

Thwarting Successful Piracy

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Introduction and Objective

In recent years, maritime piracy has received more attention from governments, the maritime industry, and the media. Increased incidents of violent attacks, particularly in the Gulf of Aden and the Red Sea, create hazards for seafarers and shipping companies. The maritime industry has issued “Best Management Practices for Protection against Somalia Based Piracy (BMP4) which can be used to prevent piracy worldwide; however, not all practices are implemented, often to the detriment of the vessel under attack.



Fig. 1. South Korean military intervention following the Somali hijacking of the cargo ship Samho Jewelry.

Source: *The Associated Press*

The purpose of this project is to identify what prevents an attack from being successful. Using data from the International Maritime Bureau’s Piracy Reporting Center and the Sea-Web shipping database, a comprehensive list of vessel characteristics, protective strategies with particular emphasis on BMP4, and cooperation with other companies or governments for each reported attack occurring between 2006 and 2011 was compiled. This information determined what relationships exist between the success or failure of an attack with the vessel and the strategies carried out by the crew. The results of this study can be used to protect ships and crewmembers.

The Piracy Problem

Under the United Nations Convention of the Law of the Sea, piracy is defined as an illegal act of violence, detention, or depredation committed for private gains against a private ship on the high seas (United Nations, 1982). Because many incidents occur *within* territorial waters, armed robbery at sea must also be considered. Both kinds of attacks can include armed robbery, hijacking, taking crew hostage, and demanding ransom for the return of persons or property (Abhyankar, 2005).

The annual reports published by the International Maritime Bureau indicate an increase in incidents of piracy and armed robbery at sea (IMB, 2010). Figure 2 depicts the trends of actual and attempted attacks from 2006 to 2010. Though Somali piracy accounts for a large number of incidents, piracy is a worldwide problem as shown in Figure 3.

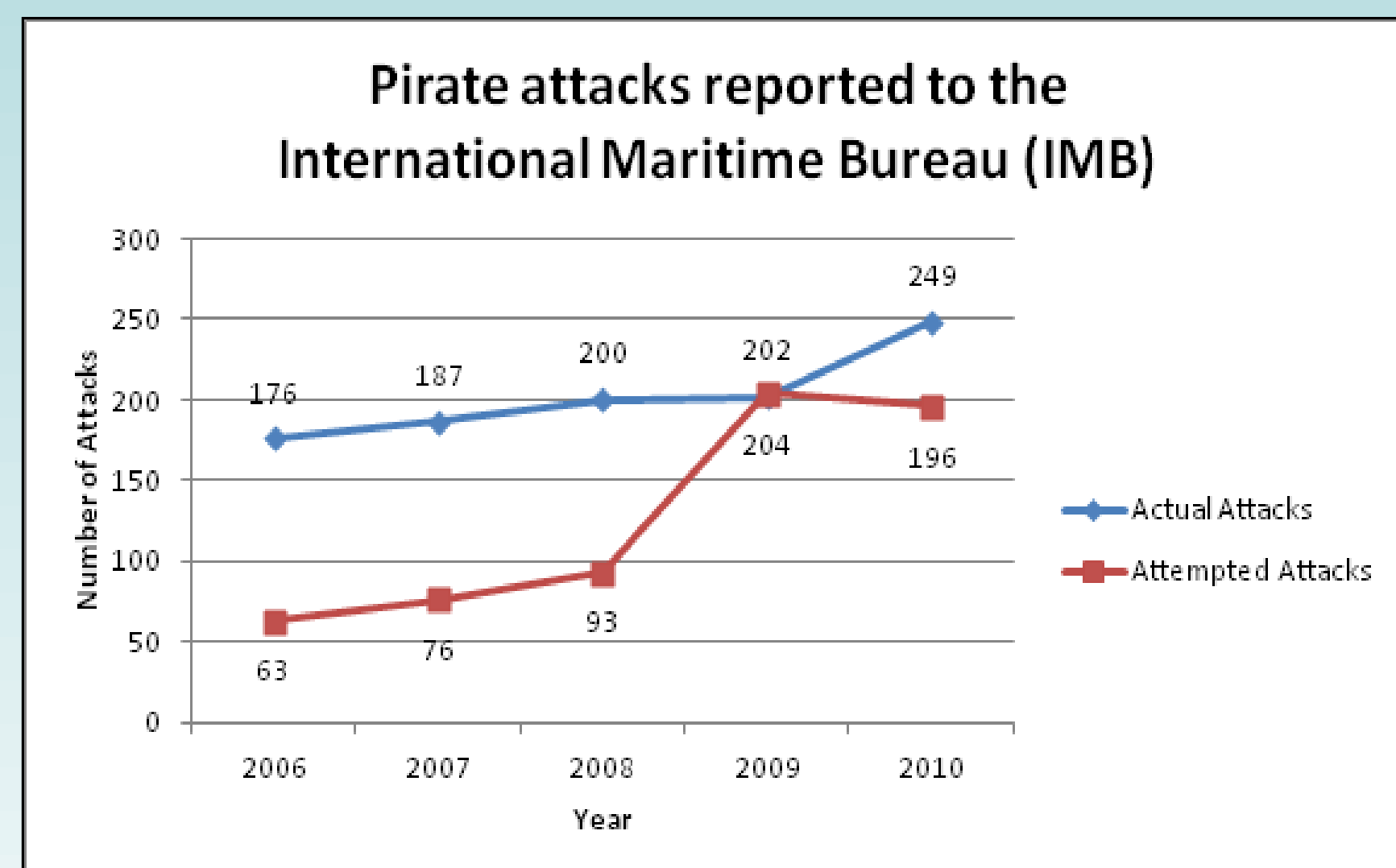


Fig. 2. The reported number of incidents of piracy and armed robbery at sea are on the increase. In 2010 alone, there were 445 attacks reported to the International Maritime Bureau’s Piracy Reporting Center (IMB, 2010).



Fig. 3. This map was published by the International Maritime Bureau to depict the location of each attack in 2010. This map indicates that most incidents occur in Southeast Asia, the Red Sea, and off the coast of Somalia, though there are incidents in the Americas as well as the western coast of Africa (IMB, 2010).

Methods

Using the IMB’s annually published Piracy and Armed Robbery Against Ships and the IHS Fairplay Sea-web shipping database, a list was created documenting the characteristics of each attack.

The variables considered are listed to the right. Each variable was selected to test whether a particular type of strategy or vessel characteristic has a significant relationship with any successful outcome for the pirates or robbers. These variables were assigned a dummy value of a “1”, indicating that the tested variable was present, or a “0”, indicating that the tested value was not present.

Variables

Dependent Variables

The dependent variables represent the potential successful outcomes for the pirates:

- Any “bad” outcome
- Hostages being taken
- Property being stolen
- Ransom being paid
- Successful escape

Independent Variables

The independent variables represent the strategies used by the crew and shipping company to prevent an attack from being successful:

- Defense strategies
- Deterrence strategies
- Cooperative strategies
- Best management practice

Control Variables*

The control variables represent the characteristics of the vessel under attack:

- Region
- Ship movement
- Type of ship
- Age of ship
- Flag of ship
- Type of attack

* The control variables size of ship and type of cargo were eliminated from the model due to collinearity and the control variables size of crew and number of pirates were eliminated from the model due to insufficient information.

With the statistical analysis software (SAS), the independent and control variables were tested against the dependent, or “outcome” variables using the equation:

$$\log(\pi/(1-\pi)) = \log O_i = \alpha + \text{Bi}(\text{Df}) + \text{Bi}(\text{Dt}) + \text{Bi}(\text{COOP}) + \text{C} + \text{E}$$

Terms: Where O_i is the log odds of a bad outcome, $\text{Bi}(\text{Df})$, $\text{Bi}(\text{Dt})$, and $\text{Bi}(\text{COOP})$ are the vectors of the defense, deterrence and cooperative strategies, respectively. C is the control variable and E is the error term.

Because “best practices” was found to be collinear with “defense” and “deterrence”, two separate studies, Models A and B, were completed in order to test the effectiveness of general defense, deterrence, and cooperative strategies, as well as industry supported BMP.

Results

The results for Model A are displayed in Table 1 and the results for Model B are displayed in Table 2.

The significance of each relationship is determined at the $p < .1$ level.

Variables with a positive (+) estimate value are shown to be more likely to result in a successful pirate attack.

Variables with a negative (-) estimate value are shown to be likely to prevent an attack from being successful.

Model A

Preventing a general “bad” outcome:

Ships using defense and cooperative strategies, or having a Netherlands flag are found less likely to result in a bad outcome. However, older vessels, or vessels in the regions of Southeast Asia, the Americas, and Africa have a higher chance of a negative outcome.

Preventing hostages being taken:

Ships using deterrence strategies, flagged under Italy or St. Vincent, at berth, or traversing the Indian Ocean are less likely to have pirates take the crew hostage. However, there is a strong relationship between vessels being hijacked and crew being taken hostage.

Preventing the need for ransom being payment:

Only defense strategies appear helpful in preventing the need for ransom payment. As with hostages, there is a strong relationship between a vessel being hijacked and the need to pay a ransom.

Preventing stolen property:

Tankers, tugs, LPG tankers, and Danish flagged vessels are more susceptible to theft. Hijacked vessels are considered stolen property, leading to a strong relationship between these variables. However, vessels attacked off of Somalia are less likely to be victims of theft.

Preventing the pirates’ escape:

Pirates are more likely to escape from older vessels. No strategy or other vessel characteristic seem to prevent a successful escape.

Dependent Variable	Independent/Control Variable	Estimate	Pr > ChiSq
Outcome	Defense	-1.4087	0.0220
	Cooperation	-1.8199	0.0010
	Attempt	2.1905	0.0189
	Fired Upon	1.9629	0.0266
Hostages	Built	0.0591	0.0048
	Netherlands	-3.3671	0.0728
	Southeast Asia	2.6381	0.0663
	Americas	3.8318	0.0305
	Africa	4.0188	0.0135
	Deterrence	-0.6972	0.0008
Stolen	Berthed	-0.7318	0.0528
	Hijacked	3.1382	< .0001
	Italy	-2.7739	0.0478
	St. Vincent	-2.1507	0.0489
	Indian Ocean	-2.1708	0.0104
Paid	Hijacked	1.6455	0.0043
	LPG	1.9978	0.0184
	Tanker	0.9389	0.0938
	Tug	1.6225	0.0113
	Denmark	2.3375	0.0655
Escape	Somalia	-3.3482	0.0078
	Defense	-2.9602	0.0080
	Hijacked	4.0282	0.0001
	Built	0.7542	0.0791

Model B

As many of the relationships are the similar in Model A as in Model B, only the differences are noted in this section.

Preventing a “bad” outcome:

Cooperation continued to be method most likely to prevent a bad outcome in general. In this model, supply ships are considered less likely to have a bad outcome.

Preventing hostages being taken:

The industry adopted best practices appear to have a positive effect in preventing hostages being taken.

Preventing stolen property:

The industry adopted best practices appear to have a positive effect in preventing hostages property being stolen. This model also shows that supply ships and vessels in the Gulf of Aden or Somali waters are less likely to be victims of theft, and tankers are no longer considered as at-risk.

Preventing the pirates’ escape:

In this model, no strategy or vessel characteristic appear likely to prevent a pirate from escaping successfully.

Dependent Variable	Independent/Control Variable	Estimate	Pr > ChiSq
Outcome	Cooperation	-2.1459	0.0002
	Attempt	2.3026	0.0135
	Fired Upon	1.9932	0.0205
	Supply	-6.2978	0.0304
Hostages	Built	0.0540	0.0053
	Southeast Asia	2.8370	0.0526
	Americas	3.8793	0.0140
	Africa	4.1288	0.0122
	Best Practices	-0.7533	0.0002
	Berthed	-0.7238	0.0523
Stolen	Hijacked	3.1086	< .0001
	Italy	-2.7922	0.0481
	St. Vincent	-2.2097	0.0470
	Indian Ocean	-2.2259	0.0086
	Best Practices	-1.3963	< .0001
Paid	Hijacked	1.5380	0.0054
	LPG	1.8671	0.0278
	Supply	-2.2395	0.0784
	Tanker	0.8714	0.0107
	Denmark	2.1125	0.0939
Escape	Somalia	-3.1751	0.0099
	Aden	-2.5105	0.0474
	Hijacked	3.9646	< .0001

References

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