Supplementary appendix for "Sanctions and Third-party Compliance with US Foreign Policy Preferences: An Analysis of Dual-use Trade"

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1 Introduction

This appendix presents the most relevant models intended to demonstrate the robustness of main results, as well as summary statistics.

2 Full coefficient table from main models

Table A.1 presents the full results from my main models, including all control variables.

	∆Dual-use TIES (19	∆DU-NDU 995-2005)	$\Delta Dual-use$ CNAS (20	∆DU-NDU 001-2014)	Δ Dual-use ICEWS (1	∆DU-NDU 995-2014)
Δ importer sanctions program	-0.07	-0.10	0.01	0.01	-0.41^{*}	-0.37*
	(0.19)	(0.17)	(0.14)	(0.13)	(0.18)	(0.16)
Lag importer sanctions program	-1.01***	-0.20**	-0.43***	-0.24***	-0.62***	-0.48***
	(0.08)	(0.07)	(0.07)	(0.06)	(0.08)	(0.07)
Δ importer SDN entries	-0.06	-0.03^{*}	-0.12^{***}	-0.05^{****}	-0.08	-0.03^{+++}
Lag importor SDN optrios	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lag importer 5DN entries	-0.04	-0.03	-0.10	-0.03	-0.10 (0.00)	-0.03
Lagged DV	-0.73***	-0.85***	-0.73***	-0.86***	-0.73***	-0.85***
	(0,00)	(0,00)	(0,00)	(0,00)	(0,00)	(0.00)
Δ importer proscribed behavior	-0.68**	-0.41	-0.55*	-0.46*	-0.78***	-0.36*
	(0.24)	(0.22)	(0.22)	(0.20)	(0.17)	(0.15)
Lag importer proscribed behavior	_0.20 [*]	-0.26 ^{***}	-0.13 [*]	-0.45 ^{***}	-0.13 [*]	-0.25 ^{***}
	(0.08)	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)
Δ exporter GDP	0.29	0.68***	-0.12	-0.45***	0.09	-0.17
	(0.16)	(0.14)	(0.13)	(0.11)	(0.11)	(0.10)
Lag exporter GDP	1.47***	0.41***	1.36***	0.27***	1.38***	0.31***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Δ importer GDP	-0.52***	-0.35^{*}	0.86***	0.30**	0.50***	0.01
	(0.15)	(0.14)	(0.12)	(0.11)	(0.10)	(0.09)
Lag importer GDP	0.00	0.12***	-0.01	0.10***	0.01	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Δ exporter US affinity	-0.70***	0.16	0.42***	0.84***	0.14	0.68***
	(0.18)	(0.16)	(0.12)	(0.10)	(0.10)	(0.09)
Lag exporter US affinity	0.51***	1.33***	0.66***	1.51***	0.57***	1.41***
	(0.09)	(0.09)	(0.06)	(0.06)	(0.00)	(0.05)
A importer US affinity	0.88	-0.79	(0.12)	-0.23	(0.10)	-0.47
Lag importor US offinity	(0.10)	0.66***	(0.12)	(0.11)	(0.10)	0.09)
Lag importer 05 annity	(0.08)	-0.00	(0.06)	-0.45	(0.05)	(0.05)
Δ dvadic affinity	(0.08)	0.07	(0.00)	-0.05	(0.03) 	-0.05
	(0.18)	(0.17)	(0.14)	(0.12)	(0.12)	(0.11)
Lag dvadic affinity	-0.36***	0.01	-0.40***	-0.12*	-0.46***	-0.09
	(0.09)	(0.08)	(0.06)	(0.05)	(0.06)	(0.05)
Δ both democracies	-0.11	-0.15	0.03	-0.11	0.16	-0.03
	(0.14)	(0.13)	(0.12)	(0.11)	(0.10)	(0.09)
Lag both democracies	0.36***	0.07	0.21***	-0.01	0.31***	0.03 [´]
	(0.05)	(0.05)	(0.04)	(0.03)	(0.03)	(0.03)
Δ both authoritarian	-2.11^{***}	-0.66	-0.44	0.07	-0.96*	-0.04
	(0.63)	(0.57)	(0.62)	(0.55)	(0.47)	(0.42)
Lag both authoritarian	0.21	-0.01	0.41**	-0.11	0.31*	-0.07
	(0.19)	(0.17)	(0.15)	(0.13)	(0.13)	(0.12)
Log average distance	-1.72***	-0.67***	-1.72***	-0.50***	-1.71^{***}	-0.56***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Δ exporter MECR	0.46*	0.54**	1.47***	1.36***	0.54**	0.58***
	(0.18)	(0.17)	(0.43)	(0.38)	(0.18)	(0.16)
Lag exporter MECR	1.18	1.05	1.60****	1.24	1.49****	1.23
Beet 0/11	(0.00)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
POSI-9/11	(0.05)	(0.05)			(0.02)	(0.03)
Constant	(0.05)	(0.05)	10 06***	0.20***	(0.03)	(0.03)
Constant	-15.75	-12.22	-12.20	-9.20	-14.19	-10.34
l ong run multipliers	(0.43)	(0.50)	(0.55)	(0.29)	(0.51)	(0.23)
Importer sanctions program	-1.40***	-0.23***	-0.59***	-0.28***	-0.85***	-0.57***
	(0.08)	(0.07)	(0.07)	(0.06)	(0.08)	(0.07)
Importer SDN entries	-0.05***	-0.04***	-0.14***	-0.04***	-0.14***	-0.04***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	144,776	144,776	234,629	234,629	312,368	312,368
Adjusted R^2	0.35	0.42	0.36	0.42	0.35	0.42
Residual Std. Error	6.68	6.13	6.65	5.86	6.68	5.97
F Statistic	3,133.67***	4,233.81***	5,399.98***	7,087.54***	6,785.24***	9,017.32***

Table A.1: Coefficients and standard errors examining US sanctions and dual-use trade

3 Generalized least squares models with AR1 errors

Table A.2 presents results from generalized least squares models that incorporate AR-1 residuals. Generally, residual serial correlation looks modest in my main models, though there is some evidence of its presence. However, the results of these additional models shows that my main findings are highly robust. The only notable difference in these models is that the coefficient for the LDV, which specifies the rate at which long-run effects manifest, is above 0.9, suggesting an even faster adjustment than I find in OLS models.

4 Models examining the United States as the exporter

Though I focus my discussion of causal mechanisms on third parties, it also makes sense that the US exports of dual-use commodities would be lower to states it has sanctioned. Indeed, the US government has direct jurisdiction over its exporting firms, which could result in stronger effects.

Table A.3 shows that the impact of us country sanctions programs of US dual-use exports indeed largely mirror effects I find in my primary models. In fact, the magnitude of US long-run dual-use export reduction tends to be greater—between approximately 80% and 90% with respect to dual-use flow as the DV, as shown in Figure A.1. The long-run effect appears somewhat smaller when examining relative dual use exports, though this finding could result because US sanctions are also reducing the US export of non-dual-use commodities to its sanctioned states. This likely phenomenon could explain why the long-run effect is not significant in a single model: using TIES data and estimating the DV of relative dual-use exports. That said, the negative and significant long-run effect using CNAS and ICEWS data suggest that, even among US exporters, dual-use commodity exports are reduced relatively more than the export of other commodities to US-sanctioned states.

Unlike my unsurprising findings for importer sanctions programs, my results for the association between importer SDN entries and US dual-use exports deviates from those presented in the main text. Indeed, importer SDN entries appear to have no consistent impact on US dual-use exports in the short or long run. Conversely, for third-party dual-use exports, SDN entities do appear to matter. One possible explanation of this finding could be that, for US exporters but not those in other states, country sanctions programs override any potential impact of SDN entities. Indeed, the fact that individuals, firms, and organizations in any state—including those not facing country sanctions programs—could be added to the SDN might lead third-parties to take greater notice of the SDN list, leading it to have a particularly strong third-party deterrent effect even amid a possible domestic redundancy. Another possibility is that the "bad behavior" control variables correlate with export controls through BIS, such that importer SDN entries are largely redundant.

5 Lagged dependent variable specifications

To demonstrate the robustness of my results in simpler models, I estimate ordinary least squares models with lagged dependent variables (LDVs). The LDV is useful to account for path-dependence; historical patterns of trade likely inform contemporary trade. Indeed, the LDV model is a special case of an autodistributed lag model, carrying an assumption that the maximal effect of sanctions occurs immediately

Table A.2: Replications specifying GLS	6 models including AR-1 residuals
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	ΔDual-use TIES (19	ΔDU-NDU 95-2005)	ΔDual-use CNAS (2)	ΔDU-NDU 001-2014)	$\Delta Dual-use$	ΔDU-NDU 995-2014)
Λ importer sanctions program	-0.26	0.07	-0.25*	0.05		-0.12
	(0.13)	(0.15)	(0.10)	(0.11)	(0.12)	(0.14)
Lag importer sanctions program	-0.89***	-0.21*	-0.44***	-0.28***	-0.83***	-0.43***
	(0.12)	(0.09)	(0.11)	(0.08)	(0.12)	(0.09)
Δ importer SDN entries	-0.03**	-0.03**	-0.06***	-0.03***	-0.04***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lag importer SDN entries	-0.04***	-0.04***	-0.09***	-0.03***	-0.08***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lagged DV	-0.91	-0.92	-0.93****	-0.93****	-0.93****	-0.92
A important processihad babaylar	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
A importer proscribed behavior	(0.18)	-0.22	-0.10	-0.30	-0.13	-0.23
Lag importer proscribed behavior	(0.18)	(0.20)	(0.13)	-0.44***	_0.30**	_0.28***
Lag importer proscribed benavior	(0.13)	(0.10)	(0.11)	(0.07)	(0.10)	(0.07)
Λ exporter GDP	0.81***	0 40**	0.62***	0.03	0 74***	0.09
	(0.11)	(0.13)	(0.08)	(0.10)	(0.07)	(0.09)
Lag exporter GDP	1.85***	0.40***	1.73***	0.28***	1.77***	0.31***
5	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Δ importer GDP	-0.16	-0.18	0.27***	0.32**	0.08	0.07
	(0.10)	(0.12)	(0.08)	(0.10)	(0.07)	(0.08)
Lag importer GDP	0.38***	0.15***	0.33***	0.13***	0.39***	0.13***
	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Δ exporter US affinity	-0.55^{***}	0.29*	0.36***	0.86***	0.14*	0.69***
	(0.12)	(0.14)	(0.08)	(0.08)	(0.07)	(0.08)
Lag exporter US affinity	-0.43**	1.22***	0.66***	1.58***	0.32***	1.39***
	(0.13)	(0.11)	(0.10)	(0.08)	(0.09)	(0.07)
Δ importer US affinity	0.37**	-0.75***	0.51***	-0.23**	0.23***	-0.45***
	(0.12)	(0.14)	(0.08)	(0.08)	(0.07)	(0.08)
Lag importer US affinity	(0.12)	-0.97	(0.10)	-0.55	(0.00)	-0.79^{+1}
Λ duadic affinity	0.12)	(0.10)	(0.10)	(0.07)	0.09)	(0.00)
	-0.32 (0.13)	(0.14)	(0.00)	(0.10)	(0.08)	(0.00)
Lag dvadic affinity	_1 14***	(0.14) -0.13	-0.65***	(0.10) -0.12	-0.91***	(0.05) -0.15*
	(0.14)	(0.11)	(0.11)	(0.08)	(0.10)	(0.07)
Δ both democracies	0.18	-0.08	0.07	-0.13	0.17**	-0.04
	(0.10)	(0.11)	(0.08)	(0.09)	(0.07)	(0.08)
Lag both democracies	0.66***	0.12*	0.36***	0.03	0.53***	0.09*́
	(0.08)	(0.06)	(0.07)	(0.05)	(0.06)	(0.04)
Δ both authoritarian	-0.03	-0.11	0.08	0.07	0.16	0.14
	(0.44)	(0.51)	(0.39)	(0.46)	(0.31)	(0.36)
Lag both authoritarian	-0.35	-0.17	-0.07	-0.25	-0.29	-0.24
	(0.30)	(0.23)	(0.27)	(0.18)	(0.23)	(0.16)
Log average distance	-2.39***	-0.71***	-2.29***	-0.52***	-2.34***	-0.59***
	(0.04)	(0.03)	(0.04)	(0.02)	(0.03)	(0.02)
Δ exporter MECR	1.28****	0.87^{****}	1.21****	0.94***	1.44	0.90****
Las overation MECD	(0.14)	(0.10)	(0.28)	(0.33)	(0.13)	(0.15)
Lag exporter MECK	2.05	1.20	2.40	1.40	2.32	1.42 (0.05)
Post 0/11	(0.10)	0.07)	(0.09)	(0.00)	0.26***	0.05)
1 031-9/11	(0.05)	(0 05)			(0.04)	(0.04)
Constant	-27.72***	-12.86***	-23.99***	-10.06***	-26.42***	-11.06***
	(0.74)	(0.53)	(0.63)	(0.41)	(0.56)	(0.36)
Observations	144.776	144.776	234.629	234.629	312.368	312,368
Log Likelihood	-446,494.10	-457,864.40	-711,849.30	-730,305.00	-950,335.40	-977,726.30
Bayesian Inf. Crit.	893,321.00	916,061.60	1,424,032.00	1,460,944.00	1,901,025.00	1,955,807.00

	Δ Dual-use TIES (19	∆DU-NDU 995-2005)	Δ Dual-use CNAS (2	∆DU-NDU 001-2014)	Δ Dual-use ICEWS (1	∆DU-NDU 1995-2014)
Δ importer sanctions program	-0.80	-0.43	-0.60	-0.39	-0.90	-0.10
	(0.90)	(0.51)	(0.66)	(0.36)	(0.87)	(0.48)
Lag importer sanctions program	-1.18^{**}	-0.05	_0.67 [*]	-0.51 ^{**}	-1.27 ^{***}	-0.47 [*]
	(0.36)	(0.20)	(0.32)	(0.17)	(0.36)	(0.19)
Δ importer SDN entries	-0.06	0.02	-0.05	0.02	-0.06	0.03
	(0.07)	(0.04)	(0.06)	(0.03)	(0.05)	(0.03)
Lag importer SDN entries	0.00	0.01	-0.02	0.02	-0.03	0.01
	(0.04)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
Lagged DV	-0.93***	-0.97***	-0.82***	-0.93***	-0.86***	-0.94^{***}
	(0.04)	(0.03)	(0.05)	(0.03)	(0.03)	(0.02)
Δ importer proscribed behavior	-0.75	-0.29	-0.21	-0.05	-0.33	-0.01
	(0.94)	(0.53)	(1.06)	(0.58)	(0.73)	(0.40)
Lag importer proscribed behavior	-0.45	0.00	-0.38	-0.24	-0.15	0.07
	(0.35)	(0.20)	(0.30)	(0.16)	(0.27)	(0.15)
Δ exporter GDP	0.65	0.47	-9.01^{*}	-4.64	-5.73	-2.04
	(7.62)	(4.32)	(4.57)	(2.47)	(4.04)	(2.21)
Lag exporter GDP	4.18*	2.56*	0.19	-2.92***	1.06	-0.52
	(1.81)	(1.03)	(1.42)	(0.77)	(1.22)	(0.67)
Δ importer GDP	-0.12	0.27	0.21	0.12	0.15	0.17
	(0.66)	(0.37)	(0.59)	(0.32)	(0.47)	(0.26)
Lag importer GDP	0.38***	0.13***	0.18**	0.08**	0.30***	0.11***
	(0.07)	(0.03)	(0.07)	(0.02)	(0.05)	(0.02)
Δ dyadic affinity	2.53**	1.27**	0.80	0.20	1.10**	0.29
	(0.77)	(0.44)	(0.48)	(0.26)	(0.41)	(0.23)
Lag dyadic affinity	2.24***	0.88***	1.95***	0.79***	1.65***	0.54***
	(0.38)	(0.22)	(0.29)	(0.15)	(0.24)	(0.13)
Δ both democracies	-1.14	-0.40	-0.55	-0.01	-0.55	-0.09
	(0.60)	(0.34)	(0.56)	(0.30)	(0.44)	(0.24)
Lag both democracies	-0.93***	-0.24	-1.01^{***}	-0.29**	-0.90***	-0.19*
	(0.22)	(0.13)	(0.17)	(0.09)	(0.15)	(0.08)
Log average distance	-1.54^{***}	0.35**	-1.71^{***}	0.20*	-1.63^{***}	0.27***
	(0.20)	(0.12)	(0.18)	(0.09)	(0.14)	(0.08)
Post-9/11	-0.05	-0.13			0.19	0.04
	(0.30)	(0.17)			(0.26)	(0.14)
Constant	-103.13	-84.21**	21.30	83.68***	-8.22	9.58
	(54.34)	(30.89)	(43.06)	(23.36)	(36.71)	(20.10)
Observations	1,421	1,421	1,950	1,950	2,778	2,778
Adjusted R ²	0.40	0.47	0.33	0.32	0.36	0.39
Residual Std. Error	3.05	1.73	2.94	1.59	2.95	1.62
F Statistic	56.64***	76.53***	60.94***	57.54***	92.35***	106.37***

Table A.3: Replication models examining US as the exporter



US sanctions: country programs

Figure A.1: US sanctions against the importing state and US dual-use exports. Predictions and 95% confidence intervals.

and then decays over time (Beck and Katz 2011, 334).¹ The LDV acts somewhat to account for omitted variable bias (though by historical interaction level rather than by unit) and could help reduce serial correlation. However, the use of LDVs along with the present level DV could lead to underestimates of

¹This assumption could be relaxed by adding lags of the sanction variable allowing for the possibility that the maximal effect occurs later; however, the fact that sanctions often remain in place for many years once imposed would lead to multicollinearity issues with such a specification (Beck and Katz 2011, 335).

associations between other explanatory variables and the dependent variable.²

Table A.4 shows that all results are robust. All coefficients for importer sanctions programs and importer SDN entries are negative and significant in these simpler models. substantive effects look quite similar to those in my ECM models, which could be occurring given that the long-run equilibrium adjustment is relatively fast in those models.

	Dual-use TIES (19	DU-NDU 995-2005)	Dual-use CNAS (20	DU-NDU 001-2014)	Dual-use ICEWS (19	DU-NDU 995-2014)
Lag importer sanctions program	-1.08***	-0.20**	-0.49***	-0.31***	-0.70***	-0.47***
5 1 1 5	(0.07)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)
Lag importer SDN entries	-0.04 ^{***}	-0.03***	-0.09 ^{***}	-0.03***	-0.10***	-0.03 ^{***}
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Lagged DV	0.27***	0.15***	0.27***	0.14***	0.27***	0.15***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Lag importer proscribed behavior	-0.03	-0.28 ^{***}	-0.16**	-0.44 ^{***}	-0.11 [*]	-0.26***
	(0.07)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)
Lag exporter GDP	1.47***	0.40***	1.35***	0.27***	1.37***	0.30***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lag importer GDP	0.01	0.11***	-0.02*	0.10***	0.01	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lag exporter US affinity	0.58***	1.31***	0.52***	1.38***	0.51***	1.33***
	(0.09)	(0.08)	(0.06)	(0.05)	(0.05)	(0.05)
Lag importer US affinity	1.85***	-0.59***	1.28***	-0.47***	1.20***	-0.57***
	(0.07)	(0.07)	(0.05)	(0.05)	(0.05)	(0.04)
Lag dyadic affinity	-0.35***	-0.04	-0.50^{***}	-0.17^{***}	-0.49***	-0.11^{*}
	(0.08)	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)
Lag both democracies	0.34***	0.07	0.25***	0.01	0.33***	0.04
	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
Lag both authoritarian	0.28	-0.01	0.38**	-0.14	0.32**	-0.10
	(0.17)	(0.16)	(0.14)	(0.12)	(0.12)	(0.11)
Log average distance	-1.72^{***}	-0.65***	-1.72^{***}	-0.50***	-1.71^{***}	-0.55^{***}
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Lag exporter MECR	1.15***	1.07***	1.67***	1.30***	1.53***	1.27***
	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.03)
Post-9/11	0.87***	0.56***			0.68***	0.62***
	(0.05)	(0.04)			(0.03)	(0.03)
Constant	-15.86^{***}	-11.87^{***}	-11.95^{***}	-9.05***	-13.98^{***}	-10.17^{***}
	(0.42)	(0.35)	(0.34)	(0.27)	(0.30)	(0.24)
Observations	162,581	162,581	254,312	254,312	332,077	332,077
Adjusted R^2	0.42	0.10	0.41	0.09	0.42	0.10
Residual Std. Error	6.67	6.10	6.65	5.85	6.68	5.96
F Statistic	8,542.15***	1,359.05***	13,792.29***	2,041.10***	16,892.88***	2,598.57***

Table A.4: Replication models with simpler lagged DV specification

* p less than 0.05, ** p less than 0.01, *** p less than 0.001

6 Including variables for "minor" sanctions

In the models presented in the main text, I scrutinize sanctions from TIES and ICEWS in order to exclude more minor restrictions less likely to be salient particularly with respect to third parties. Notably excluded are TIES sanctions over trade disputes, financial issues, the environment, and drug trafficking. I

 $^{^{2}}$ Notably, this consequence of LDV models could be considered a positive feature of my analysis. The inclusion of an LDV suggests that any bias with respect to my key explanatory variables is likely to be towards 0.

cannot specify issues using ICEWS, but I instead crate a threshold with respect to frequency of mentions regarding the imposition of sanctions. Given that these are judgment decisions, I present models here where I include additional explanatory variables for the "minor" importer sanctions grouped with "no importer sanction" in the main models.

As shown in Table A.5, main results are robust regarding "relevant" sanctions. Regarding minor sanctions, the coefficient is actually positive and significant using TIES data on relative dual-use exports, which makes sense given that incentives for sanctions busting might be highest in these cases. However, in the remaining models, the coefficient for minor sanctions (the lagged variable as well as the LRM) is negative and significant, but of a much smaller magnitude than that for the relevant sanctions variable.

I also specified models that create a single variable for "any" importer sanction program—i.e., with no threshold to be considered "broad." These results are shown in Table A.6. Again, results generally are robust, though notably, coefficients have smaller magnitudes when considering any sanction. This finding is unsurprising as the "on average" impact of sanctions incorporates the relatively stronger effect of broad sanctions with the more modest or non-existent impact of minor sanctions.

7 Including variables for third-party senders

The main models examine only US sanctions against the importing state. I argue that there is theoretical justification for this decision, given that the US has a uniquely powerful position in the international system and can exert at least some leverage over essentially all international actors, for example denying access to dollar-backed international finance. However, this decision is motivated also by data limitations, particularly with respect to CNAS and the SDN list. On the other hand, TIES has sanctions data covering all senders up through 2005. Accordingly, I replicate the TIES models including a variable for non-US sanction. I present results in Table A.7. All results are robust; and non-US sanctions appear to actually have a positive long-run impact on third-party dual-use exports, perhaps due to sanctions busting against less powerful senders (e.g., Early 2015).

I also specified models considering US unilateral sanctions vs. those with multilateral or institutional support. I could only use TIES data for these models, and accordingly there are only two models shown in Table A.8 Results are interesting as they show that US unilateral sanctions have a consistent impact similar to what I find in the main models. US sanctions with multilateral support also seem to have a negative association with third-party dual-use export flows in the immediate term only. Further, the association with dual use exports relative to non-dual-use exports is reversed in the long run. It could be that these sanctions have a stronger effect on non-dual-use trade, though, given the preliminary nature of these findings, future work should explore this issue further.

8 Models with fewer control variables

Though controls are useful to preclude spurious correlation, parsimony is also valuable. Table A.9 shows that results are consistent when I remove variables for proscribed behavior by the importer, political affinity, regime type, and time period. Given that the UN voting similarity variables are excluded from these models, results cover an additional year (to 2015).

	ΔDual-use ΔDU-NDU TIES (1995-2005)		$\Delta Dual-use$ ICEWS (1	∆DU-NDU 995-2014)
Δ importer sanctions program	-0.08	-0.02	-0.50^{*}	-0.42*
	(0.19)	(0.18)	(0.19)	(0.17)
Lag importer sanctions program	-1.13^{***}	-0.09	-0.85***	-0.54***
A importor minor constions	(0.08)	(0.07)	(0.08)	(0.07)
A importer minor salictions	(0.03	(0.08)	-0.10	(0.06)
Lag importer minor sanctions	-0.25***	0.23***	-0.28***	-0.07**
5 1	(0.05)	(0.04)	(0.03)	(0.03)
Δ importer SDN entries	-0.06***	-0.03**	-0.08***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Lag importer SDN entries	-0.04***	-0.03^{***}	-0.10^{***}	-0.03***
Larged DV	(0.01)	(0.01) 0.85***	(0.00) 0.73***	(0.00) 0.85***
	(0.00)	(0.00)	(0.00)	(0.00)
Δ importerproscribed behavior	-0.71**	-0.39	-0.72***	-0.35*
рр	(0.24)	(0.22)	(0.17)	(0.15)
Lag importer proscribed behavior	-0.18*	-0.27 ^{***}	-0.0Ś	-0.23****
	(0.08)	(0.07)	(0.06)	(0.05)
Δ exporter GDP	0.29	0.67***	0.06	-0.17
	(0.16)	(0.14)	(0.11)	(0.10)
Lag exporter GDP	$1.47^{(1,1,1,1)}$	(0.01)	1.38****	(0.01)
∆ importer GDP	(0.01) 	(0.01) _0.38**	0.01)	(0.01)
	(0.15)	(0.14)	(0.10)	(0.09)
Lag importer GDP	0.03*	0.09***	0.03***	0.11***
0	(0.01)	(0.01)	(0.01)	(0.01)
Δ exporter US affinity	-0.73***	0.18	0.15	0.69***
	(0.18)	(0.16)	(0.10)	(0.09)
Lag exporter US affinity	0.49***	1.35***	0.60***	1.42***
A improvement LIS officient	(0.09)	(0.09)	(0.06)	(0.05)
	(0.18)	-0.82	(0.10)	-0.48
Lag importer US affinity	1.89***	-0.69***	1.35***	-0.62***
	(0.08)	(0.08)	(0.05)	(0.05)
Δ dyadic affinity	-0.25	0.08	-0.30*	-0.05
	(0.18)	(0.17)	(0.12)	(0.11)
Lag dyadic affinity	-0.38***	0.02	-0.44***	-0.08
	(0.09)	(0.08)	(0.06)	(0.05)
∆ both democracies	-0.10	-0.10	(0.14	-0.04
Lag both democracies	0.38***	0.05	0.28***	0.03
6	(0.05)	(0.05)	(0.03)	(0.03)
Δ both authoritarian	-2.08***	-0.68	-0.96*	-0.04
	(0.63)	(0.57)	(0.47)	(0.42)
Lag both authoritarian	0.18	0.02	0.32*	-0.07
	(0.19)	(0.17)	(0.13)	(0.12)
Log average distance	-1.(1)	-0.07	-1.71	-0.55
Λ exporter MECR	0.03)	0.54**	0.53**	0.58***
	(0.18)	(0.17)	(0.18)	(0.16)
Lag exporter MECR	1.18***	1.05***	1.49***	1.23***
	(0.06)	(0.05)	(0.04)	(0.04)
Post-9/11	0.86***	0.49***	0.73***	0.66***
	(0.05)	(0.05)	(0.03)	(0.03)
Constant	-10.33^{+++}	-11.05***	-14.73^{***}	-10.4/
Observations	(0.47) 144 776	(0.39) 144 776	(U.31) 312 368	(U.20) 312 362
Adjusted R ²	0.35	0.42	0.35	0.42
Residual Std. Error	6.68	6.13	6.68	5.97
F Statistic	2,903.24***	3,922.05***	6,287.64***	8,349.81***

Table A.5:	Replication	models	including	variables	for	minor	sanctions	

	ΔDual-use ΔDU-NDU TIES (1995-2005)		Δ Dual-use ICEWS (1	∆DU-NDU 995-2014)
Δ any importer sanctions program	-0.03	0.10	-0.15*	-0.06
l ag any importer sanctions program	(0.09) 0 41***	(0.08) 0.17***	(0.07) -0.29***	(0.06) 0.08**
	(0.04)	(0.04)	(0.03)	(0.03)
Δ importer SDN entries	-0.06 ^{***}	_0.04 ^{**}	-0.08 ^{***}	-0.03 ^{***}
	(0.01)	(0.01)	(0.01)	(0.01)
Lag importer SDN entries	-0.05^{***}	-0.04^{***}	-0.10^{***}	-0.04***
Lagged DV	(0.01) 	(0.01) -0.48*	(0.00) 	(0.00)
	(0.24)	(0.22)	(0.17)	(0.15)
Δ importerproscribed behavior	-0.50 ^{***}	-0.39***	-0.23***	-0.38***
	(0.07)	(0.06)	(0.05)	(0.04)
Lag importer proscribed behavior	-0.72***	-0.85***	-0.73***	-0.85***
A experter CDP	(0.00)	(0.00)	(0.00)	(0.00)
	(0.16)	(0.14)	(0.11)	(0.10)
Lag exporter GDP	1.46***	0.41***	1.38***	0.31***
0	(0.01)	(0.01)	(0.01)	(0.01)
Δ importer GDP	-0.54***	-0.38**	0.56***	0.02
	(0.15)	(0.14)	(0.10)	(0.09)
Lag importer GDP	0.05^{***}	(0.10^{***})	0.03***	0.11^{***}
Λ exporter US affinity	(0.01) 0.75***	(0.01)	(0.01)	0.01)
	(0.18)	(0.16)	(0.10)	(0.09)
Lag exporter US affinity	0.45***	1.33***	0.57***	1.40***
	(0.09)	(0.09)	(0.06)	(0.05)
Δ importer US affinity	0.94***	-0.79***	0.69***	-0.45***
	(0.18)	(0.17)	(0.10) 1.42***	(0.09)
Lag importer 05 animity	(0.08)	-0.00	(0.05)	-0.57
Δ dyadic affinity	-0.28	0.07	-0.29*	-0.05
, , , , , , , , , , , , , , , , , , ,	(0.18)	(0.17)	(0.12)	(0.11)
Lag dyadic affinity	-0.44***	-0.00	-0.45***	-0.10*
	(0.09)	(0.08)	(0.06)	(0.05)
Δ both democracies	-0.10	-0.16	0.13	-0.05
Lag both democracies	0 42***	0.06	0.28***	0.03
	(0.05)	(0.05)	(0.03)	(0.03)
Δ both authoritarian	_2.02 ^{**}	– 0.66	—0.99 [*]	-0.07
	(0.63)	(0.57)	(0.47)	(0.42)
Lag both authoritarian	0.18	0.02	0.30*	-0.09
Log average distance	(0.19)	(0.17)	(0.13) _1 71***	(0.12)
Log average distance	(0.03)	(0.02)	(0.02)	(0.01)
Δ exporter MECR	0.46*	0.54**	0.53**	0.58***
	(0.18)	(0.17)	(0.18)	(0.16)
Lag exporter MECR	1.17***	1.05***	1.50***	1.24***
$D_{1} + 0/11$	(0.06)	(0.05)	(0.04)	(0.04)
Post-9/11	0.89	0.49****	(0.03)	0.00
Constant	-16 68***	_11 80***	_14 57***	(0.03)
Constant	(0.47)	(0.39)	(0.31)	(0.26)
Observations	144,776	144,776	312,368	312,368
Adjusted R ²	0.35	0.42	0.35	0.42
Residual Std. Error	6.69	6.13	6.68	5.97
F Statistic	3,128.14***	4,234.51***	6,787.02***	9,014.35***

Table A.6: Replication models including variables for any sanctions

	$\Delta Dual-use$	۵DU-NDU TIES (1995-2005)
$\overline{\Delta}$ importer US sanctions	-0.29	-0.24
	(0.19)	(0.17)
Lag importer US sanctions	-1.28***	-0.33***
	(0.08)	(0.07)
Δ importer non-US sanctions	0.18	0.29
Lag importor non LIS conctions	(0.19) 1.02***	(0.18)
Lag importer non-03 sanctions	(0.08)	0.99
Λ importerSDN entries	-0.08***	-0.04**
	(0.01)	(0.01)
Lag importerSDN entries	-0.05***	-0.04***
0	(0.01)	(0.01)
Lagged DV	-0.73***	-0.85***
	(0.00)	(0.00)
Δ importer proscribed behavior	-0.56^{*}	-0.35
	(0.24)	(0.22)
Lag importer proscribed behavior	0.04	-0.14*
	(0.08)	(0.07)
Δ exporter GDP	0.28	0.68***
	(0.10)	(0.14)
Lag exporter GDP	1.48	(0.01)
A importor CDP	(0.01)	(0.01)
	(0.15)	(0.14)
Lag importer GDP	-0.01	0.11***
	(0.01)	(0.01)
Δ exporter US affinity	-0.71***	0.15
	(0.18)	(0.16)
Lag exporter US affinity	0.54***	1.35***
	(0.09)	(0.09)
Δ importer US affinity	0.85***	-0.81***
	(0.18)	(0.17)
Lag importer US affinity	1.89***	-0.64***
	(0.08)	(0.07)
Δ dyadic affinity	-0.19	0.10
	(0.18)	(0.17)
Lag dyadic affinity	-0.28^{++}	0.00
A both democracies	(0.09)	(0.08)
	-0.08	-0.13
Lag both democracies	0.37***	0.08
	(0.05)	(0.05)
Δ both authoritarian	-2.14***	-0.67
	(0.62)	(0.57)
Lag both authoritarian	0.32	0.04
	(0.19)	(0.17)
Log average distance	-1.73^{***}	-0.68***
	(0.03)	(0.02)
Δ exporter MECR	0.46*	0.54**
	(0.18)	(0.17)
Lag exporter MECR	1.18***	1.05***
$P_{-} \rightarrow 0/11$	(0.06)	(0.05)
FUSI-9/11	0.00	(0.05)
Constant	(0.03) _15 77***	(0.05 <i>)</i> _12 10***
Constant	-13.77 (0.45)	(0.38)
Observations	144 776	144 776
Adjusted R ²	0.35	0.42
Residual Std. Error	6.67	6.12
F Statistic	2,937.52***	3,932.54***
	* n less than 0 (05 ** place than 0.01 *** place than 0.001
	A-12	

Table A.7: Replication models including variables for third-party (i.e., non-US) sanctions

	$\Delta Dual-use$	۵DU-NDU TIES (1995-2005)
Δ importer US unilateral sanctions	0.30	-0.36
Lag importer US unilateral sanctions	(0.22) -1.20***	(0.21) -0.31***
Λ importer US multilateral sanctions	(0.08) -0.59*	(0.08) 0.35
	(0.27)	(0.25)
Lag importer US multilateral sanctions	-0.30 (0.17)	0.33* (0.16)
$\Delta \ {\rm importerSDN}$ entries	-0.06***	-0.03**
Lag importerSDN entries	(0.01) -0.04***	(0.01) 0.04***
	(0.01)	(0.01)
Lagged DV	-0.73*** (0.00)	-0.85*** (0.00)
Δ importer proscribed behavior	-0.62**	-0.37
Lag importer proscribed behavior	(0.24) -0.11	(0.22) -0.20**
	(0.08)	(0.07)
Δ exporter GDP	(0.16)	(0.14)
Lag exporter GDP	1.47***	0.41***
Δ importer GDP	-0.46**	(0.01) -0.34*
Lag importor CDP	(0.15)	(0.14) 0.12***
	(0.01)	(0.01)
Δ exporter US affinity	-0.70*** (0.18)	0.15
Lag exporter US affinity	0.51***	1.34***
∆ importer US affinity	(0.09) 0.92***	(0.09) 0.81***
	(0.18)	(0.17)
Lag importer US affinity	1.88^{***} (0.08)	-0.66*** (0.07)
Δ dyadic affinity	-0.22	0.07
Lag dvadic affinity	(0.18) -0.34***	(0.17) 0.03
	(0.09)	(0.08)
Δ both democracies	-0.10 (0.14)	-0.14 (0.13)
Lag both democracies	0.36***	0.07
Δ both authoritarian	(0.05) -2.13***	(0.05) -0.66
	(0.63)	(0.57)
Lag both authoritarian	(0.19)	(0.17)
Log average distance	-1.72^{***}	-0.67***
Δ exporter MECR	0.46*	0.55**
Lag experter MECP	(0.18)	(0.17)
Lag exporter MECK	(0.06)	(0.05)
Post-9/11	0.85***	0.52***
Constant	-15.74***	-12.27***
Observations	(0.45) 144 776	(0.38) 144 776
Adjusted R ²	0.35	0.42
Residual Std. Error E Statistic	6.68 2 903 85***	6.13 3 921 16***
	2,303.03	5,321.10

Table A.8: Replication models including variables for unilateral and multilateral US sanctions

* p less than 0.05, ** p less than 0.01, *** p less than 0.001 $$A\mathchar`A-13$$

	$\Delta {\sf D}{\sf u}{\sf a}{\sf l}{\sf -}{\sf u}{\sf s}{\sf e}$ TIES (1	∆DU-NDU 995-2005)	$\Delta Dual-use$ CNAS (2)	∆DU-NDU 001-2015)	$\Delta Dual-use$ ICEWS (1	∆DU-NDU 995-2015)
Δ importer sanctions program	-0.00	-0.11	-0.04	-0.00	-0.98***	-0.39*
1 1 0	(0.19)	(0.17)	(0.14)	(0.12)	(0.18)	(0.16)
Lag importer sanctions program	-1.32***	-0.23***	-0.58***	-0.24***	-1.21^{***}	-0.45***
	(0.07)	(0.06)	(0.07)	(0.06)	(0.07)	(0.06)
Δ importer SDN entries	-0.07 ^{***}	-0.02	-0.13 ^{***}	-0.04***	-0.08***	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Lag importer SDN entries	-0.04* ^{***}	-0.03****	-0.11^{***}	-0.04***	-0.09 ^{***}	-0.01^{***}
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Lagged DV	-0.72***	-0.84***	-0.72***	-0.84***	-0.71***	-0.83***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ exporter GDP	0.90***	1.29***	-1.05^{***}	-1.53 ^{***}	-0.35* ^{***}	-0.54* ^{**}
	(0.14)	(0.13)	(0.12)	(0.11)	(0.10)	(0.09)
Lag exporter GDP	1.65***	0.62***	1.55***	0.50***	1.58***	0.53***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
Δ importer GDP	0.13	0.07	0.64***	0.47***	0.72***	0.59***
	(0.14)	(0.13)	(0.12)	(0.10)	(0.10)	(0.09)
Lag importer GDP	0.13***	0.06***	0.12***	0.07***	0.13***	0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log average distance	-1.86^{***}	-0.75***	-1.83^{***}	-0.58***	-1.81^{***}	-0.62***
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
Constant	-22.18***	-14.60***	-19.86***	-13.09***	-21.09***	-13.54***
	(0.38)	(0.31)	(0.30)	(0.24)	(0.26)	(0.21)
Observations	160,255	160,255	261,028	261,028	346,752	346,752
Adjusted R^2	0.35	0.42	0.34	0.41	0.34	0.41
Residual Std. Error	6.80	6.21	6.76	5.95	6.79	6.06
F Statistic	8,527.61***	11,441.55***	13,725.10***	18,487.60***	18,171.52***	24,393.95***

Table A.9: Replications including fewer controls

9 Models with additional control variables

In contrast to the discussion above, other readers might suspect the omission of important variables. Using data from CEPII (Mayer and Zignago 2011), I include indicators of whether the exporter and importer are EU members. EU members conduct trade individually, but have common external import barriers—though not necessarily common export control policy (Schmitt 2001). Similarly, I code variables capturing GATT membership, given that members must extend permanent normal trade relations to other members. Finally, I add a variable identifying dyads with a contiguous border. Table A.10 shows that results are again consistent with additional variables added.

10 Alternate ICEWS coding

Main models included a threshold to identify "broad" ICEWS sanctions. Admittedly, this threshold could be viewed as arbitrary. I chose this customization in order to make the ICEWS country sanctions program variable comparable to that from TIES. However, in alternate models, I instead included a logged count of net cumulative ICEWS mentions of US sanctions imposition against the importing state. This alternate coding is quite similar to my coding for SDN entries, so there remains some overlap. I logged the raw indicator given the highly skewed nature of the variable. Table A.11 presents the results, which look quite similar to my main models. Though coefficients are quite small in magnitude, this represents their interpretation as elasticities, similar to the variable SDN entries.

11 Subset models by exporter MECR membership

Next, I present models where, instead of controlling for exporter membership in multilateral export control regimes (MECRs), I instead subset the data to 1) dyads where the exporter is a member of at least one MECR, and 2) dayds where the exporter is not a member of any MECR. Results are quite interesting. Table A.12 presents models examining change in dual use flows. The first two columns use TIES data, Columns three and four use CNAS. Columns five and six present models using ICEWS data. The odd-numbered columns present results for subsets of observations where the exporters are MECR members; and the even columns do the same for non-MECR members. Results are consistent across data source: when exporters are party to these agreements, results for US country sanctions programs are stronger, including a significant immediate reduction in dual-use exports. For non-members, results look more like the results from the main paper, with only a negative and significant long-run association. This finding could suggest that members are quicker to take action, or that stockpiling behavior is less likely among firms in these member states. Notably, results for SDN entities look largely identical across all six models, further demonstrating that firm behavior depends on observation of US sanctions against other sub-national entities.

	$\Delta Dual-use$ TIES (19	∆DU-NDU 995-2005)	$\Delta Dual-use$ CNAS (2	∆DU-NDU 001-2014)	ΔDual-use ICEWS (1	∆DU-NDU .995-2014)
Δ importer sanctions program	0.09	0.00	-0.25	0.06	-0.51**	-0.34*
	(0.19)	(0.17)	(0.14)	(0.13)	(0.18)	(0.16)
Lag importer sanctions program	-0.96***	-0.06	-0.64***	-0.21***	-0.62***	-0.46***
A immenter SDN entries	(0.08)	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)
Δ importer SDN entries	-0.09	-0.04	-0.12	-0.05	-0.08	-0.03
Lag importer SDN entries	-0.07***	-0.04***	-0.12^{***}	-0.03***	-0.12^{***}	-0.03***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Lagged DV	-0.73* ^{**} *	-0.85* ^{**} *	-0.73* ^{**} *	-0.86* ^{**} *	-0.73 ^{***}	-0.85* [*] **
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Δ importerproscribed behavior	-0.63**	-0.39	-0.55*	-0.41*	-0.74***	-0.34*
	(0.24)	(0.22)	(0.22)	(0.20)	(0.17)	(0.15)
Lag importer proscribed behavior	-0.20**	-0.17	-0.23***	-0.33***	-0.19***	-0.12 [*]
A exporter CDP	(0.06)	0.78***	(0.00)	(0.05)	(0.00)	(0.05)
	(0.16)	(0.15)	(0.13)	(0.11)	(0.11)	(0.10)
Lag exporter GDP	1.44***	0.39***	1.34***	0.28***	1.36***	0.31***
5	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Δ importer GDP	-0.61^{***}	-0.28^{*}	0.64***	0.41***	0.42***	0.12
	(0.15)	(0.14)	(0.12)	(0.11)	(0.10)	(0.09)
Lag importer GDP	-0.02	0.08***	-0.01	0.09***	0.01	0.08***
A experter US offinity	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	(0.18)	(0.16)	(0.12)	(0.10)	(0.12)	(0.09)
Lag exporter US affinity	0.39***	1.20***	0.66***	1.54***	0.58***	1.40***
Eug experter de uninty	(0.10)	(0.09)	(0.07)	(0.06)	(0.06)	(0.05)
Δ importer US affinity	0.80***	-0.84* ^{**} *	0.50***	-0.36* ^{**} *	0.47***	-0.58* [*] **
	(0.18)	(0.17)	(0.12)	(0.11)	(0.11)	(0.09)
Lag importer US affinity	1.44***	-0.80***	1.10***	-0.71^{***}	0.91***	-0.83***
A description of Contract	(0.09)	(0.08)	(0.06)	(0.06)	(0.06)	(0.05)
∆ dyadic affinity	-0.32	0.05	-0.07	-0.03	-0.27	-0.01
Lag dvadic affinity	(0.10) 	(0.17)	(0.14) 	(0.12)	(0.12) 	0.03
Lag dyadic animity	(0.09)	(0.08)	(0.06)	(0.05)	(0.06)	(0.05)
Δ both democracies	-0.11	-0.17	-0.06	-0.16	0.09	-0.09
	(0.14)	(0.13)	(0.12)	(0.11)	(0.10)	(0.09)
Lag both democracies	0.27***	-0.03	0.04	-0.12^{***}	0.14***	-0.09**
A 1 .1 .1	(0.05)	(0.05)	(0.04)	(0.03)	(0.03)	(0.03)
Δ both authoritarian	-2.11	-0.54	-0.38	0.13	-0.91	0.08
Lag both authoritarian	(0.02)	(0.57)	(0.02)	(0.55)	(0.40) 0.43***	(0.42)
	(0.19)	(0.17)	(0.15)	(0.13)	(0.13)	(0.12)
Log average distance	-1.66***	-0.62***	-1.64***	-0.48***	-1.63***	-0.52***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Δ exporter MECR	0.61***	0.67***	1.62***	1.39***	0.70***	0.67***
	(0.18)	(0.17)	(0.43)	(0.38)	(0.18)	(0.16)
Lag exporter MECR	1.00	0.92	1.48	1.10	1.32	1.08
Post-9/11	0.76***	0.05)	(0.05)	(0.04)	0.58***	0.53***
1050 5/11	(0.05)	(0.05)			(0.03)	(0.03)
Direct contiguity	0.08	0.08	0.07	0.01	0.10	0.05
0,	(0.12)	(0.11)	(0.10)	(0.09)	(0.08)	(0.07)
Exporter in EU	0.53***	0.75***	0.24***	0.20***	0.41***	0.41***
	(0.06)	(0.06)	(0.05)	(0.04)	(0.04)	(0.04)
Importer in EU	1.2(****	0.5/***	1.14 ****	0.45***	1.18***	0.48***
Europeanter in W/TO	(0.00)	(0.00)	(0.05)	(0.04)	(U.U4) 0.75***	(0.04)
Exporter in WTO	(0.05)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)
	-0.45***	0.27***	-1.09***	0.25***	-0.70***	0.30***
	(0.05)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)
Constant	-15.46 ^{***}	-11.78 ^{***}	-12.86 ^{***}	-9.65* ^{**} *	-14.83 ^{***}	-10.58 ^{***}
	(0.46)	(0.38)	(0.36)	(0.29)	(0.31)	(0.25)
Observations	144,776	144,776	234,629	234,629	312,368	312,368
Adjusted R ⁴	0.35	0.42	0.36	0.42	0.36	0.42
Residual Std. Error	6.67 0.642.42***	6.12 2 F 47 26***	6.63	5.86	6.66 5.745.02***	5.97
F Statistic	2,043.42	3,547.20	4,503.48	5,878.95	5,745.93	1,540.21

Table A.10: Replication models including additional control varia	ables
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	$\Delta Dual-use$	
Δ log count net ICEWS US-importer sanctions	-0.07***	-0.01
Lag log count net ICEWS US-importer sanctions	(0.01) -0.06^{***} (0.01)	(0.01) -0.01** (0.00)
Δ importerSDN entries	(0.01) -0.08^{***} (0.01)	(0.00) -0.03^{***} (0.01)
Lag importerSDN entries	-0.10^{***}	(0.01) -0.04*** (0.00)
Lagged DV	-0.73^{***}	-0.85*** (0.00)
Δ importer proscribed behavior	-0.75^{***}	-0.44^{**} (0.15)
Lag importer proscribed behavior	$(0.11)^{-0.11*}$	-0.36^{***} (0.05)
Δ exporter GDP	0.06	-0.17 (0.10)
Lag exporter GDP	1.38***	0.31*** (0.01)
Δ importer GDP	0.56***	0.02
Lag importer GDP	0.03***	0.11*** (0.01)
Δ exporter US affinity	0.14 (0.10)	0.67***
Lag exporter US affinity	0.58***	1.40*** (0.05)
Δ importer US affinity	0.67***	-0.45^{***} (0.09)
Lag importer US affinity	1.40***	-0.57^{***}
Δ dyadic affinity	-0.30^{*}	-0.05 (0.11)
Lag dyadic affinity	-0.45^{***}	-0.10 (0.05)
Δ both democracies	0.13	-0.05
Lag both democracies	0.27***	0.03
Δ both authoritarian	-0.99^{*}	-0.07 (0.42)
Lag both authoritarian	0.31*	-0.08
Log average distance	(0.13) -1.71^{***} (0.02)	-0.56^{***}
Δ exporter MECR	0.53**	0.58***
Lag exporter MECR	(0.10) 1.50*** (0.04)	1.23***
Post-9/11	0.73***	(0.04) 0.66*** (0.03)
Constant	-14.91^{***}	(0.03) -10.43*** (0.26)
Observations	(0.32) 312,368	312.368
Adjusted R ²	0.35	0.42
Residual Std. Error	6.68 6 780 92***	5.97 0.014 29***

Table A.11: Replication models including alternate coding of ICEWS sanctions mentions

	A Dual uso						
	MECR-T	non-MECR-T	MECR-C	non-MECR-C	MECR-I	non-MECR-I	
<u>A</u> i	0.60*	0.20	0.27*	0.00	0.06***	0.11	
Δ importer sanctions program	-0.02°	0.29	-0.37	0.22	-0.90	-0.11 (0.25)	
Lag importor constions program	(0.20)	(0.20) 1 15***	(0.10)	(0.20)	(0.25)	(0.25)	
Lag importer sanctions program	-0.64	-1.15	-0.77	-0.27	-0.91	-0.47	
Λ importer SDN entries	(0.10)	_0.08***	_0.09)	_0 1/***	-0.05***	_0 10***	
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	
Lag importer SDN entries	0.02)	_0.12***	-0.04***	_0.13***	_0.01)	-0 1/***	
Lag importer 5DN entries	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	
Lagged DV	-0.70***	_0 73***	-0.73***	_0.73***	-0.72***	_0.73***	
	(0.01)	(0.00)	(0,00)	(0, 00)	(0.00)	(0,00)	
Λ importer proscribed behavior	-0.59	-0.72*	0.19	-0.88**	-0.32	-1 02***	
	(0.31)	(0.34)	(0.29)	(0.31)	(0.22)	(0.24)	
Lag importer proscribed behavior	-0.23*	-0.14	0 42***	-0 37***	0 33***	-0 34***	
Eug importer proseribed benavior	(0.11)	(0.11)	(0.08)	(0.08)	(0.08)	(0.07)	
Λ exporter GDP	1 15***	0.04	0.68***	-0.32	0.80***	-0.09	
	(0.23)	(0.21)	(0.18)	(0.18)	(0.15)	(0.15)	
Lag exporter GDP	1 45***	1 48***	1 46***	1 32***	1 45***	1 35***	
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	
Λ importer GDP	-0.78***	-0.44*	0.73***	0.78***	0.34*	0 49***	
	(0.20)	(0.21)	(0.17)	(0.17)	(0.14)	(0.14)	
Lag importer GDP	-0.08***	0.04*	-0.04**	-0.02	-0.02	0.01	
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	
Λ exporter US affinity	-0.31	-0.71***	0.80***	0.21	0.51**	-0.01	
	(0.34)	(0.21)	(0.17)	(0.16)	(0.16)	(0.14)	
Lag exporter US affinity	0 70***	0 46***	1.32***	0 42***	1 18***	0.36***	
8	(0.15)	(0.12)	(0.09)	(0.09)	(0.09)	(0.08)	
Λ importer US affinity	1.36***	0.52*	0.62***	0.64***	0.76***	0.52***	
	(0.25)	(0.26)	(0.17)	(0.17)	(0.15)	(0.15)	
Lag importer US affinity	1.94***	1.72***	1.29***	1.39***	1.17***	1.24***	
	(0.12)	(0.14)	(0.08)	(0.10)	(0.07)	(0.09)	
Δ dvadic affinity	-0.57*	-0.09	0.09	-0.13	-0.14	-0.37*	
	(0.25)	(0.26)	(0.18)	(0.20)	(0.16)	(0.17)	
Lag dyadic affinity	-0.29	-0.37*	0.11	-0.58***	-0.02	-0.62***	
3,	(0.16)	(0.15)	(0.10)	(0.10)	(0.10)	(0.09)	
Δ both democracies	-0.42*	0.22	0.07	0.01	0.09	0.25	
	(0.17)	(0.21)	(0.15)	(0.17)	(0.12)	(0.14)	
Lag both democracies	0.12	0.74***	-0.14 ^{**}	0.54***	0.04	0.61***	
	(0.06)	(0.08)	(0.05)	(0.06)	(0.04)	(0.05)	
Δ both authoritarian	-4.09	-2.08**	-0.33	-0.41	-0.11	-0.99	
	(4.01)	(0.69)	(1.60)	(0.71)	(1.64)	(0.52)	
Lag both authoritarian	1.49*	0.30	1.97***	0.34	1.99***	0.29	
	(0.68)	(0.21)	(0.30)	(0.18)	(0.30)	(0.15)	
Log average distance	-1.78^{***}	-1.65^{***}	-1.89^{***}	-1.60^{***}	-1.87^{***}	-1.59***	
	(0.04)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	
Post-9/11	0.51***	0.99***			0.56***	0.70***	
	(0.08)	(0.08)			(0.04)	(0.05)	
Constant	-11.01^{***}	-17.85***	-11.38^{***}	-12.44^{***}	-12.49***	-14.66***	
	(0.69)	(0.61)	(0.53)	(0.47)	(0.46)	(0.41)	
Observations	54,016	90,760	83,298	151,331	112,846	199,522	
Adjusted R^2	0.34	0.36	0.33	0.36	0.33	0.36	
Residual Std. Error	5.58	7.25	5.27	7.29	5.40	7.30	
F Statistic	1,187.37***	2,203.54***	1,905.90***	3,922.83***	2,447.81***	4,859.59***	

Table A.12: Replication of dual-use trade flow models subset for exporters that belong to MECRs vs. exporters who do not

12 Summary statistics

Statistic	N	Mean	St. Dev.	Min	Max
Δ log dual-use exports	372,134	0.091	8.490	-26.099	29.098
Lag log dual-use exports	372,134	7.479	8.748	-4.605	24.690
Δ DUE - NDUE	372,134	-0.002	7.943	-44.501	43.718
Lag DUE - NDUE	372,134	-5.126	6.334	-26.729	23.980
Δ TIES sanction	170,023	0.005	0.095	-1.000	1.000
Lag TIES sanction	190,898	0.077	0.266	0.000	1.000
Δ CNAS sanction	280,875	0.005	0.097	-1.000	1.000
Lag CNAS sanction	280,875	0.059	0.235	0.000	1.000
Δ ICEWS sanction	372,134	0.004	0.065	0	1
Lag ICEWS sanction	372,134	0.038	0.192	0	1
Δ importer SDN entries	372,134	0.175	1.117	_9	10
Lag importer SDN entries	372,134	-2.376	3.403	-4.605	6.621
Δ importer proscribed behavior	333,895	-0.001	0.069	-1.000	1.000
Lag importer proscribed behavior	333,895	0.087	0.282	0.000	1.000
Δ exporter GDP	354,920	0.052	0.118	-1.068	0.833
Lag exporter GDP	355,456	24.507	2.193	16.493	29.681
Δ importer GDP	352,437	0.054	0.121	-1.068	0.833
Lag importer GDP	353,090	24.098	2.216	16.493	29.681
Δ exporter US affinity	372,016	0.00000	0.149	-2.000	2.000
Lag exporter US affinity	372,134	-0.291	0.320	-1.000	1.000
Δ importer US affinity	371,997	-0.001	0.156	-2.000	2.000
Lag importer US affinity	372,134	-0.306	0.319	-1.000	1.000
Δ dyadic affinity	371,762	-0.003	0.117	-2.000	2.000
Lag dyadic affinity	372,067	0.644	0.281	-1.000	1.000
Δ both democracies	372,134	0.004	0.117	-1	1
Lag both democracies	372,134	0.209	0.407	0	1
Δ both authoritarian	372,134	-0.0002	0.027	-1	1
Lag both authoritarian	372,134	0.009	0.095	0	1
Log average distance	360,694	8.614	0.807	4.546	9.886
Δ exporter MECR	365,977	0.004	0.066	0.000	1.000
Lag exporter MECR	365,977	0.374	0.484	0.000	1.000
Post-9/11	372,134	0.706	0.456	0	1

Table A.13: Summary Statistics

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