

# Web Appendix for:

## The Trade Consequences of Maritime Insecurity: Evidence from Somali Piracy

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This document contains additional data exercises that complement the empirical analysis in the study “*The Trade Consequences of Maritime Insecurity: Evidence from Somali Piracy*”, and are not intended for publication. All the references to the estimated regression model, or to particular specifications that are not reported this appendix, correspond to equations and results included in the manuscript submitted for publication.

### A Piracy and the Extensive Margin of Trade

When analyzing the effect of trade costs on the volume of bilateral trade, it has become customary in the trade literature to decompose the aggregate effect into an extensive margin effect (i.e., creation or destruction of bilateral trade pairs), and an intensive margin effect (i.e., changes in the volume of trade within an established trade pair). In this section, we investigate the possibility that piracy affected the extensive margin of trade.

We start first by comparing the patterns of zero trade flows over time between country pairs whose shortest shipping distance goes through the Gulf of Aden, and country pairs connected by other routes. Figure B1 plots the fraction of country pairs with zero bilateral trade in a given year, out of all the possible trade pairs.<sup>1</sup>

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<sup>1</sup>For a country pair to appear as having zero trade in a given year, we require both countries to have reported at least *some* trade in that particular year.

[Figure B1 Here]

Figure B1 shows a slight decline in the number of zero trade flows over time, suggestive of a secular decrease in trade barriers. Zero trade is as frequent in the routes crossing the Gulf of Aden as in other routes, and the two plotted trend lines comove quite closely. If anything, the slight increase in the gap between the two trend lines starting in 2004 suggests that countries trading through the Gulf of Aden are more likely to establish new trade partners over time than countries connected through other trade route.

We next investigate the effect of Somali piracy on the probability of positive trade flows between any two countries in our dataset by estimating a linear probability model. The dependent variable is an indicator for positive trade between a country pair in a given year, and the regression specification is the same as estimated in the paper. Table B1 reports the estimation results for total trade (Panel A) and for bulk trade (Panel B).

[Table B1 Here]

The preferred specification includes importer-year and exporter-year fixed effects to account for multilateral resistance terms. Overall, the coefficient on the Somali piracy variable – whether measured by the number of attacks or by the piracy reach – is not statistically significant and very close to zero in magnitude. This confirms the data patterns revealed by the plot in Figure B1, and provides further evidence that Somali piracy threats only affect the intensive margin of trade.

## **B Errors in Variables: Instrumental Variables Estimates**

One concern about the estimated effect of maritime piracy on international trade is the possibility of attenuation bias triggered by classical errors-in-variables. Our proposed measures of Somali piracy – i.e., the number of attacks and the pirates’ reach – are not comprehensive measures of the piracy-driven cost of maritime insecurity. Rather, they are proxies for the latent cost of piracy. Under the assumption that the measurement error terms embedded in each piracy variable are not correlated between them, then instrumental variables method can correct for potential attenuation bias (Wooldridge, 2002).

In Table B2, we report the second stage results from a regression estimation where one measure of piracy is instrumented with the other available measure. We report the same set of regression specifications as in the paper, and take the specification containing the exporter-year and the importer-year fixed effects as the preferred specification. We do the estimations for total trade as well as for bulk trade.

[Table B2 Here]

Panel A includes the results using Somali attacks as measure of maritime piracy, which is instrumented by piracy reach. Panel B includes the estimates using reach as the measure of piracy, which is then instrumented by the number of attacks. While we do not report the first stage coefficients in the interest of space, the two piracy measures are highly correlated (F-test of excluded instruments

exceeds 100 in all the estimations). In most cases, we see that the IV estimates are somewhat larger than the OLS estimates reported in the paper in Tables 5, 6 and 7 respectively, which consistent with measurement error in our pirate variables.

## **C Robustness Check: Pre-Financial Crisis Sample (2000 - 2008)**

The overlap between the peak period of Somali piracy attacks and the Great Trade Collapse raises a concern about the ability to correctly identify the effect of maritime piracy on international trade. To the extent that we attribute the fall in trade triggered by the financial crisis to the threatening effect of maritime piracy, this biases upwards the coefficient of interest.

The data analysis presented in the paper pays close attention to this issue and addresses it in two ways: first, by allowing for a structural break in bilateral trade flows at the time of the financial crisis, and then, more rigorously, by including importer-year and exporter-year fixed effects. So, while the first approach assumes that the financial crisis affected worldwide trade uniformly across regions, the latter approach actually allows for differences across countries in the intensity of the financial crisis shock.

Nevertheless, to remove any concerns that the estimated trade effect of Somali piracy is biased due to the Great Trade Collapse, we re-estimate our gravity equation using only data from the pre-crisis period, i.e., 2000 - 2007, and report the results in Table B3. We also report estimates using the 2000 - 2008 period as the pre-crisis sample. The financial crisis started in September of 2008, so 2008 arguably precedes the Great Trade Collapse.

[Figure B2 Here]

This is quite evident in figure B2, which illustrates the growth in global trade over time. Trade volumes in 2008 were at an all-time high, and the Great Trade Collapse does not become visible in the data until 2009.

[Table B3 Here]

The regression estimates reported in Table B3 always have the expected sign, and their magnitude is in the ballpark of corresponding estimates reported in the paper. The precision of the estimates is weak in the 2000 - 2007 sample. The inclusion of data for year 2008 in the sample makes the coefficients slightly larger in absolute value; but the benefit of including an additional time period can be noticed in the confidence intervals, which are narrower now; this makes the coefficients of interest achieve statistical significance.

## **D Accounting for Zero Trade Flows: Poisson Pseudo-Maximum Likelihood (PPML)**

Since the influential work of Santos Silva and Tenreyro (2006), it has become customary to estimate the gravity model of trade using the Poisson Pseudo-Maximum Likelihood (PPML) method. It is

argued that this method: (1) corrects for heteroskedasticity when the error term is additive (case in which the OLS method yields biased estimates), and (2) takes into account the information available in the country pairs with zero bilateral trade flows (information that otherwise gets missed when taking logs of the value of trade).

***PPML Estimates.***

For robustness purposes, we re-estimate the main regression specifications using the PPML method, and report those estimates in Table B4. For each regression specification, we report two estimates: a “main data sample” estimate that employs the full dataset, and a “reduced data sample” estimate based on a trimmed sample which excludes approximately 20% of the data. The reason we used a trimmed sample is because the PPML procedure does not allow us to estimate cluster-robust standard errors in all specifications, while the trimmed sample does. We think that the reason for this computational failure is the inability of the PPML procedure to invert the variance-covariance matrix with the very large number of fixed effects in our regular sample.<sup>2</sup> We carefully motivate the construction of the reduced sample at the end of this section, and show that it provides OLS estimates that match very closely to those reported in the paper.

[Table B4 Here]

Table B4 reports the full (columns 1-3) and restricted (columns 4-6) sample PPML results for all trade (panel A) and bulk trade (panel B). For simplicity, we only report the coefficient on the interaction term between Aden and the measure of piracy. Poisson estimates can be interpreted in the same way as log-normal regressions, so the coefficient estimates are directly comparable to those from Tables 5–7 reported in the paper.

To begin, note that the estimates from the reduced sample are very similar to those from the full sample in all specifications. In addition, for those cases where we have standard errors for both full and reduced sample, the standard errors from the reduced sample are larger. With this, we will proceed with the analysis by making inferences about the full sample estimates with missing standard errors by looking at the (conservative) standard errors from the reduced sample.

Consider first the all trade results, where two out of the six full sample PPML specifications have missing standard errors. The coefficient on Aden  $\times$  Piracy Attacks in our preferred specification, column 3, is -0.009, and the coefficient on Aden  $\times$  Piracy Reach is -0.051. Neither is statistically significant. Compare these values with the OLS estimates from the fifth column of Table 5, respectively the second column of Table 6 in the paper, which are -0.040 and -0.082, respectively. The result using piracy attacks looks significantly diminished in the PPML estimates. The result using reach is also

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<sup>2</sup>The reason that our model includes many indicator variables is that we have a large number of country pairs in our dataset, observed annually over 11 years. These indicator variables have a very high proportion of zeros relative to positive values (e.g., country-year dummies, country-specific financial crisis deviations from trend). This excess of zeros creates estimation problems with convergence and the computation of clustered standard errors. In particular, the “*xtpqml*” command for panel datasets in Stata fails to converge, while the “*ppml*” command converges but without generating standard errors. This is because the *ppml* estimation procedure is designed to “identify and drop regressors that may cause the nonexistence of the (pseudo-) maximum likelihood estimates” (Santos Silva and Tenreyro, 2010). Due to computing power limitations, bootstrapping the standard errors was also unfeasible.

smaller, but only by a factor of one third. Note that in all cases the PPML estimates fall within the confidence interval of the OLS estimates.

Consider next the bulk trade results. Again, four of the six full sample PPML specifications have no standard errors, so our inference is based on the standard errors from the reduced sample. Here, the estimates of Aden  $\times$  Attacks and Aden  $\times$  Reach from the preferred specifications (column 3) are -0.169 and -0.327, which are double the respective estimates of -0.085 and -0.154 from the OLS estimations reported in Table 7 in the paper. Both coefficients are statistically different from zero, and in both cases the OLS estimates fall within the confidence interval of the PPML estimates.

In summary, PPML confirms a significant effect of piracy on international bulk trade that is consistent with the OLS results in the main paper. On the other hand, PPML results on all trade are significantly weaker than the OLS estimates, suggesting that we need to consider those results with caution.

### *Derivation of the reduced data sample.*

We now explain the derivation of our restricted sample. In practice, we trimmed the data using two criteria: excluding countries that rarely trade through Aden, and excluding countries that appear infrequently in the dataset.

First, we calculate what share of a country's total imports in a year travels through Somali pirate waters, and drop all importer observations from years in which their piracy-affected trade share was 0.5 percent or less (this corresponds roughly to the bottom 10 percent of the distribution). While trade flows not exposed to piracy threats are important for the regression estimation because they make up the control group, as long as the reduction in observations does not alter in a major way the size of the control group, and leaves its composition unaffected, then the estimation should not be impacted by this data cut. To illustrate this point, in our sample Costa Rica imports only 0.4 percent of goods from partners whose shortest route passes through the Gulf of Aden. On the other hand Denmark – a country comparable in size to Costa Rica – imports 14.4 percent of goods via the Gulf of Aden routes, on average. Based on our threshold for sample reduction, we would be dropping all of Costa Rica's import flows but not Denmark's. Yet, since Denmark's trade with countries in Europe, North and South America are not impacted by Somali piracy, we still retain in the control group a significant number of trade pairs.

Our second trimming criteria is to eliminate countries that appear infrequently in the dataset. For each country (whether importer or exporter), we calculate the total number of trading partners per year and the total number of years it reports any positive trade. We then drop the trade flows involving importers or exporters who fall in the bottom 5 percent of either distribution. In doing so, we try to identify the small, remote countries that engage very little in international trade, and also the countries that might appear infrequently or might have reported to the U.N. COMTRADE dataset much later during our sample period. These would again be instances where the country-year dummy variables would contain an overabundance of zero values relative to ones.

After carrying through the described data cuts for the total trade and bulk trade datasets, the resulting samples are reduced by approximately 20 percent. To show that the trimming is not affecting our results, we report side-by-side the OLS estimates from the full and reduced samples. Table B5

provides the results, with Panel A reporting the OLS estimates from the total trade sample, and Panel B reporting the OLS estimates from the bulk sample. In the interest of space, we estimate the three most preferred regression specifications (as discussed in the main paper) and only report the coefficient of interest on the interaction term between the Gulf of Aden and the measure of Somali piracy. However all the reported specifications are based on the full set of control variables, whose estimates are available upon request.

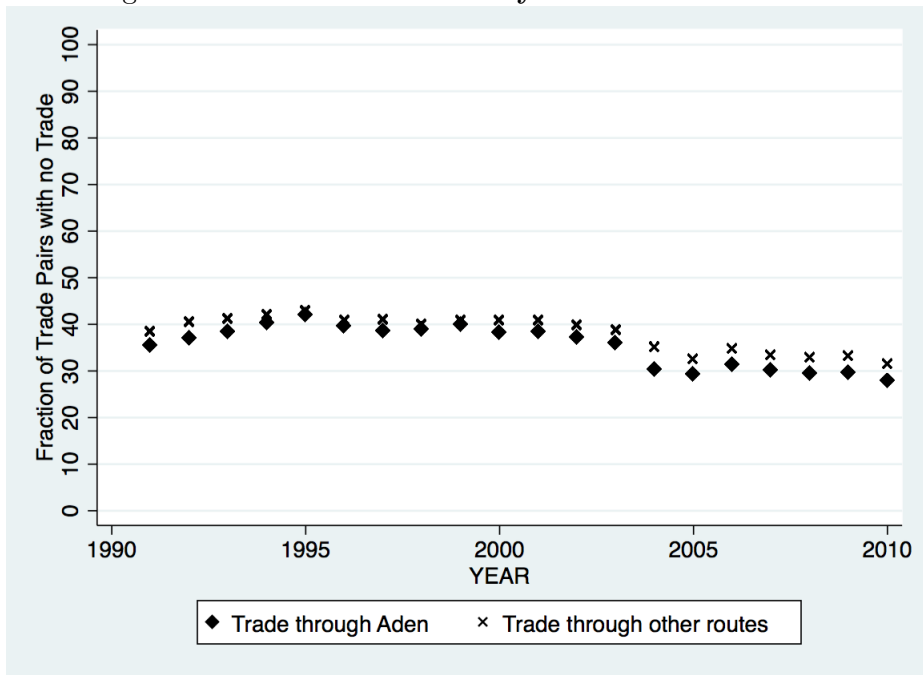
[Table B5 Here]

The coefficients from columns 1-3 in panels A and B are based on the full estimation sample and correspond to the OLS estimates reported in the main paper. The coefficients reported in columns 4-6 are based on the reduced sample. In spite of the difference in the number of regression observations, the important thing to notice is that the estimated coefficients from the full and reduced data samples are very close in magnitude. In fact, in all instances, the value of the coefficient from the reduced sample falls within a standard deviation of the main regression coefficients reported in the paper.

## References

- [1] Santos Silva, J. M. C., and S. Tenreyro, 2006. The Log of Gravity. *The Review of Economics and Statistics*, 88(4), 641-658.
- [2] Santos Silva, J. M. C., and S. Tenreyro. 2010. On the Existence of the Maximum Likelihood Estimates in Poisson Regression. *Economics Letters*, 107, 310-312.

Figure B1: Fraction of Country Pairs with No Trade



Note: Countries that do not report trade with any partner in a given year are not included.

Figure B2: Global trade flows before and after the 2008 Great Recession

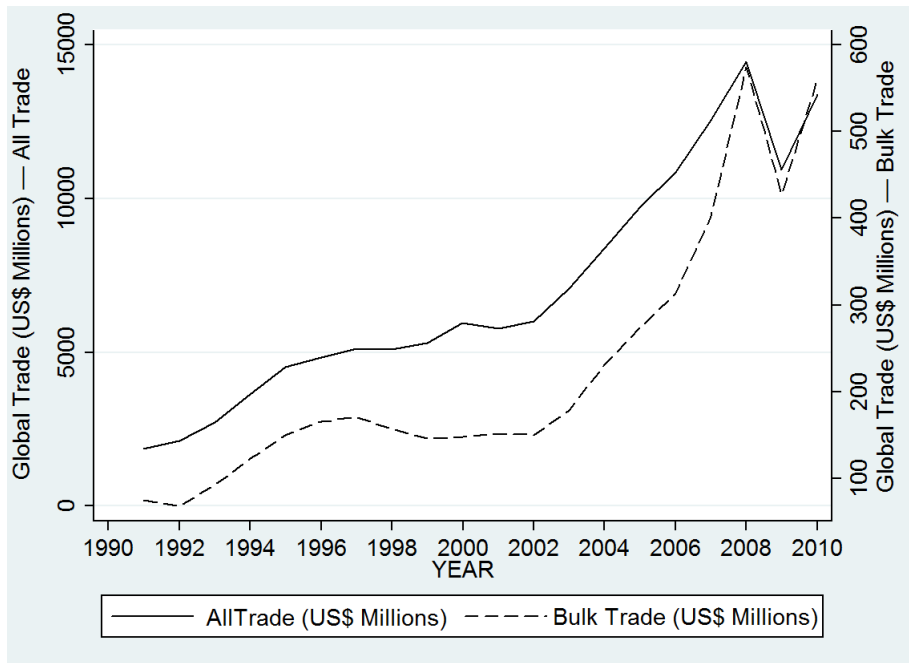


Table B1: **Linear Probability Model: Effect of Piracy on the Extensive Margin of Trade**

*Panel A: All Trade*

Piracy measure:	Dependent Variable: Indicator (1/0) if Imports > 0					
	(1)	(2)	(3)	(4)	(5)	(6)
	Attacks	Attacks	Attacks	Reach	Reach	Reach
Aden Dummy	0.012 (0.012)	0.007 (0.013)	0.006 (0.013)	0.026 (0.031)	0.027 (0.031)	0.018 (0.033)
Aden × Piracy Measure	-0.003 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.005)
Ind. Ocean Dummy	0.057* (0.030)	0.048 (0.031)	0.048 (0.032)	0.092 (0.076)	0.094 (0.076)	0.085 (0.080)
Ind. Ocean × Piracy Measure	-0.013* (0.007)	-0.011 (0.007)	-0.011 (0.008)	-0.014 (0.011)	-0.015 (0.011)	-0.012 (0.012)
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	207,105	207,105	207,105	207,105	207,105	207,105
R-squared	0.296	0.297		0.300	0.301	

*Panel B: Bulk Trade*

Piracy measure:	Dependent Variable: Indicator (1/0) if Imports > 0					
	(1)	(2)	(3)	(4)	(5)	(6)
	Attacks	Attacks	Attacks	Reach	Reach	Reach
Aden Dummy	-0.010 (0.012)	-0.010 (0.013)	-0.005 (0.014)	-0.044 (0.033)	-0.045 (0.034)	-0.037 (0.035)
Aden × Piracy Measure	0.005* (0.003)	0.005 (0.003)	0.004 (0.003)	0.008 (0.005)	0.008* (0.005)	0.007 (0.005)
Ind. Ocean Dummy	0.004 (0.028)	0.006 (0.029)	0.015 (0.031)	-0.121 (0.075)	-0.122 (0.075)	-0.109 (0.077)
Ind. Ocean × Piracy Measure	0.012* (0.007)	0.011 (0.007)	0.009 (0.008)	0.026** (0.011)	0.026** (0.011)	0.024** (0.012)
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	203,288	203,288	203,288	203,288	203,288	203,288
R-squared	0.410	0.410		0.410	0.410	

\*\*\* p≤0.01, \*\* p≤0.05, \* p≤0.1. Standard errors clustered by importer-year in brackets.

*Note:* OLS estimates reported. See Table 5 in the paper for the list of included but unreported covariates.



Table B2: **Errors-in-Variables: Instrumental Variables Approach for Somali Piracy**

*Panel A: Instrument for Somali Attacks using Reach*

Piracy measure:	Dependent Variable: Log Imports					
	All Trade (1)	All Trade (2)	All Trade (3)	Bulk (4)	Bulk (5)	Bulk (6)
Aden Dummy	0.317*** (0.112)	0.317*** (0.112)	0.291*** (0.112)	0.447*** (0.152)	0.438*** (0.190)	0.407*** (0.149)
Aden × Somali Attacks (instrumented)	-0.070** (0.028)	-0.070** (0.028)	-0.063** (0.028)	-0.126*** (0.037)	-0.124*** (0.046)	-0.116*** (0.037)
Ind. Ocean Dummy	0.194 (0.171)	0.180 (0.171)	0.264 (0.178)	-0.246 (0.238)	-0.089 (0.438)	-0.188 (0.240)
Ind. Ocean × Somali Attacks (instrumented)	-0.26 (0.042)	-0.022 (0.042)	-0.043 (0.044)	-0.014 (0.061)	-0.054 (0.110)	-0.030 (0.062)
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	154,781	154,781	154,781	82,360	82,360	82,360
R-squared	0.703	0.703	0.705	0.435	0.435	0.444

*Panel B: Instrument for Piracy Reach using Attacks*

Piracy measure:	Dependent Variable: Log Imports					
	All Trade (1)	All Trade (2)	All Trade (3)	Bulk (4)	Bulk (5)	Bulk (6)
Aden Dummy	0.574* (0.301)	0.559* (0.294)	0.541* (0.292)	1.287*** (0.431)	1.156*** (0.417)	1.031*** (0.413)
Aden × Somali Reach (instrumented)	-0.081* (0.045)	-0.079* (0.044)	-0.076* (0.044)	-0.203*** (0.065)	-0.183*** (0.063)	-0.164*** (0.062)
Ind. Ocean Dummy	0.367 (0.477)	0.638 (0.434)	0.712 (0.439)	-0.666 (0.842)	-0.034 (0.708)	0.009 (0.695)
Ind. Ocean × Somali Reach (instrumented)	-0.042 (0.072)	-0.083 (0.065)	-0.094 (0.066)	0.055 (0.128)	-0.041 (0.108)	-0.048 (0.107)
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	154,781	154,781	154,781	82,360	82,360	82,360
R-squared	0.703	0.703	0.705	0.435	0.421	0.444

\*\*\* p≤0.01, \*\* p≤0.05, \* p≤0.1. Standard errors clustered by importer-year in brackets.

*Note:* In panel A, Aden × Somali Attacks is instrumented with Aden × Reach; Indian Ocean × Somali Attacks is instrumented with Indian Ocean × Reach. The same reasoning is applied to the instruments in Panel B. See Table 5 in the paper for the list of included but unreported covariates.

Table B3: Pre-Crisis Sample: Effect of Somali Piracy on Bilateral Trade

*Panel A: All Trade*

Piracy measure:	Dependent Variable: Log Imports							
	Attacks [2000 - 2007]		Attacks [2000 - 2008]		Reach [2000 - 2007]		Reach [2000 - 2008]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aden Dummy	0.160 (0.180)	0.094 (0.194)	0.270** (0.132)	0.212 (0.137)	0.577* (0.336)	0.494 (0.344)	0.672** (0.289)	0.602** (0.294)
Aden × Somali Attacks	-0.032 (0.051)	-0.013 (0.055)	-0.062* (0.035)	-0.046 (0.037)	-0.083 (0.053)	-0.070 (0.054)	-0.097** (0.045)	-0.087* (0.045)
Ind. Ocean Dummy	0.116 (0.194)	0.304 (0.317)	0.002 (0.149)	0.238 (0.213)	-0.082 (0.489)	0.145 (0.556)	0.003 (0.426)	0.202 (0.467)
Ind. Ocean × Somali Attacks	-0.001 (0.055)	-0.054 (0.091)	0.030 (0.039)	-0.034 (0.057)	0.030 (0.077)	-0.005 (0.087)	0.016 (0.066)	-0.014 (0.072)
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	108,614	108,614	124,413	124,413	108,614	108,614	124,413	124,413
R-squared	0.706	n.a.	0.705	n.a.	0.706	n.a.	0.705	n.a.

*Panel B: Bulk Trade*

Piracy measure:	Dependent Variable: Log Imports							
	Attacks [2000 - 2007]		Attacks [2000 - 2008]		Reach [2000 - 2007]		Reach [2000 - 2008]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aden Dummy	0.285 (0.229)	0.232 (0.248)	0.345** (0.174)	0.279 (0.191)	0.977** (0.445)	0.811* (0.450)	1.003** (0.395)	0.885** (0.400)
Aden × Somali Attacks	-0.090 (0.065)	-0.075 (0.070)	-0.104** (0.047)	-0.086* (0.052)	-0.157** (0.070)	-0.132* (0.071)	-0.160*** (0.061)	-0.142** (0.062)
Ind. Ocean Dummy	-0.362 (0.305)	-0.005 (0.393)	-0.422* (0.244)	-0.107 (0.305)	-0.264 (0.667)	0.002 (0.706)	-0.213 (0.604)	0.002 (0.629)
Ind. Ocean × Somali Attacks	0.014 (0.087)	-0.089 (0.113)	0.032 (0.067)	-0.056 (0.084)	-0.008 (0.106)	-0.050 (0.112)	-0.015 (0.095)	-0.049 (0.099)
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	57,524	57,524	65,916	65,916	57,524	57,524	65,916	65,916
R-squared	0.447	n.a.	n.a. 0.443	n.a.	0.447	n.a.	0.443	n.a.

\*\*\* p≤0.01, \*\* p≤0.05, \* p≤0.1. Standard errors clustered by importer-year in brackets.

Note: See Table 5 in the paper for the list of included but unreported covariates.

Table B4: PPML Estimates of the Effect of Piracy on Trade

*Panel A: All Trade*

	Dependent Variable: Imports (> 0)					
	Main Data Sample			Reduced Data Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Reg. #1:</b> Aden × Piracy Attacks	-0.072 [0.069]	-0.029 [N/A]	-0.009 [N/A]	0.002 [0.084]	-0.021 [0.082]	-0.008 [0.084]
<b>Reg. #2:</b> Aden × Piracy Reach	-0.164 [0.107]	-0.115 [0.110]	-0.051 [0.119]	-0.061 [0.135]	-0.114 [0.124]	-0.061 [0.133]
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	154,781	154,781	154,781	119,943	119,943	119,943

*Panel B: Bulk Trade*

	Dependent Variable: Imports (> 0)					
	Main Data Sample			Reduced Data Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Reg. #3:</b> Aden × Piracy Attacks	-0.0945 [0.084]	-0.195 [N/A]	-0.169 [N/A]	-0.156 [0.096]	-0.186* [0.095]	-0.169* [0.097]
<b>Reg. #4:</b> Aden × Piracy Reach	-0.194 [0.128]	-0.328 [N/A]	-0.327 [N/A]	-0.336** [0.137]	-0.386*** [0.133]	-0.338** [0.145]
<i>Fixed Effects Specification:</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>	<i>Imp-Year</i> <i>Exp×Trend</i>	<i>Imp-Year</i> <i>Exp×Trend</i> <i>Exp×Crisis</i>	<i>Imp-Year</i> <i>Exp-Year</i>
Observations	82,362	82,362	82,362	65,101	65,101	65,101

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Standard errors clustered by importer-year in brackets.

*Note:* The table is organized as a matrix and the reported coefficients correspond to different specifications both across rows and columns. Each row reports the coefficients on Aden × Piracy measure from a separate regression model estimated with PPML. Panel A coefficients are obtained from bilateral data on total trade flows, with regression #1 using the number of attacks as measure of piracy, and regression #2 using piracy reach. Panel B coefficients are obtained based on bilateral data on bulk trade, with each regression reported by row corresponding again to one of the two Somali piracy measures – attacks or reach. Looking at the table coefficients by columns, the key difference across the reported specifications comes from the structure of fixed effects (reported at the bottom of each column), and from the data sample used in the estimation (distinguishing between the full sample and reduced sample, as discussed in the text of this Appendix). All the reported specifications include a full set of control variables not reported in the table but available upon request.

Table B5: Comparison Between Full and Reduced Samples: OLS Effect of Piracy on Trade

*Panel A: All Trade*

	Dependent Variable: Log Imports					
	Main Data Sample			Reduced Data Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Reg. #1:</b> Aden × Piracy Attacks	-0.042* [0.023]	-0.041* [0.023]	-0.040* [0.024]	-0.043* [0.025]	-0.041 [0.026]	-0.040 [0.026]
<b>Reg. #2:</b> Aden × Piracy Reach	-0.091** [0.036]	-0.091** [0.036]	-0.082** [0.036]	-0.093** [0.039]	-0.093** [0.039]	-0.086** [0.040]
<i>Fixed Effects Specification:</i>	<i>Imp-Year Exp×Trend</i>	<i>Imp-Year Exp×Trend Exp×Crisis</i>	<i>Imp-Year Exp-Year</i>	<i>Imp-Year Exp×Trend</i>	<i>Imp-Year Exp×Trend Exp×Crisis</i>	<i>Imp-Year Exp-Year</i>
Observations	154,781	154,781	154,781	119,943	119,943	119,943
R-squared	0.703	0.703		0.708	0.708	

*Panel B: Bulk Trade*

	Dependent Variable: Log Imports					
	Main Data Sample			Reduced Data Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Reg. #3:</b> Aden × Piracy Attacks	-0.100*** [0.031]	-0.092*** [0.032]	-0.085*** [0.033]	-0.118*** [0.033]	-0.111*** [0.034]	-0.110*** [0.035]
<b>Reg. #4:</b> Aden × Piracy Reach	-0.168*** [0.050]	-0.170*** [0.049]	-0.154*** [0.050]	-0.209*** [0.053]	-0.209*** [0.053]	-0.197*** [0.053]
<i>Fixed Effects Specification:</i>	<i>Imp-Year Exp×Trend</i>	<i>Imp-Year Exp×Trend Exp×Crisis</i>	<i>Imp-Year Exp-Year</i>	<i>Imp-Year Exp×Trend</i>	<i>Imp-Year Exp×Trend Exp×Crisis</i>	<i>Imp-Year Exp-Year</i>
Observations	82,362	82,362	82,362	65,101	65,101	65,101
R-squared	0.435	0.437		0.449	0.450	

\*\*\* p≤0.01, \*\* p≤0.05, \* p≤0.1. Standard errors clustered by importer-year in brackets.

*Note:* The table is organized as a matrix and the reported coefficients correspond to different specifications both across rows and columns. Each row reports the coefficients on Aden × Piracy measure from a separate regression model estimated through OLS. Panel A coefficients are obtained from bilateral data on total trade flows, with regression #1 using the number of attacks as measure of piracy, and regression #2 using piracy reach. Panel B coefficients are obtained based on bilateral data on bulk trade, with each regression reported by row corresponding again to one of the two Somali piracy measures – attacks or reach. Looking at the table coefficients by columns, the key difference across the reported specifications comes from the structure of fixed effects (reported at the bottom of each column), and from the data sample used in the estimation (distinguishing between the full sample and reduced sample, as discussed in the text of this Appendix). All the reported specifications include a full set of control variables not reported in the table but available upon request.