Understanding the Root Causes of Modern Maritime Piracy

Watcharapong Ratisukpimol

November 2010

Abstract

This paper examines the trends and determinants of modern-era piracy. To that end, it first applies the extralegal appropriation and production model to contemporary maritime piracy. It, then, utilizes a new dataset of 3,362 maritime piracy incidents that occurred worldwide between 1998 and 2007. To test model predictions, the data cover detailed information on the location, timing, the number of pirates involved, the ship's characteristics and success of each attack, as well as the material damage and violence inflicted upon the crew and the cargo. I combine these data with macroeconomic and aggregate measures on per-capita incomes, rates of economic growth, unemployment rate and institutional quality of countries where piracy incidents occur. I find the results well support the model in that economic and political factors do matter: higher real incomes per capita, lower unemployment rates and more political freedoms influence the number of pirates involved in incidents, the success of attack and property damage inflicted.

Department of Economics, University of Colorado at Boulder. Address: UCB 256, University of Colorado, Boulder, CO, 80309-0256. E-Mail: ratisukp@colorado.edu. I am grateful to Murat Iyigun, Anna Rubinchik, Jennifer Lamping and Hale Utar for helpful comments and suggestions. Any remaining errors are my own.

1. Introduction

When mentioning \pirates", most people imagine cruel men with the eye patches and green parrots on their shoulders. But maritime piracy is one of the oldest criminal professions which made a deadly comeback in the early 1990s becoming a serious global threat to sea commerce.

According to the International Maritime Organization (IMO), the total number of incidents of piracy and armed robbery against ships, reported to have occurred or to have been attempted from 1984 to the end of December 2009, is 5,633. Up to date, the number of acts of piracy and armed robbery against ships in 2009 reported was 406, an increase of 106 (24.6%) over the number reported in 2008. Unsurprisingly, 80 percent of international maritime freight travel is largely unguarded and only 1 percent of maritime pirates get arrested (Maggio, 2007).[1] Somalia accounts for more than half of the incidents in 2009, followed by the Far East, in particular the South China Sea, West Africa, South America, the Caribbean and Indian Ocean.

Even though there has been signi cant improvement in maritime safety in South East Asian and Far East waters, there still remains an underlying potential for piracy incidents. The pressure on the pirates and the robbers has to be maintained by the littoral states and the constant physical presence in the waters. For example, Indonesia is highly praised for their diligent e orts in curbing piracy and armed robberies at sea. There continues to be a year-on-year decline in the number of incidents, with incidents for 2009, the majority opportunistic in nature. On the other hand, this is the second year in a row where incidents in the Singapore straits have increased. Thirteen incidents were reported by ships steaming in the South China Sea. This is the highest number of incidents in the previous ve years.

Corresponding with this rise are the crew violence and the material damage from attacks between 1991 and 2009, 382 crew members were killed; 902 crew members were reportedly injured/assaulted; 5,910 crew members were reportedly taken hostage/kidnapped; and 203 crew members went missing. Assaults on crews were typically involved by groups

[1] \Maritime Piracy: Poverty in lawless lands breeds a new era of piracy on the seas" by TakePart, LLC (2010) at http://www.takepart.com/issues/maritime-piracy/16433

of ve to ten pirates, some of whom were heavily armed.

Despite these gures, maritime piracy incidents are underreported by as much as

Empirical study reveals the following findings. First, the results fit the theoretical model well in that economic factors play a significant role in the number of pirates, the success of the attack and property damage inflicted. For instance, higher real per-capita incomes and lower unemployment rates tend to reduce the number of pirates. Political institutions are also important explaining this phenomenon. For example, the incidents that occur in a country with higher political freedoms tend to have less number of pirates and the incidents that occur in the territories of more democratic countries tend to reduce the chance of successful attacks. Incidents that take place in more democratic locations also tends to involve fewer cases in which pirates board the ship and ask for ransom demands.

It has already well emphasized that economic conditions and incentives help to explain modern maritime piracy. For instance, many Indonesian pirate attacks are the result of harsh economic conditions. The current spate of attacks in Indonesia can be traced back to the onset of the 1997-98 Asian economic crisis (Wiencek 2001). Also, lack of regional cooperation can explain this subsistence. Smaller developing nations cannot defend against pirate attacks occurring within their jurisdiction. Local authorities in areas such as Malaysia and Indonesia are not equipped with the technology and resources to combat pirates. While Singapore and Malaysia have increased their army forces, Indonesia in particular needs help in reducing pirate activities. This corresponds to Mo

since maritime piracy incidents sometimes occurs in international waters beyond the reach of the law in key locations that can a ect the global security of nations around the world as well as the world economy.

2. Theoretical Framework

2.1 Individual Choice

Consider the following model of a representative economy. Assume that the resource endowment of this economy is given, ¯: The economy uses resources to produce the good for domestic consumption and exports to another economy by water transportation. Let t be the proportion of the resource produced for domestic consumption , 0 t 1. Thus, exports are (1 t)¯ . The population of the economy consists of N identical families. Each family can divide their time between productive and subversive activities. The productive activity (being a farmer) is a wage employment o ered by producers.

The income of a family from being a farmer is $w_f f$ where w_f is the wage rate of each unit time of labor and f is the fraction of its time that this family allocates to productive activities. De ne p as the fraction of the time that family allocates to subversive activities (being a pirate). That is,

$$f + p = 1 \tag{1}$$

Pirates attack cargo ships containing exported goods. Assume that the exported good is split into R identical cargo ships exporting from this country. The total piracy income is (1 t)¯ where is the fraction of cargo lost due to the attack; 0 < 1.

The total income from attacking cargo ships are divided among all families proportionately to the time allocated by each family to subversive activity. Therefore, the income of a family from attacking cargo ships is $\frac{(1\ t)\bar{\omega}}{N}\frac{p}{P}$ where P is the fraction that of its time that the average family allocates to being a pirate. Thus, the total income of a family, i, is given by

$$i = w_f f + \frac{(1\ t)\bar{\omega}}{N}\left(\frac{p}{P}\right) \tag{2}$$

Each family takes w_f and $\frac{(1\ t)\bar{\omega}}{NP}$ as given and chooses f and p , subject to

In equilibrium, since all families are identical, p is equal to P ,which is the fraction of its time that the average family allocates to being a pirate, and f is equal to F. Therefore, the average family would allocate the time according to

$$P = \begin{cases} 0 & \text{if} \quad w_f > \frac{\phi(1-t)\overline{\omega}}{R} \\ \frac{\frac{(1-)^{-}}{\phi-}}{} - 1 & \text{if} \quad \frac{(1-)^{-}}{1+\text{—}} < w_f < \frac{\phi(1-t)\overline{\omega}}{} \end{cases}$$

R

$\frac{\partial P}{\partial w} = \frac{(1 \quad t)\overline{\omega}}{N(w \quad)^2} < 0$

$\frac{\partial P}{\partial R} = \frac{1}{N\phi} < 0$ ■

The results from the proposition are straightforward and make economic sense. One may wonder why the time allocation for subversive activities is decreasing in the number of cargo ships. More ships sent with exports on board should be more attractive to the pirates. The reason seems to be di erent. For a given level of subversive technology, more ships mean fewer resources devoted to piracy attacks per ship. This, however, lowers success probability (or share of resources captured by pirates). In turn, this makes piracy even less attractive.

In equation (5), substituting x into the success contest function, I obtain

$$= \frac{NP}{R + \quad NP} \tag{8}$$

Plugging P from the individual optimization in equation (6) into the contest success function in equation (8), I obtain

$$= 1 \quad \frac{Rw_f}{(1 \quad t)\dagger} \tag{9}$$

Proposition 2 The success of attack, , is increasing in the time that average family allocates to subversive activity, P, the resource endowment, †, the proportion of exports, (1 t), and the e ectiveness of time allocated to be a pirate, , but decreasing in the return of a legal job, w_f, and the number of ships, R.

Proof.

By comparative static analysis,

From equation (8), since $= \frac{\phi NP}{R+\phi NP}$; I have

$\frac{\partial \beta}{\partial P} = \frac{\phi RN}{(R+\phi NP)^2} > 0$

From equation (9), since = 1 $\frac{Rw}{\phi(1\ \ t)\overline{\omega}}$; I have

$\frac{\partial\beta}{\partial\overline{\omega}}$ = $\frac{Rw}{(1\ \ t)\phi(\overline{\omega})^2}$ > 0

$\frac{\partial\beta}{\partial(1\ \ t)}$ = $\frac{Rw}{\phi\overline{\omega}(1\ \ t)^2}$ > 0

$\frac{\partial\beta}{\partial\phi}$ = $\frac{Rw}{(1\ \ t)\overline{\omega}(\phi)^2}$ > 0

$\frac{\partial\beta}{\partial w}$ = $\frac{R}{\phi(1\ \ t)\overline{\omega}}$ < 0

$\frac{\partial\beta}{\partial R}$ = $\frac{w}{\phi(1\ \ t)\overline{\omega}}$ < 0

■

Success of attack does not imply that pirates can appropriate properties on board. Pirates can board ship but leave empty handed because of the crew alert. Now I consider the success of appropriation on economic outcomes. In order to model the success of theft, I introduce piracy pro ts as a proxy since pro ts come not only from hiring the optimal number of pirates but also from liquidating appropriated goods in the market. In the following section, I analyze the labor market for pirates and derive the determinants of piratical pro ts.

2.3 Competitive Labor Market of Pirate Firms

Assume that, with the large number of indigenous families, the labor market for pirates is competitive.[2] Output (cargo appropriated) is obtained from using pirates with the technology $p^{\alpha}; 0 <$ < 1; where p is the unit of labor time of pirating and is a parameter re ecting productivity as well as the relative price of the goods produced by the economy. Given this technology, the gross pro t obtained from attacking one ship is = p^{α} $w_p p$: Recall from individual optimization that w_p =

$$= p^{\alpha} \left(\frac{1 \quad t)\dagger}{NP} \right)^{!} p \tag{10}$$

The pirate rms take $\frac{1 \quad t)\bar{\omega}}{NP}$ and as given and choose p to maximize . This maximization implies that p satis es

$$p = \left(\frac{NP}{(1 \quad t)\dagger} \right)^{! \frac{1}{1-}} \tag{11}$$

The market-clearing condition for the labor market is that labor demand (the unit of labor time of pirates times the number of cargo ships) is equal to the labor supply (the fraction of time that the average family allocates to piracy times the number of families). That is,

$$pR = NP \tag{12}$$

Taken together, equations (11) and (12) imply that the market-clearing wage rate equals the marginal product of labor:

$$\left(\frac{NP}{R} \right)^{1 \quad \alpha} = \left[\frac{\beta(1 \quad t)\bar{\omega}}{NP} \right] \tag{13}$$

$$w_p = \left(\frac{(1 \quad t)\dagger}{-} \right)^{"}$$

Therefore, pro ts from attacking each cargo ship are

$$= (1 \quad) \left(\frac{NP}{R}\right)^{\alpha} \tag{16}$$

Plugging P from the individual optimization in equation (6) into the pro t function above, I obtain

$$= (1 \quad) \left(\frac{(1 \quad t)\tau}{Rw_f}\right)^{\alpha} \tag{17}$$

Proposition 3

$$\frac{\partial \pi}{\partial w} = (1 \quad) \left[\frac{(1 \quad t)\overline{\omega}}{Rw} \quad \frac{1}{\phi}\right]^{\alpha \quad 1} \left[\frac{(1 \quad t)\overline{\omega}}{R(w \quad)^2}\right] < 0$$

$$\frac{\partial \pi}{\partial R} = (1 \quad) \left[\frac{(1 \quad t)\overline{\omega}}{Rw} \quad \frac{1}{\phi}\right]^{\alpha \quad 1} \left[\frac{(1 \quad t)\overline{\omega}}{R^2 w}\right] < 0 \ \blacksquare$$

3. The Empirical Analysis

3.1 Data and Descriptive Statistics

I created the data using several speci c underlying datasets. For the full description of each piracy incident between 1998 and 2007, the main information sources are the annual reports by the International Maritime Bureau (IMB) and the annual and monthly reports from International Maritime Organization (IMO). For statistical purposes, the

Then, based on the location of the attack, I combined the above data with country-level economic and political measures. Data such as real GDP per capita and its 10-year growth rate are sourced from the Penn World Tables, Mark 6.3. Annual data on unemployment rates are obtained from the World Databank. The data on political

divided by the total population in the region.

There are ve geographic regions covered: Asia, Africa, America, Europe and Oceania. I calculate the cargo tra c volume within each region based only on selected ports, although those data represent 71 percent of the actual world seaborne trade over

STATUS dummy variable ranges from zero to two. It equals to zero if countries where the incidents happened have \Not Free" status; one if \Partly Free" status and two if

in the ransom demand and vessel hijacking but decreasing in the cash and cargo goods robberies.

In Table 2 c, incidents with cash and cargo goods robberies have declined slightly over time, whereas incidents involving vessel hijacking and ransom demanding rose. The number of pirates is increasing with all four types of robberies.

[Table 2 about here.]

3.2 Main Results

Now, to validate the extralegal appropriation model as an application to modern maritime piracy, I utilize dataset described above to estimate the number of pirates, success of attack and piracy pro ts on economic and political explanatory variables. The time that average family allocates to subversive activity is represented by the data on number of maritime pirates involved in each incident. The success of attack is a proxy for subversive technology of attacking vessels and piratical pro ts are represented by the success of the economic outcomes.

3.2.1 Reduced-Form Estimates

I derive the baseline empirical results by estimating the following reduced-form equation:

$$\text{OUTCOME}_{it} = + {}_{it}\beta + {}_{it}\gamma + \sum_{j=1998}^{2007} {}_{j} \quad I_j + \sum_{k=1}^{32} {}_{k} \quad I_k + \sum_{m=1}^{5} {}_{m} \quad I_m + "_{it}, \tag{18}$$

where OUTCOME_{it} is an outcome of the piracy act that took place in location i at time t; it is based on the number of pirates, the success of the attack or the nature of the appropriation involved. In (18), is a constant and $_{it}$ represents incident-speci c

explanatory variables related to the vessel or geographic location where the incident occurred. And $_{it}$

In Tables 3 through 8, I report the baseline, reduced-form estimates. Table 3 includes the economic and political factors and outcome related to the number of pirates and the next table turn to the success of attack. Table 5 through 8 then turn to an assessment of more economic-based outcomes. From Table 3 to Table 8, the regressions in column (1) are the simplest speci cation, with only key economic and politico-institutional measures employed with the xed e ects on attack locations and years. The second regression then adds xed e ects based on the attack regions.[11] The third column adds WATER as a basic right-hand side control. The next regression then adds TONNAGE of the vessels, MTRADECAP and SHIPS as additional controls. And the nal column in table 4 through 8 includes the number of pirates, PIRATES, as an additional control variable.

In terms of the incident-related or geographic variables that are controlled for in all regressions in Table 3, I include the TONNAGE of the vessels because the number of pirates required for an attack might be associated with the size of the vessel. Since the variable WATER could be interpreted as the distance from the sea shore, the position of the attack could a ect the amount of pirates employed w7(trop)-27 (E)-59(eg(w7(tr-259(t)1(he)-267(v)2

real income per capita, RGDPCAP, economic growth, GROWTH, and the unemployment rate, UNEMP. And the main controls for political stability and institutional quality are the political rights index, PRIGHTS, the freedom status, STATUS, and the polity score, POLITY.

In the first column of Table 3, I regress the number of pirates, PIRATES, on the simplest set of only economic and political variables and fixed effects for location and year. As shown, the number of pirates depends negatively on per-capita income, positively on unemployment rates and negatively on the freedom status of the country where the incident took place. Adding fixed effects for the region of attacks reveals that GDP per capita, unemployment rate and freedom status are still statistically significant determinants of the number of pirates. In column (3), I add WATER as an additional control which is significant. This implies that more pirates were needed when they attacked ships farther ashore. In the final column, I present the estimate wil

(1), only real income per capita, unemployment rate and political rights matter. Real income per capita produces the expected sign whereas the unemployment rate and political rights come with the unexpected signs meaning that higher unemployment rate and the lower political right freedom reduce the chance of success in attack. The results remain the same in column (2) when I add the xed e ect for regions except PRIGHTS which is no longer signi cant. When the WATER is added to column (3), it becomes statistically signi cant with the negative sign. Probability that pirates successfully attack is higher when they target the ships closer to land. As the dataset suggest, the probability of successful attacks at the port is about 88% while the probability of success in international waters is around 46%. In column (4), when TONNAGE, MTRADECAP and SHIPS are added, all of them are signi cant with the expected sign. TONNAGE produces a negative sign; the larger the ship, the lower probability of successful attack. MTRADECAP produces a positive sign; if the region has more ows of cargo tra c by water, the likelihood that the pirates successfully attack improves. SHIPS produces a negative sign; if the number of world eet rises, the success of attack drops. In the last column, the number of pirates can also explain the success of attack. More pirates improve the success of attack. POLITY becomes signi cant with the negative sign. The more democratic country, the lower probability of successful attack. In contradiction, I also nd that PRIGHTS becomes signi cant again; more political rights freedom was associated with higher success rates.

Compare this table with Proposition 2 and recall that is the success of attack which is a dependent variable in this table. Similar to proposition 1, I also nd that the estimates support this proposition. Coe cient of the number of pirates, PIRATES, real income, RGDPCAP, maritime trade volume per capita, MTRADECAP, and number of ships, SHIPS, produce the same sign as in Proposition 2 when performing comparative static analysis of on P, w_f, (1 t) and R, respectively.

[Tables 4 about here.]

Since success of attack solely does not imply success of appropriation, I, then, consider economic outcomes as dependent variables. Because the level of piratical pro ts

comes from the number of appropriation incidents, I test Proposition 3 by using economic outcomes as a proxy of pro ts. Table 5 through 8 present four measures of common economic outcomes pirates appropriated: whether or not the pirates stole cash, cargo

higher volume of goods carried by water faces a higher chance of the vessel capture. Moreover, unlike other types of appropriation, the coe cient of the growth rate of real GDP per capita, GROWTH, is positive in vessel hijackings only. With the higher growth rate of income per capita, the number of vessel hijackings is increasing. Pirates have more opportunities to select the target goods because of the accumulation of capital and technology. De nitely, pirates decide to hijack vessel which yields higher return to them.

Finally, Table 8 presents the impact of my explanatory variables on the extent to which pirates seek ransom. As seen, the income level is signi cant except the last column while the growth rate of income level is signi cant in the last column only. They produce the predicted negative sign while illogically STATUS is also signi cant with the positive sign in all columns. The distance from the land, the size of the vessel and the volume of maritime trade per capita also matter for ransom demanding. Note that ransom demand is the only economic outcome that the number of pirates, PIRATES, is no longer signi cant.

Comparing these results with Proposition 3, I nd that all four estimates support this proposition as the number of pirates and real income produces the same sign as proposed in model. However, maritime trade volume per capita supports the theory only in vessel hijacking and the signs of coe cient SHIPS in all four regressions are not consistent with the number of ships, R, in the model.

[Tables 5, 6, 7 and 8 about here.]

3.2.2 Alternative Speci cations & Robustness

Although I show the reduced-form estimates with the Probit regression when the dependent variables are dummies, I performed the reduced-form linear regressions to

vessel hijacking estimate in table 7 where the coe cient of SHIPS is negative in linear regression which now corresponds to Proposition 3.

Since the data on the total world eet is collected annually, variable SHIPS takes only ten values. This might cause a problem when I control for year xed e ects. Then I perform the regression shown in the nal columns of Table 3 through 8 without year xed e ects. They produce the same results as reported in tables.

Next, one problem with estimating the incidents of appropriation by using the reduced-form approach comes from the fact that some explanatory variables are endogenous; TONNAGE; WATER; PIRATES. They are choice variables that the pirates have full control over because they can decide on how many pirates hired, which ships and where to attack them. Thus, I did two-stage least square estimates (2SLS) in which I instrument for these endogenous variables. My instrument choice is a set of (twelve) dummies for month of attack. The idea is that because weather conditions are not only highly seasonal but also signi cant in uence whether or not attacks in the open seas or harbors would succeed with higher likelihood. The baseline 2SLS empirical results were estimated and they did not alter in any qualitative manner.

Although I report a subset of the analyses conducted, I experimented with a variety of alternative speci cations to test the robustness of my qualitative results. For example,

References

[1] Abhyankar, J. (1999). \An Overview of Piracy Problems", ICC International Maritime Bureau, Essex, UK.

[2] Bates, R., A. Greif, and S. Singh. (2002). \Organizing Violence," Journal of Con ict Resolution, Vol. 46 No. 5, October, 599-628.

[3] Burnett, J. S. (2002). \Dangerous Waters: Modern Piracy and Terror on the High Seas", Penguin Group, USA.

[4] Chalk, P. (2008). \The maritime dimension of international security terrorism, piracy, and challenges for the United States", Santa Monica, CA, RAND.

[5] Freedom House. (2010), \Freedom in World Country Ratings 1972-2009", Freedom House, Washington D.C.

[6] Gottschalk, J. A. et al. (2000). \Jolly Roger with an Uzi: The Rise and Threat of Modern Piracy", US Naval Institute Press (USA).

[7] Grossman, H. I. (1994). \Production, Appropriation, and Land Reform," American Economic Review, 84(3), June, 705-12.

[8] Grossman, H. I. and M. Kim. (1995). \Swords or Plowshares? A Theory of the Security of Claims to Property," Journal of Political Economy, 103(6), December, 1275-1288.

[9] Grossman, H. I. and M. Iyigun. (1995).\The Pro tability of Colonial Investment," Economics & Politics, 7:3, November, 229-24.

[10] Grossman, H. I. and M. Iyigun. (1997). \Population Increase and the End of Colonialism," Economica, 64(3), August, 483-493.

[11] Haavelmo, T. (1954). A Study in the Theory of Economic Evolution, (Amsterdam: North-Holland).

[12] Hafer, C. (2006).\On the Origins of Property Rights: Con ict and Production in the State of Nature," Review of Economic Studies, January, 73 (1) 119- 43.

[13] Hastings, J. V. (2009). \Geographies of State Failure and Sophistication in Maritime Piracy Hijackings," Political Geography, 28, 213-23.

[14] Heston A., R. Summers and B. Aten. (2009), Penn World Tables, Version 6.3, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

[15] Hirshleifer, J. (1991).\The Paradox of Power," Econom]TJ/E45)227(n3H(ersit)28(-3ay()-3ay(it)280(Td[)-(V)3.

[27] Ratisukpimol, W. (2010). \Extralegal appropriation model," University of Colorado at Boulder, unpublished manuscript, November.

[28] Skaperdas, S. (1992). \Cooperation, Con ict, and Power in the Absence of Property Rights," American Economic Review, September, 82, 720-39.

[29] Skaperdas, S. (2005). \The Market for Protection and the Origin of the State," University of California at Irvine, unpublished manuscript, May.

[30] Wiencek, D. P. (2001). \The Growing Threat of Maritime Piracy," China Brief, 1(1).

Table 1: Descriptive Statistics

Variables	Observations	Mean	St. Dev.	Min	Max
YEARS	3; 371	5:45	2:62	1	10
PIRATES	2; 300	5:95	7:57	1	200
ATTACK	3; 371	0:744	0:436	0	1
GOODS	3; 371	1:559	1:981	0	7
CASH	3; 371	0:096	0:295	0	1
CARGOGOODS	3; 371	0:036	0:187	0	1
VESSEL	3; 371	0:045	0:208	0	1
RANSOM	3; 371	0:028	0:165	0	1
RGDPCAP	3; 362	7; 595	39; 804	345:517	653; 046
GROWTH	3; 371	22:04	21:73	65:5087	130:991
UNEMP	3; 371	8:01	4:35	0:691563	50
PRIGHTS	3; 371	4:26	1:50	1	7
STATUS	3; 371	1:08	0:603	0	2
POLITY	3; 371	4:26	4:35	10	10
WATER	3; 371	1:80	0:780	1	3
TONNAGE	3; 371	16; 768:04	21; 602:44	0	218; 593

Table 2: Correlation Matrices

Table 2 a:

The Correlation Matrix									
	ATTK	YEAR	PRTS	GOOD	RGDP	GRW	UNEM	PRGT	STAT
ATTK	1	...	...	...	...	...	...	...	...
YEAR	.0305	1	...	...	...	...	...	...	...
PRTS	.0302	-.019	1	...	...	...	...	...	...
GOOD	.4851	.0345	.1723	1	...	...	...	...	...

Table 3: Reduced-Form Estimates with The Number of Pirates as Dependent Variable

VARIABLES	(1)	(2)	(3)	(4)
RGDPCAP	-4.04e-06***	-3.51e-06***	-3.97e-06***	-4.71e-06***
	(1.27e-06)	(1.16e-06)	(1.36e-06)	(1.25e-06)
GROWTH	0.000763	0.000555	-0.000947	0.00833
	(0.00624)	(0.00627)	(0.00694)	(0.00713)
UNEMP	0.0791***	0.0945***	0.0960***	0.0921***
	(0.0239)	(0.0256)	(0.0285)	(0.0256)
PRIGHTS	0.556	0.679	0.627	0.753
	(0.513)	(0.520)	(0.474)	(0.532)
STATUS	-1.871**	-1.830**	-1.675**	-1.902**
	(0.718)	(0.698)	(0.617)	(0.729)
POLITY	-0.0671	-0.0613	-0.0889	-0.0982
	(0.0574)	(0.0614)	(0.0578)	(0.0571)
WATER			0.922*	0.903*
			(0.501)	(0.481)
TONNAGE				-2.48e-05**
				(9.67e-06)
MTRADECAP				3.058
				(2.088)
SHIPS				-0.000274*
				(0.000156)
LOCATION FE	Y	Y	Y	Y
YEAR FE	Y	Y	Y	Y
REGION FE	N	Y	Y	Y
Observations	2,293	2,293	2,293	2,293
R-squared	0.037	0.039	0.043	0.050

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Reduced-Form Estimates with Probit Regressions with The Success of Attack as Dependent Variable

VARIABLES	(1)	(2)	(3)	(4)	(5)
RGDPCAP	-9.14e-07***	-1.14e-06***	-8.34e-07***	-1.05e-06***	-4.97e-07
	(1.59e-07)	(3.18e-07)	(2.37e-07)	(2.63e-07)	(3.48e-07)
GROWTH	-0.00114	0.000200	0.000273	0.00201	0.00175
	(0.000738)	(0.000947)	(0.000796)	(0.00149)	(0.00184)
UNEMP	-0.00649*	-0.0180**	-0.0205***	-0.0206***	-0.0260***
	(0.00337)	(0.00811)	(0.00706)	(0.00703)	(0.00630)
PRIGHTS	0.157**	0.0393	0.0412	0.0698	0.153**
	(0.0771)	(0.0424)	(0.0484)	(0.0480)	(0.0746)
STATUS	-0.0275	-0.0268	-0.0100	-0.0166	-0.117
	(0.0950)	(0.0836)	(0.112)	(0.138)	(0.154)
POLITY	-0.0312	-0.0249	-0.0129	-0.0198	-0.0230*
	(0.0202)	(0.0170)	(0.0124)	(0.0146)	(0.0138)
WATER			-0.461***	-0.481***	-0.544***
			(0.0611)	(0.0641)	(0.0596)
TONNAGE				-8.81e-06***	-9.78e-06***
				(2.99e-06)	(3.28e-06)
MTRADECAP				0.487*	0.707**
				(0.273)	(0.330)
SHIPS				-4.47e-05**	-1.25e-05
				(2.16e-05)	(3.93e-05)
PIRATES					0.0131*
					(0.00746)

Table 6: Reduced-Form Estimates with Probit Regressions with Cargo Goods Robbery as Dependent Variable

VARIABLES	(1)	(2)	(3)	(4)	(5)
RGDPCAP	-7.70e-06	-3.18e-06	-2.75e-06	-3.09e-06	-5.98e-07
	(5.54e-06)	(4.80e-06)	(3.56e-06)	(3.89e-06)	(5.24e-07)

Table 7: Red:

Table 8: Reduced-Form Estimates with Probit Regressions with Ransom Demand as Dependent Variable

VARIABLES	(1)	(2)	(3)	(4)	(5)
RGDPCAP	-1.82e-06***	-1.96e-06***	-2.16e-06***	-1.80e-06***	-4.22e-07
	(2.93e-07)	(4.52e-07)	(5.03e-07)	(3.72e-07)	(8.05e-07)
GROWTH	0.00232	-2.38e-05	-0.000997	-0.00294	-0.0154***
	(0.00271)	(0.00589)	(0.00553)	(0.00484)	(0.00489)
UNEMP	-0.0201*	0.0198	0.0218*	0.0473***	0.0317
	(0.0121)	(0.0122)	(0.0116)	(0.0124)	(0.0319)
PRIGHTS	-0.129	-0.123	-0.148	-0.0161	0.0229
	(0.0798)	(0.0884)	(0.109)	(0.0981)	(0.255)
STATUS	0.502***	0.805***	0.899***	1.248***	3.148***
	(0.146)	(0.165)	(0.194)	(0.234)	(0.333)
POLITY	0.0133	0.00289	-0.0168	-0.0836***	-0.178***
	(0.0140)	(0.0189)	(0.0302)	(0.0302)	(0.0562)
WATER			0.465***	0.484***	0.575***
			(0.157)	(0.126)	(0.162)
TONNAGE				-9.21e-05***	-0.000127***
				(2.09e-05)	(3.42e-05)
MTRADECAP				-0.938*	-2.647***
				(0.509)	(0.575)
SHIPS				4.13e-05	0.000112
				(3.61e-05)	(7.56e-05)
PIRATES					0.0154
					(0.00961)
LOCATION FE	Y	Y	Y	Y	Y
YEAR FE	Y	Y	Y	Y	Y
REGION FE	N	Y	Y	Y	Y
Observations	2,746	2,717	2,717	2,717	1,836

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1