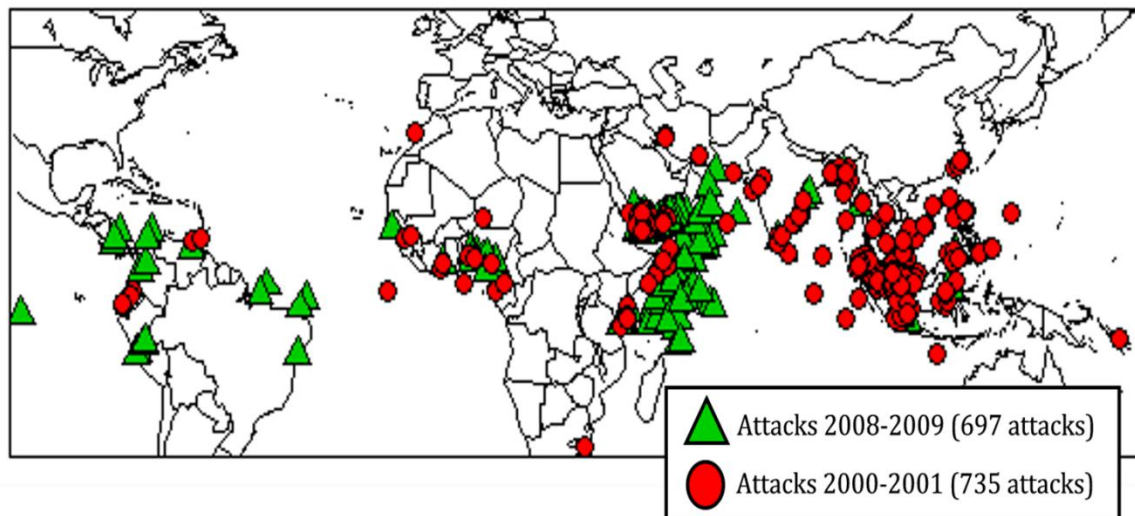


Supplementary Online Appendix  
“The Political Economy of Plunder: Economic Opportunity and Modern Piracy”  
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*Supplementary Figures*

Supplementary Figure 1: The Geography of Piracy



Each dot indicates the location of a pirate attack. These coordinates are based upon location information provided to the International Maritime Organization (IMO) at the time of the attack.

## Supplementary Tables

Supplementary Table 1: Effect of Unskilled Labor Prices on Somali Attacks <sup>a</sup>

Unskilled Labor Price * 2008	-2.5 (0.85)***
Year 2008	-7.2 (1.9)***
Unskilled Labor Price	0.09 (0.23)
Conflict Events	-0.37(0.23)
Naval Vessels	0.83 (0.44)*
State Fragility	2.8 (1.7)
Vessel Traffic (Suez)	-0.24 (0.59)
Cyclone Season	1.6 (0.81)*
Observations	93
Log Likelihood	-164.9

Standard errors in parentheses. \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

<sup>a</sup> The dependent variable is the monthly count of attacks from 2000-2009. Estimated using a negative binomial regression with time trends (month and month<sup>2</sup>), yearly GDP, yearly population levels, and month fixed effects as additional controls.

Supplementary Table 2: Variable Summary Statistics

	Mean	SD	Min	Max	Mean Rice Producer	Mean Sugar Producer	Mean Oil Producer
Monthly PirateAttacks	0.67	2.1	0.0	40.0	0.73	0.71	0.78
NonTanker Attacks	0.61	1.9	0.0	40.0	0.68	0.66	0.72
Oil Price (USD/Barrel)	39.28	18.6	16.5	102.5	n/a	n/a	n/a
Avg Oil Production (Bls/1000 GDP)	127.0	269.3	-0.8	1629	110.06	97.68	183.09
Rice Price (USD/Ton)	316.1	178.3	162.1	1015	n/a	n/a	n/a
Avg Rice Production (Kg./1000 GDP)	111.2	209.5	0.00	1527	127.20	125.00	126.39
Sugar Price (US Cents/Pound)	2.2	0.25	1.8	3.0	n/a	n/a	n/a
Sugar Production (Kg./1000 GDP)	21.7	60.7	0.0	482	24.21	24.92	11.41
Vessel Traffic (Suez Canal)	1415	229.9	1010	1993	n/a	n/a	n/a
Vessel Traffic (Singapore)	10832	412.4	9604	11744	n/a	n/a	n/a
GDP (Billion USD)	134.9	381.0	0.6	3925	474.77	10.42	87.86
Population (Millions)	98.89	256.7	0.8	1326	403.44	10.90	56.31
Precipitation Rice (mm)	78.43	23.98	40.4	136.3	n/a	n/a	n/a
Precipitation Sugar (mm)	75.37	20.01	40.4	141.8	n/a	n/a	n/a

In all regressions the independent variables are standardized to deviations from the mean to simplify interpretation.

Supplementary Table 3: Instrumental Variable Results for the Effect of Commodity Pricing on Attacks (including stage one and two estimates)

	Rice Model	Sugar Model
<i>IV Stage One</i>		
Rice Precipitation	0.123*** (0.015)	
Rice Precipitation Squared	-0.042*** (0.005)	
Rice Precipitation t-1	0.011* (0.007)	
Rice Precipitation Squared t-1	0.007*** (0.004)	
Rice Precipitation t-2	-0.143*** (0.017)	
Rice Precipitation Squared t-2	0.043*** (0.006)	
Sugar Precipitation		0.022*** (0.006)
Sugar Precipitation Squared		-0.016*** (0.003)
Sugar Precipitation t-1		-0.012*** (0.003)
Sugar Precipitation Squared t-1		0.018*** (0.005)
Sugar Precipitation t-2		-0.044*** (0.004)
Sugar Precipitation Squared t-2		0.03*** (0.006)
Sugar Price t-1		0.733*** (0.009)
<i>R-squared</i>	0.892	0.818
<i>F-Test that instruments=0</i>	82.3 (p<.001)	15.08 (p<.001)
<i>IV Stage Two</i>		
Rice Production $\widehat{\text{Rice Price}}$	1.00*** (0.038)	
Sugar Production $\widehat{\text{Sugar Price}}$		1.00*** (0.059)
<i>R-squared</i>	0.889	0.825
<i>F-Test that instruments=0</i>	4537 (p<.001)	2866 (p<.001)
<i>IV Stage Three</i>		
RicePrice* $\widehat{\text{Rice Production}}$	-0.19** (0.07)	
Rice $\widehat{\text{Price}}$	0.34 (0.23)	
Rice Production	-0.08 (0.06)	
SugarPrice* $\widehat{\text{Sugar Production}}$		-0.14* (0.08)
Sugar $\widehat{\text{Price}}$		-0.01 (0.18)
Sugar Production		-0.05 (0.07)
<i>Num Obs</i>	4030	4030
Year Fixed Effects	Yes	Yes
Country Fixed Effects	No	No
Country Random Effects	Yes	Yes

\*p<10%; \*\*p<5%; \*\*\*p<1%. Standard errors in parentheses. Included but not shown are controls for population, GDP, vessel traffic and a binary variable for the East Asia Monsoon Season. Estimated using a Poisson model with corrections for over dispersion and country random effects. Standard errors are bootstrapped.

Supplementary Table 4: OLS Estimates of the Effect of Commodity Prices on Piracy Attacks by Production

	Rice Model1	Sugar Model2	Oil Model3
Rice Price * RiceProduction	-0.10*** (0.02)		
Rice Price	-0.05 (0.06)		
Sugar Price * Sugar Production		-0.02** (0.01)	
Sugar Price		0.10** (0.04)	
Oil Price * Oil Production			0.02** (0.01)
Oil Price			-0.11 (0.07)
Vessel Traffic (Suez)	0.14** (0.06)	0.11 (0.07)	0.20** (0.08)
GDP	0.06* (0.04)	0.09** (0.04)	0.09** (0.04)
Population	-5.24*** (0.92)	-5.48*** (0.92)	-5.49*** (0.93)
Num Obs	4,662	4,428	4,662
R-Squared	0.03	0.03	0.03
<i>Year Fixed Effects</i>	Yes	Yes	Yes
<i>Country Fixed Effects</i>	Yes	Yes	Yes

\*p<10%; \*\*p<5%; \*\*\*p<1%. Robust standard errors in parentheses. \*significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%. This is a least squares regression with yearly GDP, yearly population levels, and monthly shipping levels through the Suez Canal as controls. Also includes year and country fixed effects.

Supplementary Table 5: All Robustness Checks

	Monsoon <sup>b</sup>	State Fragility <sup>c</sup>	Malacca Shipping <sup>d</sup>	No Somalia <sup>e</sup>	No Tanker <sup>f</sup>
<i>Rice Model</i>					
Rice Price *	-0.19***	-0.12**	-0.13***	-0.13***	
Rice Production	(0.04)	(0.05)	(0.05)	(0.04)	n/a
Rice Price	-0.07*	-0.09	0.02	-0.06	
	(0.04)	(0.08)	(0.08)	(0.08)	n/a
Rice Production	-0.20*	-0.27**	-0.29	-0.27**	
	(0.11)	(0.14)	(0.21)	(0.12)	n/a
<i>Num Obs</i>	4,662	4,248	2,148	4,554	
<i>Log Likelihood</i>	-3467	-3228	-1404	-3218	
<i>Sugar Model</i>					
Sugar Price * Sugar Production	-0.12***	-0.12***	-0.13	-0.12***	
	(0.04)	(0.04)	(0.10)	(0.04)	n/a
Sugar Price	-0.05*	0.16***	-0.11	0.05	
	(0.03)	(0.05)	(0.08)	(0.05)	n/a
Sugar Production	-0.10	-0.18	-0.11	-0.15	
	(0.13)	(0.12)	(0.24)	(0.12)	n/a
<i>Num Obs</i>	4,662	4,248	2,148	4,554	
<i>Log Likelihood</i>	-3476	-3222	-1407	-3221	
<i>Oil Model</i>					
Oil Price * Oil Production	0.09**	0.11**	0.01	0.13***	0.08**
	(0.04)	(0.05)	(0.06)	(0.04)	(0.04)
Oil Price	-0.05	-0.06	-0.01	-0.07	-0.05
	(0.06)	(0.07)	(0.07)	(0.08)	(0.07)
Oil Production	0.17	0.07	-0.11	-0.03	0.25
	(0.22)	(0.29)	(0.26)	(0.22)	(0.26)
<i>Num Obs</i>	4,662	4,248	2,148	4,554	4,662
<i>Log Likelihood</i>	-3479	-3230	-1409	-3221	-3357
Year Fixed Effects	No	Yes	Yes	Yes	Yes
Seasonal/Month Effects	Yes	No	No	No	No
Time Trends	No	No	No	Yes	No
State Fragility Controls	No	Yes	No	No	No
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes

\*p<10%; \*\*p<5%; \*\*\*p<1%. Standard errors in parentheses.

<sup>a</sup> Estimated using a negative binomial regression with yearly GDP, yearly population levels, and monthly shipping levels through the Suez Canal as controls.

<sup>b</sup> Includes controls for civil war, state fragility, and governance.

<sup>c</sup> Includes a dummy variable for monsoon season in South Asia as well as month fixed effects.

<sup>d</sup> Excludes attacks in Somali waters. . Also includes time trends include (time and time squared in months).

<sup>e</sup> Excludes all attacks reported on oil tankers.

Supplementary Table 6: Population of Pirate-Prone Countries and Summary Information

Country	Total Attacks (2000-2009)	Average Rice Production (1000 Tons)	Average Sugar Production (1000 Tons)	Average Oil Production (1000 Barrels)
Angola	13	9.8	0.0	1,257.1
Bangladesh	285	27,322.4	0.0	6.0
Brazil	50	7,893.0	0.0	1,988.6
Cameroon	24	36.9	0.0	77.8
China	12	126,847.7	0.0	3,699.3
Colombia	36	1,507.2	0.0	590.2
Dominican Rep	25	440.1	483.5	-0.3
Ecuador	43	784.3	0.0	471.3
Egypt	6	4,086.5	0.0	699.5
Gabon	11	0.0	0.0	255.7
Ghana	34	152.2	0.0	7.5
Guinea	31	554.5	0.0	0.0
Guyana	29	311.4	281.6	0.0
Haiti	17	61.9	0.0	0.0
India	165	88,836.4	0.0	834.4
Indonesia	932	35,266.1	0.0	1,215.1
Iran	18	1,753.4	0.0	3,973.1
Iraq	8	132.6	0.0	2,108.3
Ivory Coast	38	428.1	0.0	35.5
Jamaica	26	0.0	166.1	-0.4
Kenya	13	34.1	0.0	-0.1
Madagascar	8	2,059.1	0.0	0.1
Malaysia	136	1,443.5	0.0	765.2
Mozambique	9	124.1	215.1	0.0
Myanmar	8	0.0	0.0	18.2
Nigeria	224	2,579.5	0.0	2,295.2
Oman	9	0.0	0.0	817.7
Peru	63	1,630.8	0.0	107.3
Philippines	67	9,450.1	0.0	18.1
Senegal	18	151.0	0.0	0.0
Sierra Leone	10	321.8	0.0	0.0
Singapore	33	0.0	0.0	9.9
Somalia	429	1.0	0.0	0.0
Sri Lanka	14	2,088.3	0.0	-0.5
Tanzania	60	684.2	0.0	0.0
Thailand	31	18,310.3	0.0	278.9
Togo	6	46.7	0.0	0.0
Venezuela	41	437.3	0.0	2,874.1

Vietnam	87	22,617.0	0.0	352.5
Yemen	33	0.0	0.0	386.6



Supplementary Table 7: Naval Deployments in the Gulf of Aden, 2001-2009

Organization	Operation						Source
	Operation Name	Start Date	End Date	Contributing States	Vessel Numbers	Mission/Objectives	
NATO	Operation Ocean Shield	Aug-09	Ongoing	Canada; Denmark; Greece; Italy; Netherlands; Portugal; Turkey; United States; UK	Between six and ten vessels	Deter, defend against and disrupt pirate activities in the Gulf of Aden and off the Horn of Africa; assistance in regional state counter-piracy capacity building	<a href="http://www.nato.int/cps/en/natolive/topics_48815.htm">http://www.nato.int/cps/en/natolive/topics_48815.htm</a>
	Operation Allied Protector	Mar-09	Aug-09	Canada; Greece; Italy; Netherlands; Portugal; Spain; Turkey; United States; UK	Five vessels (one destroyer, four frigates). Began with three vessels and expanded December 09.	Deter, defend against and disrupt pirate activities in the Gulf of Aden and off the Horn of Africa	<a href="http://www.nato.int/cps/en/natolive/topics_48815.htm">http://www.nato.int/cps/en/natolive/topics_48815.htm</a>
	Operation Allied Provider	Oct-08	Dec-08	Italy; Greece; UK	Three vessels (one destroyer, two frigates)	Provide naval escorts for World Food Program (WFP) vessels; Patrol waters around Somalia	<a href="http://www.nato.int/cps/en/natolive/topics_48815.htm">http://www.nato.int/cps/en/natolive/topics_48815.htm</a>

EU	Operation Atalanta	Dec-08	Ongoing	Italy; Germany; France; Netherlands; Spain; Luxembourg; Belgium; Greece; Norway; Sweden; Cyprus; Finland; Malta; Ireland	Up to twelve vessels	Protect vessels for the World Food Program (WFP) and African Union Military Mission in Somalia (AMISOM); Protect vulnerable shipping; Deter, prevent and repress of acts of piracy and armed robbery off the Somali coast; Monitor fishing activities off the coast of Somalia	<a href="http://www.eunavfor.eu/about-us/mission/">http://www.eunavfor.eu/about-us/mission/</a>
Combined Maritime Force (CMF) - Under US Fifth Fleet	Task Force 150	Oct-01	Ongoing	United States; Republic of Korea; Turkey; Canada; Denmark; France; Germany; Pakistan; Thailand; UK; Australia; Italy; Netherlands; New Zealand; Portugal; Singapore; Spain; France	Between fourteen and fifteen vessels	To carry out Maritime Security Operations (MSO) in support of Operation Enduring Freedom (established in 2001 to support Operation Enduring Freedom, CTF-150 first became involved in anti-piracy activities in 2006)	<a href="http://www.cusnc.navy.mil/cm/150/index.html">http://www.cusnc.navy.mil/cm/150/index.html</a>

	Task Force 151	Jan-09	Ongoing	United States; Republic of Korea; Australia; Denmark; Singapore; France; Netherlands; Pakistan; UK	Began with three U.S. vessels, and expanded to four when the Koreans joined in March. The Australian vessel HMAS Warramunga is believed to have joined in May.	Actively deter, disrupt and suppress piracy in the Gulf of Aden and off the Horn of Africa	<a href="http://www.cusnc.navy.mil/cm/151/index.html">http://www.cusnc.navy.mil/cm/151/index.html</a> ; <a href="http://news.smh.com.au/breaking-news-national/aussie-warship-aircraft-to-fight-piracy-20090529-bp7d.html">http://news.smh.com.au/breaking-news-national/aussie-warship-aircraft-to-fight-piracy-20090529-bp7d.html</a>
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