports to *State a* (that is, *State a*'s imports from

State b). We use this method because it enables us to include simple interaction terms between *Third-Party Conflict* with *Naval Power* and the *Merchant Fleet Size* of the importer or the exporter in the dyad, which are directed variables. Nonetheless, this method does not enable us to express in the same estimation the fact that *State a*'s imports to *State b* can be affected by the conflict that either it or *State b* are engaged in.

To address this issue, in Table A4 we report the results from models in which we specify *Third-Party Conflict* as 1 if one state in the dyad - either the importer or the exporter - was in conflict with *State c*. For example, in 1982, Argentina was at war with the United Kingdom; thus, *Third-Party Conflict* receives a score of 1 with regard to Argentina's imports from France (as well as from any other state in the sample except the UK) in 1983 (one year lagged). The variable also receives a score of 1 when France is the importer and Argentina is the exporter in 1983.

Alongside this specification's advantage, it also makes the coding of *Naval Power* and *Merchant Fleet Size* more challenging, because these variables must indicate which of the two states in the dyad were involved in the conflict (we are interested in the conditional effect of the combatant's maritime-related variables). We, therefore, code *Combatant's Naval Power* and *Combatant's Merchant Fleet* as follows: When *Third-Party Conflict* equals 0, the variables take the value of the importer's naval power and merchant fleet, using the same operationalization employed in the main text (the log total tonnage). If one of the states in the dyad experienced a conflict with a third party, we code the combatant's naval power and merchant fleet. If both states in the dyad were in conflict with third parties, we simply take the average of the values of their naval power and merchant fleet scores.

To clarify, *Combatant's Naval Power* refers to Argentina's total tonnage (logged) in the observation where Argentina is the importer and France is the exporter in 1983, as well as in the observation where Argentina is the exporter and France is the importer. In all other years where both Argentina and France are not involved in a major MID with other states, *Naval Power* refers to Argentina's tonnage when Argentina is the importer, and to France's tonnage if France is the importer state in the directed dyad.

The results in the models that employ this specification are in line with those presented in the main text. In both models, the coefficient of ***Third-Party Conflict*** is negative and significant, and its interactions with *Combatant's Merchant Fleet Size* in Model A4-13, and with *Combatant's Naval Power* in Model A4-14, are positive and significant.

Table A4. Dyadic Specification for third-Party conflict

	(A4-13)	(A4-14)
Third-Party Conflict	-.383***	-.776***
	(.089)	(.144)
Dyadic Conflict	-1.71***	-1.685***
	(.408)	(.469)
Combatant's Naval Power		.004
		(.013)
Third-Party Conflict ×		.058***
Combatant's Naval Power		(.012)
Combatant's Merchant Fleet	-.024***	
	(.005)	
Third-Party Conflict ×	.022***	
Combatant's Merchant Fleet	(.006)	
Constant	-9.52***	-12.16***
	(.401)	(.725)
N	525966	259580
R-squared	.198	.232

High-Dimensional Fixed Effects Regression

Recent theoretical and empirical work recommends estimating the gravity models by controlling for Importer-Year Fixed Effects (IYFE), Exporter-Year Fixed Effects (EYFE) and Directed-Dyad Fixed Effects (DDFE). IYFE and EYFE control for any country-level variables that can affect a state's trade patterns in a given year. These identifiers control for any country-year variable, including GDP and GDP per capita, and thus obviate the need to specify them in the regression.

Since our key variables of interest are a nation's naval power and the size of its merchant fleet in a given year, we cannot fully employ this method. The importer's naval power and merchant fleet in a given year are perfectly collinear with IYFE. Nonetheless, we can include the EYFE, which are not collinear with the importer's time-varying variables. In the same way, we can include IYFE in the models that refer to the exporter's naval power and merchant fleet (Models 3-4 in the main text).

Table A5 replicates Table 1 in the main text, using a high dimensional fixed effects regression. Models A5-15 and A2-16, which replicate Models 1 and 2 in the main text, include EYFE and DDFE. Models A5-17 and A5-18, which replicate Models 3 and 4, include IYFE and DDFE. Standard errors are clustered on directed dyads in all models.

Overall, the results in three of the four models in Table A5 are very similar to those presented in the main text. The coefficients of the interaction terms *Third-Party Conflict* × *Importer's Naval Power* and *Third-Party Conflict* × *Exporter's Naval Power* are positive and significant in Models A5-16 and A5-18, and their values are almost identical to their corresponding coefficients in Table 1. Similarly, *Third-Party Conflict* × *Importer's*

Merchant Fleet is positive and significant in Model A5-18, and its value is very close to its corresponding coefficient in Model 3 in the main text. The only exception is *Third-Party Conflict* × *Importer's Merchant Fleet* in Model A5-17, which is positive as expected, but far from achieving statistical significance.

Three-way interactions

Table A6 reports the results of the models that include the three-way interactions discussed in the main text. Recall that we used Models A6-19 and A6-20 to produce Figures 7-8 in the main text.

Table A5. High-Dimensional Fixed Effects

	(A5-15)	(A5-16)	(A5-17)	(A5-18)
Third-Party Conflict	-.528**	-1.209***	-.303	-1.033**
	(.221)	(.33)	(.181)	(.455)
Dyadic Conflict	-1.497***	-1.718***	-1.239***	-1.549***
	(.427)	(.539)	(.424)	(.362)
Importer's Naval Power		.003		
		(.026)		
Exporter's Naval Power				-.022
				(.025)
Third-Party Conflict × Importer's Naval Power		.095***		
		(.027)		
Third-Party Conflict × Exporter's Naval Power				.124***
				(.03)
Importer's Merchant Fleet	-.035***			
	(.01)			
Exporter's Merchant Fleet			.001	
			(0.008)	
Third-Party Conflict × Importer's Merchant Fleet	.032**			
	(.015)			
Third-Party Conflict × Exporter's Merchant Fleet			.017	
			(.013)	
Constant	-5.159***	-6.728***	-4.425***	-2.983***
	(.587)	(1.014)	(.636)	(1.008)
N	525788	249369	527588	250745
R-squared	.889	.891	.89	.895

Table A6. 3-way Interaction

	(A6-19)	(A6-20)
Third-Party Conflict	-10.312***	-11.82***
	(1.433)	(1.425)
Dyadic Conflict	-1.868***	-1.369***
	(.535)	(.502)
Importer's Naval Power	-.469***	-.007
	(.104)	
Importer's Merchant Fleet size	-.348***	
	(.072)	
Third-Party Conflict ×	.779***	
Importer's Naval Power	(.008)	
Third-Party Conflict ×	.658***	
Importer's Merchant Fleet	(.09)	
Third-Party Conflict ×	-.049***	
Importer's Naval Power	(.008)	
×Exporter's Merchant Fleet		
Exporter's Naval Power		-.429***
		(.096)
Exporter's Merchant Fleet size		-.263***
		(.067)
Third-Party Conflict ×		1.056***
Importer's Naval Power		(.128)
Third-Party Conflict ×		.029***
Importer's Merchant Fleet size		(.007)
Third-Party Conflict ×		-.061***
Importer's Naval Power		(.008)
×Exporter's Merchant Fleet size		
Constant	-7.275***	-4.462***
	(1.191)	(1.128)
N	248092	249469
R-squared	.235	.292

Table A7: Summary Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max	Unit	Source
Directed trade flow	795,641	-.734	3.86	-4.6	12.95	ln(Nominal $)	COW (Barbieri and Keshk 2016)
Third-Party Conflict	1,032,982	.04	.20	0	1	Dummy	COW (Palmer et al 2020)
Dyadic Conflict	1,032,982	0.0004	0.02	0	1	Dummy	COW (Palmer et al 2020)
Importer's Naval Power	318,535	10.04	1.81	0	15.12	ln(Tonnage)	Crisher and Souva (2014)
Exporter's Naval Power	318,535	10.04	1.81	0	15.12	ln(Tonnage)	Crisher and Souva (2014)
Importer's Merchant Fleet	760,278	12.53	2.91	5.57	19.18	ln(Tonnage)	Lloyd's List Intelligence
Exporter's Merchant Fleet	760,278	12.53	2.91	5.57	19.18	ln(Tonnage)	Lloyd's List Intelligence
Importer's GDP	1,020,447	9.93	2.3	4.3	16.5	ln(Nominal $)	Gleditsch (2002)
Exporter's GDP	1,020,447	9.93	2.3	4.3	16.5	ln(Nominal $)	Gleditsch (2002)
Importer's GDP per capita	1,020,447	8.27	1.3	4.7	11.63	ln(Nominal $)	Gleditsch (2002)
Exporter's GDP per capita	1,020,447	8.27	1.3	4.7	11.63	ln(Nominal $)	Gleditsch (2002)
Currency	840,085	0.01	0.1	0	1	Dummy	CEPII
PTA	840,085	0.06	.23	0	1	Dummy	CEPII
Joint Democracy	1,032,982	0.29	0.45	0	1	Dummy	Polity 5
Ally	1,032,982	0.06	0.24	0	1	Dummy	COW (Gibler 2009)
WTO2 – Two WTO member	1,032,982	0.39	0.49	0	1	Dummy	WTO website
Importer's CINC	1,032,982	-7.34	2.49	-15.2	-1.54	Ln(CINC)	COW(David Singer)
Exporter's CINC	1,032,982	-7.34	2.49	-15.2	-1.54	Ln(CINC)	COW(David Singer)