

The Influence of Modern Piracy on Maritime Commercial Transport

Thesis submitted for partial fulfillment of the requirements for the MSc Degree in Urban, Port and Transport Economics

By

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November 2008

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Preface

As part of my study Urban, Port and Transport Economics at Erasmus University, I did a research on the influence of modern piracy on maritime commercial transport. I would like to acknowledge several people for their contribution towards my study. First, I want to thank my parents, for sponsoring and supporting me during the years. Second, my supervisor, Mr. M. Nijdam MSc for sharing his vast knowledge and for his guidance and comments during the study. Finally, all the persons who made time for sharing their knowledge through answering my questions.

Dordrecht, November 2008

Remon van der Meijden



Summary

Modern maritime piracy is a serious issue nowadays. The perception that the international community has eliminated sea piracy is far from true. Piracy has become increasingly more violent. Besides armed robbery, hijacking the whole ship and cargo is a routine job for today's pirates. The main objective of this thesis is:

- *To determine if modern piracy has a significant influence on shipping companies' behaviour patterns in doing their business and if there can be found significant economic effects.*

This objective is translated in a main research question:

- *What is the influence of modern piracy on maritime commercial transport?*

In order to get an answer to this question I researched the actual situation of piracy at sea, the possible effects, the direct and indirect consequences for shipping companies and the financial costs of piracy to the shipping industry. Most important information is acquired by sending a survey to shipping companies and maritime associations. Attention is given to the history perspective, the definition of piracy, the difference with terrorism, types of piracy, the most risky waters, working methods and the development of piracy in the last decade. Piracy is a crime, motivated and based on financial gain, instead of political goals. Pirates want to avoid attention and will inflict only as much harm and damage as necessary to accomplish their objective. Piracy can be classified into categories based on differences in violence and regions. The problem of piracy is an ongoing and ever changing problem. Each area has their own features and requires their own solution for their specific situation.

Reasons why piracy occurs are political corruption, economics of the third world, willingness of shippers to pay the costs of piracy rather than higher insurance premiums, failure to develop international protection and today's small crews working on vessels. Published figures on piracy do not reflect the true extent of the problem. The true number of actual pirate attacks could be close to double the official numbers. Last years, there is an increase of pirate attacks in East- and West-Africa. Furthermore, piracy is moving away from the normal coastal attacks towards the open waters. Another trend in piracy-prone areas is the tremendous increase in the hijacked and hostage strategy.

Possible effects of piracy are divided into direct effects and indirect effects such as security costs, insurance costs, the possibility of changing steaming routes, reputation damage of maritime transport and the effects of arbitrariness of pirates comparing to their main targets.



A piracy survey has revealed if this list of possible effects would have a significant influence on shipping companies. A part of 83% says that it is a significant problem for shipping companies. Especially the impact on seafarers and their relatives is one of the main reasons to point piracy as a significant problem. What can be concluded considering the piracy effects, is that a significant part says that piracy increase the transport price, leads to more integration with the navy, to increasing sailing speed in dangerous areas, to more security equipment on board, to avoiding coastlines and sailing more nautical miles, to avoiding some ports, to other sailing routes and to an increase of the insurance premiums. About 20% to 30% of the correspondents think piracy, leads to more sailing in convoy, to a decreasing labour market for crewmembers and higher wages. According to the survey piracy have a minimum effect, less than 20%, to less (grow of) demand of maritime transport, to larger vessels, a decrease in the position or liability of maritime transport, that it will have an effect to attract investors or that it will influence the development of their company's global network.

The five most attacked types of vessels are container vessels, tanker chemical product, bulk carriers, general cargo vessels and tanker crude oil. What is evidently illustrated, is that chemical and product tankers show a dramatic increase in all the years and take the second place in the list in 2008. Danger exists due to the fact that most of world's oil and gas is shipped through the dangerous piracy regions. There is also some arbitrariness of piracy related to nationalities where the ship is managed or controlled. Especially German vessels are major targets, as pirates believe their owners are more willing and able to pay ransoms for the return of the crew and vessel. Furthermore, the successfulness of pirate attacks during the years ranges between 70% and 80%. There is an increase of large pirate groups while attacks with 1-4 persons are still most common with more than 50%. Deaths, injuries, traumas, kidnapped crew, stolen personal items, pressure on crews, stress, feeling of helplessness, fear among ship crew and extra duties and risks to safety of seafarers, demoralise crews and put pressure on their relatives. This contributes to the poor public image of working in the maritime industry. Furthermore, if lack of solving the problem continuous, shipping companies will choose for alternative routes which means that inventory levels increase. Piracy can also lead to environmental disasters and can lead to a spiral of weakness in the respective region. Evidence shows that there is a relationship between global pirate attacks and failed state indicators.

According to the financial estimation, total costs of direct effects is about US \$250 million. Together with additional security, insurance costs, the chance of changing trade routes and reputation damage, piracy costs the shipping industry US \$9 billion. However, estimations of the cost of piracy vary widely and ranges between US \$1 billion and US \$16 billion per year. In relation with the US \$7.8 trillion industry of maritime commerce piracy costs approximately US \$20 for every US \$10.000 of goods shipped. Concluding, in answer to whether piracy is a threat to commerce, threat exists but is not significant in respect to the financial costs. It is however a significant problem in respect to human safety on vessels in piracy-prone areas.



1. Introduction

1.1 Problem Statement and Objective

Modern maritime piracy is a serious issue nowadays. Recent years, more attention to piracy was given in the media. South East Asia, the Horn of Africa, Gulf of Guinea and the Caribbean are still very dangerous waters for the shipping industry. It has been said that millions of dollars are lost as a direct result of maritime piracy. Piracy has become increasingly more violent. Besides armed robbery, hijacking the whole ship and cargo is a routine job for modern pirates. This phenomenon is a serious threat to the maritime shipping industry. I wonder if modern maritime piracy changes shipping companies' behaviour patterns in doing their business and if there can be found significant economic effects.

There has been done some research related to this subject. In example the report "*Piracy- Threat at Sea: A Risk Analysis*" (Munich Re Group, 2006), "*Piracy and its Effects on International Shipping*" (Bondar, 1995) and "*International and Regional Trends in Maritime Piracy 1989-1993*" (Farley, 1993). These reports dealing with possible effects as a consequence of modern maritime piracy. However, none of these researches deepened the question if these effects have a significant influence for the daily business of shipping companies. This information is vital for policy makers in governments in understanding the nature of this crime, which can lead to more effective policies.

Coming from the problem definition above, it is possible to define the main objective of this thesis:

- *To determine if modern piracy has a significant influence on shipping companies' behaviour patterns in doing their business and if there can be found significant economic effects.*

This objective can be translated in several research questions. The main research question:

- *What is the influence of modern piracy on maritime commercial transport?*

which can be divided in the following sub-questions:

- *What is the actual situation concerning modern maritime piracy?*
- *What are the possible effects?*
- *What are the direct and indirect consequences for shipping companies?*
- *What are the financial costs of piracy to the shipping industry?*



1.2 Approach and Contents

The main objective of this thesis is to determine if modern piracy has a significant influence on shipping companies' behaviour patterns in doing their business and if there can be found significant economic effects. In order to come to a well structured answer I used literature, articles, books and the knowledge of the past years obtained during the Master Urban, Port and Transport Economics at the Erasmus University Rotterdam. Though, most important information is acquired by sending a survey to shipping companies and maritime associations. To illustrate and to give a better understanding of the problem, I used some small cases. The research is focused on international merchant shipping only. Pleasure craft and inland navigation is not included in this research.

The outline of this study is as follows. The actual situation of modern maritime piracy is given in chapter two. Subjects are the history perspective, the definition of piracy, the difference with terrorism, types of piracy, the most risky waters, working methods and the development of piracy in the last decade.

Chapter three sets out the possible effects of modern maritime piracy. Insurance rates, travel time, loss of ship, crew or cargo and ransom money are some subjects that will rise in this part of the thesis. All possible effects are summed up in this chapter.

The most important issue of this research is attached to chapter four. Chapter four deals with the question if the possible effects, mentioned in chapter three, would have a significant influence on shipping companies. In this chapter, the results of the survey are stated as well. Chapter four presents the piracy perception of shipping companies, the influence on decision making and the piracy impact on the behaviour of daily business.

Chapter five provides the financial costs of piracy to the shipping industry. Finally, chapter six will end with general conclusions and final remarks.



2. Actual Situation of Modern Maritime Piracy

This chapter presents the history and the definition of piracy. I mention the different forms of piracy and the areas where most piracy attacks were reported in the last decade.

2.1 History Perspective

When we think of pirates, we often refer to the romantic and heroic stories and legends about the freedom and rich full life's at the open sea. Piracy is as old as the history of seafaring itself. In the Roman Empire period, pirates controlled the waters of important trading routes. Options to fight against it were to sign treaties and to deploy naval forces. From the 16th to the 19th century's European countries extended their territories to other contingents. Due to the growth of maritime trade, piracy became a real profession. Though in spite of the negative effects, in time of war, piracy was seen as a solution for their problem of defence. Governments permitted shipowners to plunder ships from other nationalities. Famous and fearful pirates were Barbarossa (Redbeard), Edward Teach (Blackbeard) and Henry Morgan. These historic pirates could never imagine what passes along strategic passages for piracy nowadays.

Between 1970 and the 1980, piracy began to rise again as a serious threat to merchant ships and their crews. This was one of the reasons that the International Maritime Bureau (IMB) had set up piracy reports in 1981. More and more cases were reported during the following years, due to the fact that shipping companies became more aware of the IMB reports. The perception that the international community has eliminated sea piracy is far from true. The number of piracy attacks has tripled in the past decade. Today's pirates are trained fighters and drugged teenagers aboard speedboats, equipped with satellite phones and global positioning systems, armed with automatic weapons and rocket-propelled grenades. Modern piracy is a violent, bloody and ruthless practice. Lloyd's Shipping Economist (1996b) stated that potential piracy solutions are bound in a complex web of financial, political, legal and moral issues. Besides of that, shipping companies doing their business with increasing financial pressure and the necessity to cut costs which can lead to less vessel's security in dangerous waters.

Piracy has increasingly linked with terrorism as well. Terrorist could use the same methods to capture ships and to cause blockage of trade routes or to cause serious damage in ports. However, in this thesis I only refer to piracy. Therefore, in the next section, I raise attention to the definition and the difference between piracy and acts of terrorism.



2.2 Definition of Piracy

Different definitions of piracy exist as an effort of several institutions. The definitions of the United Nations, International Maritime Bureau (IMB) and the International Maritime Organization (IMO) are mentioned below.

UNCLOS Article 101: Definition of Piracy

In the United Nations Convention on the Law of the Sea (UNCLOS) 1982, "maritime piracy" consists of:

"(a) any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed:

(i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft;

(ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;

(b) any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;

(c) any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b)."

This definition is unclear on the meaning of the word 'illegal'. It is left to the courts of the countries to decide whether the act is designed as illegal according to the international law or according to the national law of the countries.

IMB Definition of Piracy

The International Maritime Bureau (IMB) defines piracy as:

"An act of boarding or attempting to board any vessel with the apparent intent to commit theft or any other crime, and with an intent or capacity to use force in furtherance of that act."

The IMB's definition is not concerned with a formal legal definition but can be mentioned as a quite practical one in a way to effectively register pirate attacks. This definition is broader than the international legal definition. However, the IMB is an organisation that does not seek to sensationalize stories for profit. According to international law, any illegal acts of violence and detention which are committed within State's territorial waters are not defined as piracy. But, according to the IMB, nearly all illegal acts in Southeast Asia occur within territorial waters and thus would not fall under the definition of piracy. According to Chew (2005), the lack of a standard and comprehensive definition of piracy results in some subjectivity in the available statistics. In reality, a significant number of IMB's reported incidents involve thefts from ships sailing close to land, at dockside or at anchor.



IMO Definition of armed robbery

The term 'modern piracy' is often used to cover both 'piracy' and 'armed robbery' at sea. The IMO follows the United Nations Convention on the Law of the Sea (UNCLOS). IMO makes no distinction between attacks in international and territorial waters. The International Maritime Organisation (IMO) defines piracy as:

"Any unlawful act of violence or detention or any act of depredation, threat therefore, other than an act of piracy directed against a ship or against persons or property on board such ships, within a state's jurisdiction over such offences."

Another problem in the definition of piracy is the fact that piracy has increasingly linked with terrorism. Ong (2004) argued that one possible way forward in dealing with piracy and maritime terrorism in Southeast Asia is to couple them. In this way, piracy can classified by international law and conventions as acts of maritime terrorism. The effect will be that the overall threat of piracy will rise into a significant security issue. It will sharpen the attention on piracy, which is a relatively neglected concern by regional governments as compared to the threat of terrorism. Tremendous initiatives in dealing with piracy are absent because the problem is not given the kind of attention it deserves. Piracy seems not recognised as an existing modern threat in contrast to other threats such as international terrorism. However, there can still made a well argument distinction between piracy and terrorism. This will be explained in the next section.



Ong (2004) mentioned some similarities between piracy and terrorism. Both, piracy and acts of terrorism are international or transnational crime. Secondly, the tactics and methods used in both activities overlap each other. Both use same types of equipment, weapons and violence in achieving their objectives. Due to the fact that piracy has become more violent, last years it becomes closer to an act of terrorism. The remaining barrier between extreme acts of piracy and maritime terrorism according to Ong (2004) is a legal and definitional one. This is illustrated in figure 2.1. Piracy is a crime, motivated by greed, and therefore based on financial gain. Terrorism is motivated by political goals beyond the immediate act of attacking or hijacking a maritime target. The motivating factor for terrorists is generally a political ideology and to sabotage the political or economic system. Pirates however, want to avoid attention and will inflict only as much harm and damage as necessary to accomplish their mission while terrorists want to call attention to their cause and inflict as much harm and damage as possible. Pirates have no interest in a terrorist attack that would draw attention to their lucrative business. Percival (2005) stated that for today, no significant relationship between piracy and modern terrorism is demonstrated. Besides of that, the increase in piracy attacks can not be seen as an indicator of the increase in terrorist threat.

Piracy in relation to terrorism

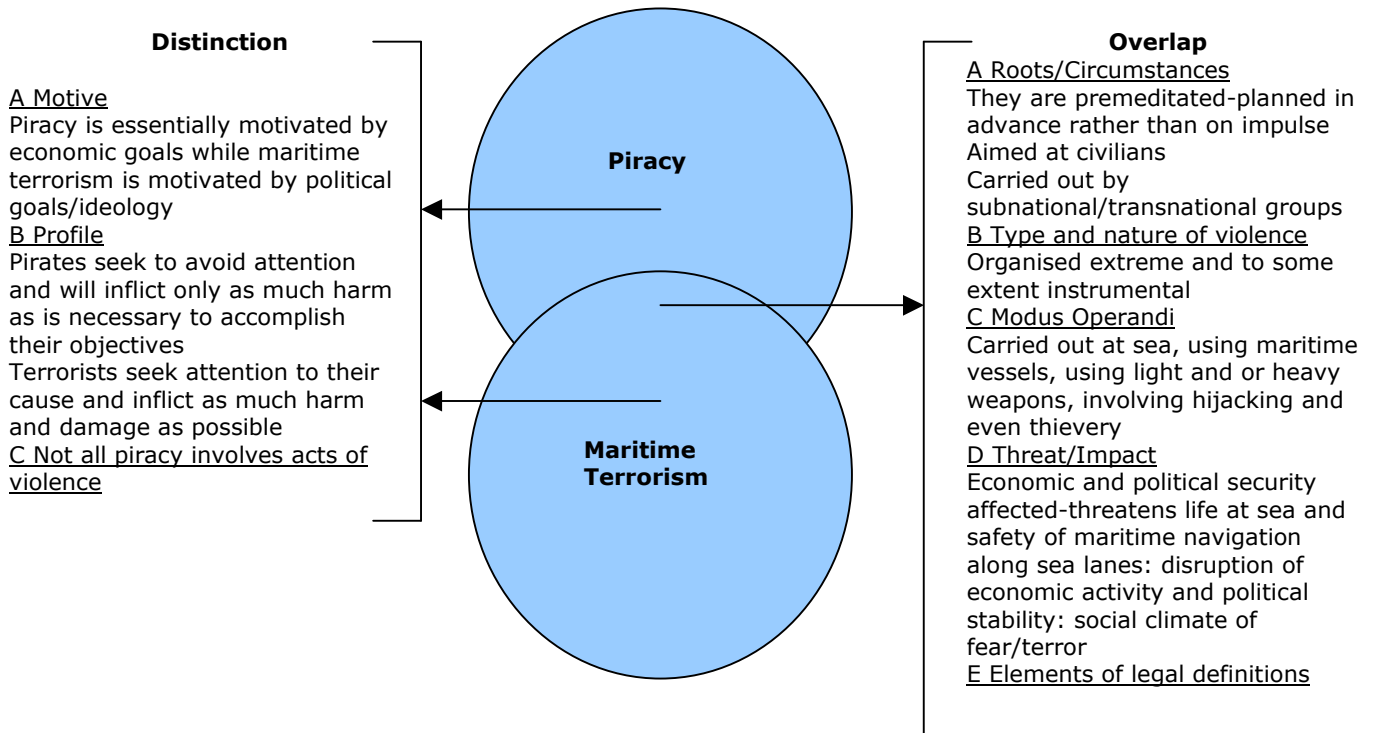


Figure 2.1. Piracy linked to terrorism (Ong, 2004)



The distinction between piracy and maritime terrorism is also well illustrated by Chew (2005). He explains that three dimensions are important. Namely 'ends', 'means' and 'effects'. In terms of 'ends', piracy is driven by a financial gain, while terrorism is often politically motivated. In terms of 'means', piracy is associated with basic tactics and capabilities. Terrorists are associated with sophisticated capacities. In terms of 'effects', piracy can be addressed to the tactical level. Terrorism often aims at achieving a strategic effect. These characterizations are rather simple. In practice, piracy and maritime terrorism can not easily be divided. Certain groups operate in the so called 'grey zone'. This is illustrated in figure 2.2.

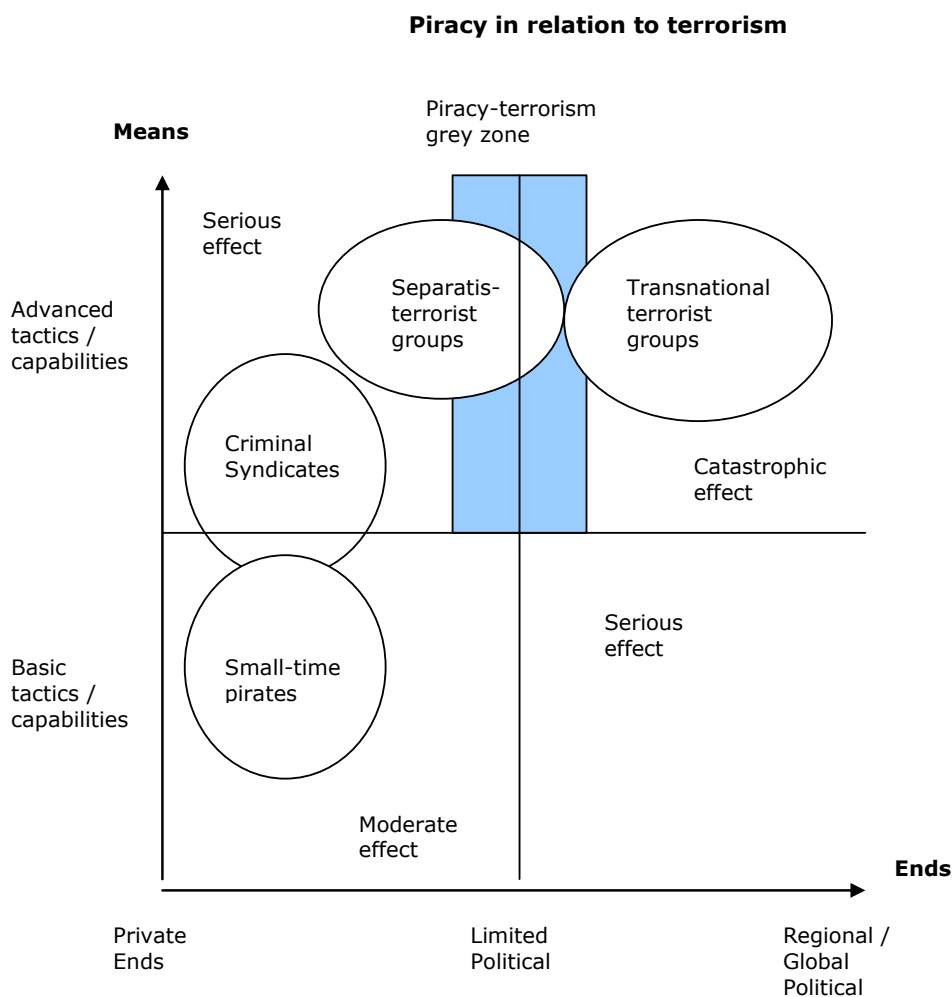


Figure 2.2. Distinction between piracy and terrorism (Chew, 2005)



2.3 Regional Variations and Types of Piracy

According to the International Chamber of Shipping (ICS), piracy can be classified into three basic categories. First, there is 'Low level armed robbery' which contains an attack with the intention of stealing. Whatever there can be carried from the deck and hold would be stolen. Pirates looking for money, crew belongings, cigarettes, alcohol, stores, ropes and mooring. Violence only occurs when the crew tries to stop them. Usually, the duration of such an attack lies between thirty and forty minutes.

The second form is called 'Medium level armed assault and robbery' or armed assault with violence or threats of violence. Pirates usually come on board unnoticed and force the crew to hand over their cash and valuables. Cargo would also be stolen if possible. Each raid is over in less than an hour. The financial loss is usually in the order between US \$10.000 and US \$20.000.

The last category is called 'Major criminal hijack', which is defined by the ICS as carefully planned theft of the entire cargo. Pirates often know every detail of the cargo and the ship's steaming plan. While some of the pirates hold the crew captive, others transfer the cargo to another ship. When the attack is over, the ship drift in the ocean with the bridge unmanned. This type of attack usually results in a million dollar loss.

Abhyankar (2002) used another classification. According to Abhyankar (2002), piracy can be divided in five specific forms, varying according to different regions. First, there is what can called 'Asian piracy'. Ships are boarded by pirates, sometimes disguised as coast guards or harbour police, and then cash and valuables are stolen from the safe and the crew with minimum violence. The ship's safe often contain large amounts of cash which is needed for payroll and port fees. These attacks are not on the high seas as all the waters in the region are within the territory of the various countries. This form of piracy is characterized by night attacks, the high degree of skill that is used to come on board of the ship and the fact that violence is only used when detected or getting resistance.

Secondly, there is 'South American' or 'West African piracy'. More violent attacks will happen where ships berthed or at anchor. Targets are cash, cargo, equipment or anything which can be moved and carried. The high degree of violence, pre-planning and value and the lack of competence or willingness to respond on the part of law enforcement are the characteristics of this kind of piracy. Just as the first form, pirates come alongside in small craft and mount high-sided ships with remarkable skills.

'Piracy with military or political feature' is the third form of piracy. These are likely incidental incidents. 'Hijacking a ship, overpowering the crew and stealing the entire cargo' can be stated as the fourth variation.



Finally, the latest form that can diversified is called 'phantom- or ghost-ship'. The pirates force the crew off the ship and then sail it to a port in order to repaint it and to give it a new identity through false papers. According to Macqueen (2004), register a vessel can easily done in Belize, Honduras or Panama. These governments do not ask the origin of the ship. The objective of this kind of piracy is to use the ship to commit cargo frauds. The turnaround time for a phantomship operation lies around the ninety days. Such ships can manage three or four voyages a year. It is a huge profitable business. The life time of a phantom ship is about two and a half years. After that, the ships which are not maintained very well will be abandoned by the pirates.

Another new trend in piracy is characterized by the fact that pirates attacked and kidnapped crewmembers and demanding ransom for their safe return. Modern pirates make use of the newest technology. They use mobile phones, modern speedboats, assault rifles, shotguns, pistols, mounted machine guns, and even rocket-propelled grenade and grenade launchers. In spite of that, more primitive weapons such as knives, batons, or boat-hooks are also often used.

According to the Munich Re Group (2006), the problem of piracy is ongoing and ever changing problem. Each area has their own features and requires their own solution for their specific situation. Reasons for a regional increase in piracy are different per region. Pirates are organised in different ways. Individuals, gangs, separatist groups, organized criminal gangs or pirates posing local military forces. However, there are also some similarities between these regions. First, where piracy is concerned, regional growth trends are always directly related to economic crises and inadequate legal and security systems. Second, pirates often operate in regions of developing or struggling countries with smaller navies and large trade routes. Marine Log (2007b) stated that socio-economic issues arising in regions where maritime trade meets poverty, social instabilities and an absence of effective law. The financial gain creating a breeding ground for piracy. Facilitators of the piracy development are maritime bottle necks, fishing fleet for camouflage, adequate boat facilities, existence of black markets and money laundering. The most piracy-prone waters can divided into three areas:

- South East Asia and the Indian Sub Continent (Bangladesh, India, Indonesia, Malacca straits, Singapore Straits, Africa and Red Sea);
- Gulf of Aden and Southern Red Sea (Somali waters, West Africa);
- South and Central America and the Caribbean waters (Brazil, Haiti, Dominican Republic, Jamaica, Peru).



South East Asia and the Indian Sub Continent (Bangladesh, India, Indonesia, Malacca straits, Singapore Straits, Africa and Red Sea)

Narrow bodies of water, such as the Suez Canal, the Panama Canal, and the Strait of Malacca, are vulnerable hotspots. As usage of these canals increases, many of these ships have to lower steaming speeds for navigation and traffic control, making them prime targets for piracy. According to Bondar (1995) in Southeast Asia and in the China seas, people have always looked upon piracy as an alternative of fishing. However, in Indonesia, an increase in trade and the many small ports were one of the reasons of the increase of piracy. There was a small decrease of piracy in Indonesian waters as a cause of the deadly tsunami in December 2004. Mednikarov (2006) mentioned that besides 'low level armed robbery' and 'medium level armed assault', hijacks of vessels have often happened in coastal waters of Indonesia, the Straits of Malacca and the India subcontinent. During piracy attacks, the vessel is not under the command of its crew for a period of time. In some cases, the movement of supertankers during an attack is controlled only by the automatic pilot, while the attack is carried out in canals, straits or other areas with busy navigation. This increases the risk of collision or stranding the ship with all resulting economic losses and ecological consequences.

Gulf of Aden and Southern Red Sea (Somali waters, West Africa)

Munich Re Group (2006) described that when the Barre regime in Somalia was deposed in the early 1990s, the state lost control of its own coastal waters and trawlers. Other countries were able to fish in Somali waters unhindered and this have led to violent collisions. The local fishermen were more or less defenseless against the large foreign trawlers and increasingly turned to piracy in order to save their make of living. There is also a power conflict between the warlords, which has now extended to the sea. The warlords use their power in Somalia for their own private attacks on ships, above all with the intention of demanding ransoms. As a result of political instability, poverty, easy access to weapons and the desire to acquire bigger vessels in order to become better skilled pirates, acts in Somalia becomes very violence. Somali piracy is characterized by the fact that pirates attacked and kidnapped crewmembers and demanding ransom for their safe return. Somali pirates use mother ships to launch attacks as far as 350 nautical miles offshore. When a ship moves slowly or stops, due to engine failure for example, in this area of the coast of Somalia, there is a high possibility that vessel and cargo will be hijacked or crew kidnapped.

South and Central America and the Caribbean waters (Brazil, Haiti, Dominican Republic, Jamaica, Peru)

According Mednikarov (2006), attacks of mostly 'low level armed robbery' and 'medium level armed assault' are being carried out in the coastal waters and ports in South America near Brazil, Ecuador and Columbia. In South America some piracy and armed robbery attacks are related with drugs. Pirates in this area trying to gain access when the ship is berthed in ports. Checking of ships' compartments and securing before leaving ports is recommended in this region. With the development of the economy and therefore increasing maritime trade to this region, this environment could be the next piracy-prone area.



2.4 Development of Piracy

After the flourishing time, piracy declined in the 19th century. Daniel (2000) mentioned some reasons behind this trend. One of these reasons was the increased size and speed of merchant vessels that disadvantaged pursuing pirates. Second, in the 19th and 20th centuries, the international Navy patrols increased at sea for supporting colonial networks. In this period of time land and colonies were marked by the regular administration. These nations protecting their merchant fleets. Finally, there was a general recognition of piracy as well.

2.4.1 Reasons and Facilitators

According to Daniel (2000), after World War II these four factors began to encourage the activity of pirates. Technology has reduced the size of the crew, as well as a vessel's ability to defend itself. It has also improved the pirates' weapons of speed, shock, surprise, fire power and rapid escape, as well as the easier access to information about shipping plans and routes. At the same time there was a trend of reducing Navy forces. Dramatically decreased international ocean patrols and presence have left merchant vessels unprotected on the risky waters. Another reason of the increase in piracy is the fact that former colonies have not maintained their ties with home countries. These links brought stabilising effects, including piracy problems. Now, former colonies have some financial inability to afford effective navy patrol.

To conclude, reasons why piracy occurs are political corruption, economics of the third world, willingness of shippers to pay the costs of piracy rather than higher insurance premiums and to avoid the political risks associated with reporting attacks and the failure to develop international protection agency and today's small crews working on vessels as a consequence of cost saving tactics. Therefore pirates can come on board without ever being seen. In the crucial geographic areas, at the local level, no serious effort is made to prevent or to respond to piracy, due to the corruption of officials and simply insufficient resources, police and military forces. Furthermore, last decade, there is an increase in the level of violence, use of weapons, technological equipment and launching speedboats from motherships. Due to piracy reporting centre's there is created more awareness to governments and they are forced to take action.



Petretto (2008) also states some causes and facilitators of piracy. First, piracy has a financial gain motive. Easy and low-risk profit making is the main reason for people to become a pirate. However, the amount of reported pirate attacks is different per region which proves evidence, that there are more variables which have to take into account as an explanation for piracy. Busy sea routes and suitable geography do facilitate piracy as well. Ships which have to pass straits, islands or so called choke-points have to reduce speed and are therefore an easy target. These surroundings are also perfect hide-outs for pirates and their boats. Furthermore, conflict, disorder, poverty together with a weak security sector provides a breeding ground for piracy. On the one hand, when facing poverty and continuous disorder, people quite easily slide into illegality as a way to survive. Moreover, fishing-disputes are also a reason for piracy. Besides of that, piracy is also tied up ashore. First, there is a constant need of information about which vessel passes where and when, how large the crew is and what type of cargo is loaded. Secondly, accessibility of shores or anchorages has to be provided. Therefore, well guarded ports with strong security forces are not really an option. Thirdly, especially when vessel-, cargo- or oil theft is involved, pirates do not only need buyers for the stolen goods but also able persons to falsify official documents. The last factor, does link piracy to international organized crime. Pirates can therefore considered as the tip of the iceberg within a complex network of organised criminal activities all over the world.

2.4.2 Piracy Statistics

The International Maritime Bureau (IMB) maintains statistics regarding pirate attacks dating back to 1995, while the International Maritime Organisation maintains reports since 1984. Published figures on piracy may however not reflect the true extent of the problem. Some experts believe the true number of actual pirate attacks could be close to double the official numbers. The IMB piracy reporting centre assumes that 50% remain unreported. According to the IMO, it is estimated that only one third of piracy incidents are reported and according to Daniel (2000) even only 10% are reported by the shipping industry. Political reasons could prevent shipping companies from helping and mobilising the local authorities. Munich Re Group (2006) mentioned that there were cases in which victims reported the attacks and then became involved in suspicious investigations or were even declared to be offenders themselves. The investigations could very lengthy as well. The associated loss of time leads that shipping companies not reporting an attack. It is therefore difficult to state any precise figures to the number of attacks. Due to experiences in the past, it is not strange that shipping companies prefer to negotiate the release of crew, ship and their cargo rather than absorb the costs, both in time and money, of reporting acts of piracy to local authorities. Reporting an attack to some local authorities is time consuming and can lead to a delay of several days. According to Percival (2005), the running sunk costs of a ship are approximately US \$25.000 per day. Due to this fact it is, especially in smaller cases, cheaper not to report the incident.



State authorities do not often report incidents that happened under their surveillance to international institutions, trying to minimise the risk of damaging the reputation of their harbour and sea routes. One good example is given by Hand (2008). He described that some Singapore-flagged shipowners were told not to report attacks to the piracy reporting centre in Kuala Lumpur. Furthermore, the IMB is finding that attacks are not reported to it by rescue centres in the Asian region, but rather to the regional cooperation agreement on combating piracy and armed robbery against ships in Asia's Information Sharing Centre (ISC) in Singapore. However, ISC is only open during office hours and does not play an active role in coordinating responses to attacks. Quick response can save seafarers lives and reduce the amount of financial costs. A list of reasons why shipping companies are reluctant to report attacks is mentioned below:

- State authorities often do not report incidents that happened under their surveillance to international institutions trying to minimise the risk of damaging the reputation of their harbour and sea routes;
- Due to the fact that there are different official piracy definitions, it leads to underreporting of incidents of piracy in territorial waters if captains and/or state officials act upon the UNCLOS definition and refrain from reporting them to the respective authorities;
- Some shipping companies only report to local institutions;
- Some shipmasters do not report pirate attacks because they expect that country's representatives cannot help them anyway;
- Fear of companies regarding bad publicity to customers or media attention;
- Small vessels attacked, belonging to small companies, not often see any interest in reporting such attacks, or even do not know that these attacks can be reported;
- In some areas when piracy takes place, it can happen that all people on board are killed and vessel seized. In case of a fishing vessel, no one will hear about this attack;
- In the highly competitive shipping industry, there is reluctance for shippers to report piracy incidents fearing missing contracts and fear that their customers will lose confidence in them;
- Shipmasters are aware of the fact that the more incidents are reported, the higher will be the costs of future risk insurances for the respective sea routes;
- Shipmasters fear that being a victim of piracy reflects unfavorably on their discipline and watch keeping;
- Shipping companies believe that by highlighting themselves, their risk of further attack is increased;
- Some shipping companies only report bigger ones, because daily attempted attacks are too much time consuming to report every day;
- Pirates themselves want to avoid attention as well.



As said, the International Maritime Organisation maintains piracy reports since 1984. The reports of IMO contain the names and descriptions of the ships attacked, their positions and times of attack, consequences to the crew, ship or cargo and actions taken by the crew and coastal States to which the incidents were reported.

Yearly statistics of incidents which occurred since 1984 (worldwide)

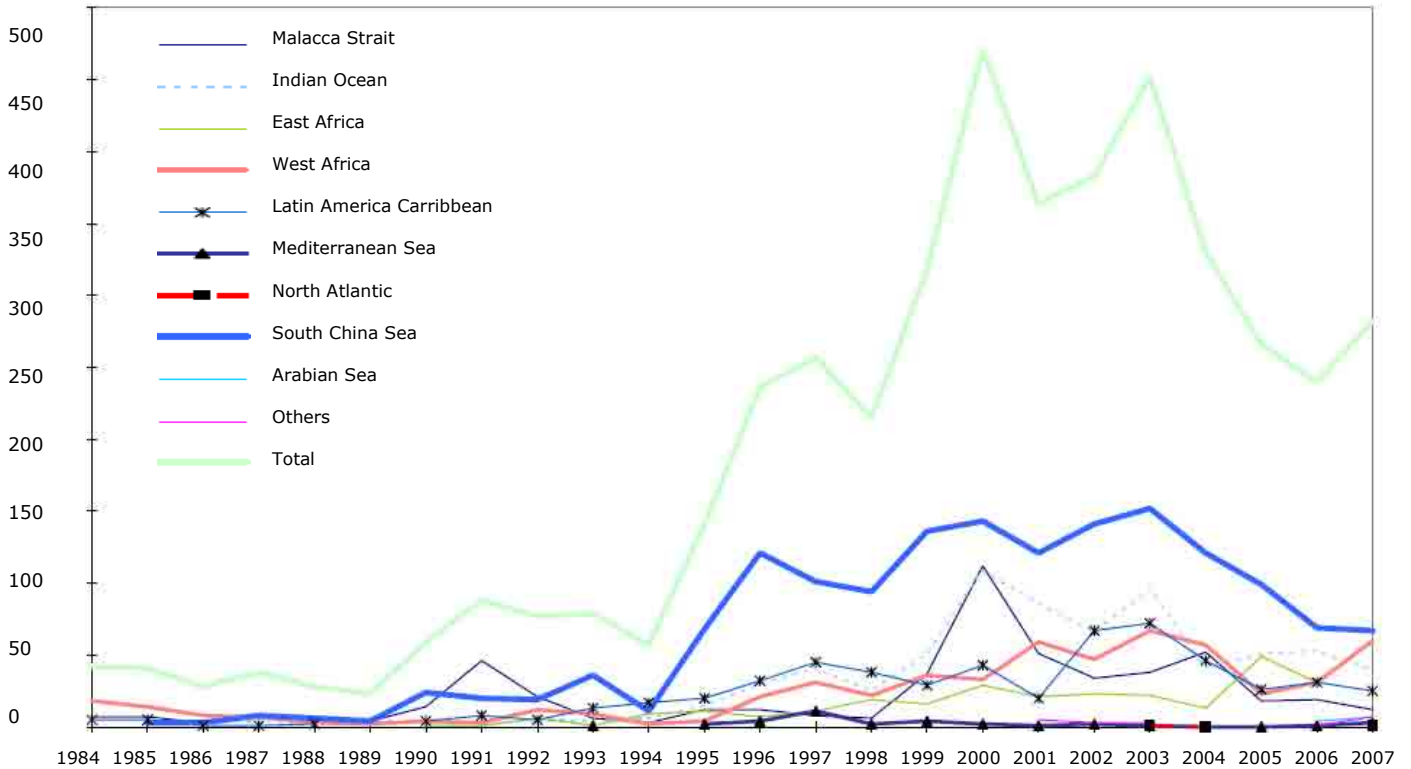


Figure 2.3. Yearly statistics of incidents since 1984 (annual report IMO, 2007)

In figure 2.3 there can be seen a tremendous increase in reported pirate attacks between 1994 and 2003. After this period, pirate attacks declined until last year. One of the reasons in this aspect is that the maritime safety committee in May 1995 instructed to prepare monthly reports of all incidents of piracy and armed robbery against ships reported to the IMO. Secondly, in 1994 the reporting centre of Kuala Lumpur started making monthly piracy reports as well. Another reason that has had influence on the amount of attacks was the tsunami in December 2004, which has led to a decrease in 2005. Other reasons of declined worldwide reported incidents in 2005 compared to the previous six years are mentioned by Fouché (2006). As a cause of the decrease in incidents he pointed out the increased awareness and anti-piracy watches by masters in risk prone areas, increase in law enforcement patrols and international pressure on some governments to take action.



As said before, published figures on piracy may not reflect the true extent of the problem. Besides of that, there must noticed that the IMO reports contains acts of piracy and armed robbery against ships as well. The IMB piracy reporting centre assumes that 50% remain unreported, the IMO itself estimated this number to 66% and Daniel (2000) estimated even 90%. Petretto (2008) also suggest dark figures about 20% to 70% higher than the statistics reveals. Instead of the 282 reported pirate attacks in 2007, in practice this can range from 340 to 2820 actual pirate attacks and armed robbery against ships. Although the statistical data is by no means a true indicator of the actual criminal activity that takes place, it still provides an overall view of the problem.

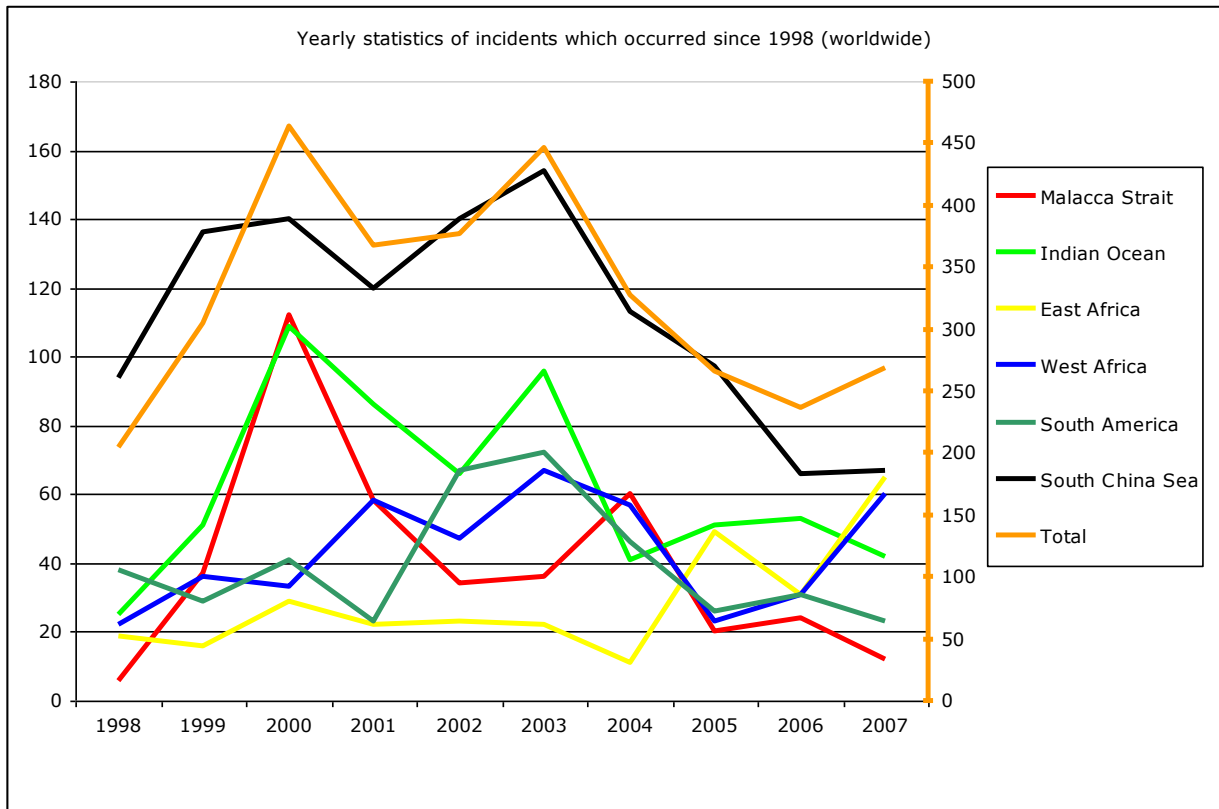


Figure 2.4. Yearly statistics of incidents since 1998 (data obtained from annual reports IMO, 1998-2007)

The yearly statistics of incidents since 1998 is given in more detail in figure 2.4. The total number of reported incidents of piracy and armed robbery against ships is stated in 'orange'. After three years of decreasing reported incidents, there can be seen an increase in pirate attacks in 2007. With 282, this is an increase of 41 attacks or 17% over the figure for 2006. Last months, high attention was given by the media to pirate attacks at Somalia, the Gulf of Aden and Nigeria. In spite of the fact that 2008 is not included in the figure above, there can already be seen an increase of pirate attacks in East Africa and West Africa in 2007. The rest of the world shows a small a decrease, with a kind of some stability in the South China Sea. Appendices V, IX and X illustrate the regions where piracy often occurs.



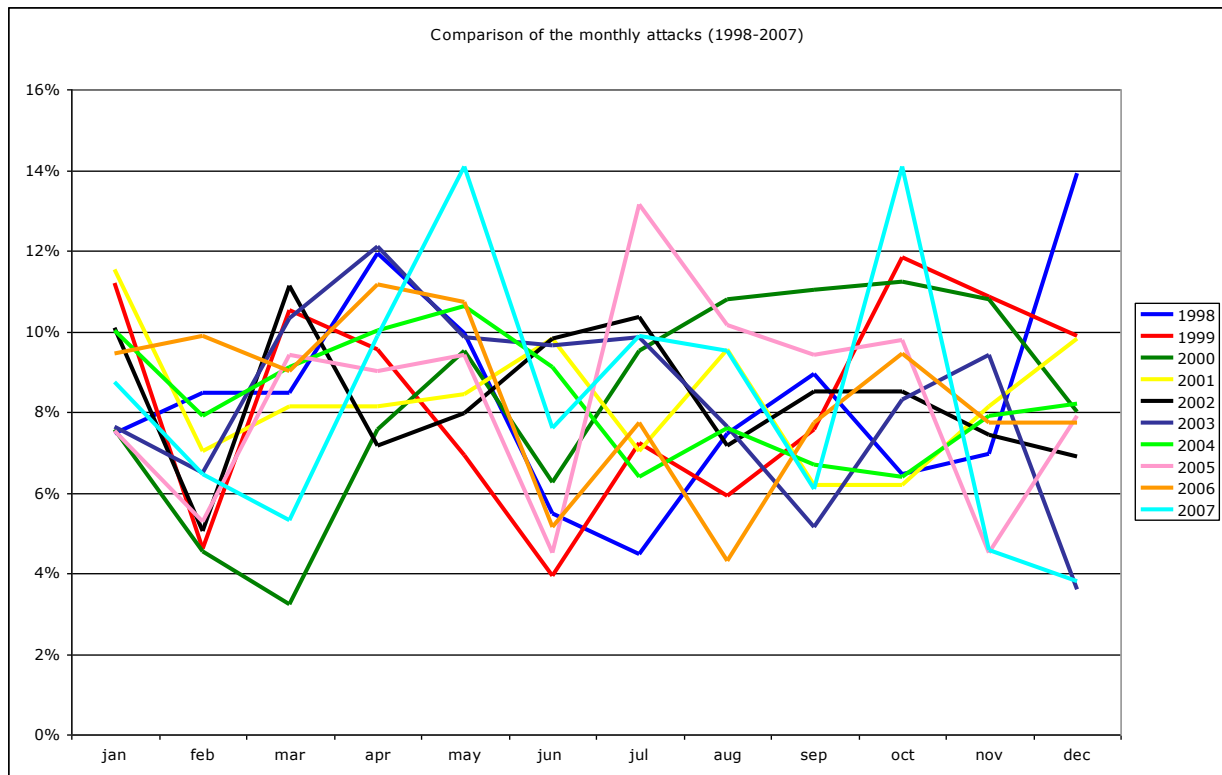


Figure 2.5. Comparison monthly attacks (data obtained from annual reports IMO, 1998-2007)

Other trends are that pirate attacks moving away from the normal coastal attacks towards the open waters and that it become more violent. Talley (2005) gives an answer on the question if the number of piracy attacks are higher during certain times of the year. He stated that the smallest number of monthly attacks occurs in the months of November to March and the highest number of attacks occurs in the months of April to October. Nevertheless, analyzing the reports of IMO this varies widely per year. I have made a comparison of the monthly statistics of the total reported attacks in figure 2.5. It is very hard to give some conclusions. Even after splitting it up into different areas, which is illustrated in appendix I, it remains difficult. There is not a significant seasonal patron.

In this chapter, I have outlined the history of piracy, the definition and the different forms of piracy. I have made attention to the development of piracy as well. In the next chapter, I will list the possible effects of modern maritime piracy.



3. Possible Effects of Modern Maritime Piracy

3.1 Direct Effects

The continuing threat of piracy raises the cost of undertaking trade through a range of indirect and direct effects. Examples of direct effects are robbery and ransom payments due to losses of safe and cash money, losses of ships and cargo and additional pay for crews. Indirect effects are for example security costs incurred in the fight against piracy and higher insurance premiums in the dangerous areas. Before giving an estimation of the related piracy costs in chapter 4 and 5, possible effects will be summed up below, starting with the possible direct effects:

- Delays caused by attempted attacks themselves due to escaping maneuvers;
- Damage to the ship or cargo incurred in the attack;
- Loss of safe and cash money;
- Loss of cargo;
- Loss of hire;
- Loss of operation during the attack and investigation procedures;
- Loss of the whole ship as a cause of hijacking;
- Kidnap and ransom money for ship and seafarers;
- Investigation costs;
- Costs of negotiating and delivering the money;
- Contractual penalties due to delayed or damaged delivery;
- Cargo fraud with phantom- or ghost-ships.

I will state some notes in the context of the investigation procedures. With daily vessel operating costs ranging from US \$10.000 to US \$50.000 or more, spending a week in a port while sometimes untrained or corrupted local police doing their investigation will usually cost a lot more in lost time than a small pirate attack itself. Second, there are examples of cases in which victims reported the attacks and then became involved in the course of investigations or were even declared to be offenders themselves. This is well illustrated in the case below: 'When victims become offenders'.

Case: When victims become offenders.

"A container ship sailing under German flag was raided in Port Harcourt (Nigeria). The pirates boarded the ship under cover of darkness as it was being unloaded. They broke into a 40-foot container on deck with spare parts for commercial vehicles and stole most of the shipment. When the crew noticed what was happening and raised the alarm, the robbers made off in their boats and disappeared in the nearby mangrove swamps. The ship's officers reported the attack to the local authorities. After checking the papers, the authorities charged the officers with having imported undeclared and uncustomed goods – an offence for which a large fine was imposed. The local authorities appeared not to display any interest in the reported robbery. So far as is known, they did not follow up the crew's information, no-one was arrested, and the stolen goods were never found."

(Munich Re Group, 2006)



3.2 Indirect Effects

Security costs

To minimise the risks, shipping companies dealing with additional cost of transport due to additional security measures. Piracy force shipping to take expensive measures, such as hiring security guards, crew training and defensive equipment. In the end it will probably have an effect on the transport price.

Possible effects which can mentioned:

- Costs incurred in the fight against piracy;
- Additional security measures;
- Additional security costs;
- Increase transport price.

Insurance costs

In certain regions, insurance costs can increase due to the threat of piracy. This is illustrated in the case of the 'Limberg attack' on page 28. Immediately after the attack, underwriters tripled insurance premiums for vessels calling on Yemeni ports. The shipowners and cargo owners themselves are usually insured against pirate attacks. According to Munich Re Group (2006), it is far more difficult for the insurers to reduce the incurred loss than for their clients. If the insurance companies getting aware of a new increase of piracy in some dangerous waters, then it is a fact that the insurance premiums will rise. Shipping companies have insurance, but according to the IMB, kidnap and ransom premiums will rise higher and higher. Today, according to the IMO, US \$1.5 million dollar is estimated for ransom money per attack. The transport price could rise due to this phenomenon. In no doubt, shipping has become more expensive as companies began paying ransoms and higher insurance premiums to protect their ships, cargoes and crews. Possible effects in respect to insurance costs are:

- Higher premium in piracy-prone areas;
- Additional kidnap and ransom insurance;
- Additional costs;
- Increase transport price.



Change in trade routes

A possible effect could be that shipping companies avoid servicing in piracy-prone areas or that they change their steaming routes. If risks continuous in Southeast Asia, shippers may instead sail south of Indonesia to avoid the dangerous region and increase their prices to finance longer routes. Procedures of the IMO change continuously. The official warning today is to sail 250 nautical miles of the East coast of Africa. This will lead to non-optimal economic routes and a price increase of maritime transport. Effects of change in shipping routes are:

- Longer distance;
- Longer travel time;
- Avoiding some ports;
- Increase costs;
- Increase transport price.

Arbitrariness of piracy

Luft (2004) stated that piracy is especially dangerous for energy markets. Most of world's oil and gas is shipped through the dangerous piracy-prone regions. Targets of piracy attacks include most classes of vessels. Though, when it comes to cargo, chemical product tankers are one of the most interesting targets. In relation with the increased competition in energy markets, this can also have an effect on world's oil price. This could be a dramatic consequence of attacks on oil tankers where pirates pumping fuel to their own vessels. Today, this has become a serious coordinated business at the East of Africa. In the end, the consumer will pay these kinds of additional costs.

Large ships with freeboard (distance from the water line to the deck) of more than 10 meter and speed above 20 knots (37 km/u) are more difficult to capture for pirates. Easy targets are small container vessels with low speed and a small freeboard. The question will be, if piracy has more effect on shipping companies with smaller vessels in their fleet or that in general the strongest players will survive. In that case, according to Bulkeley (2003), only the most expensive or well-equipped shipping companies will find it economically feasible to bring imports into piracy-prone waters. As a result, due to the possible arbitrariness of pirates, the following effects can mentioned:

- Increased competition energy markets;
- Increase world's oil price;
- Increase general price levels;
- Change in level playing field;
- Specialisation.



Reputation damage

Doing business in a more risky environment could lead to higher investment risk premiums. Furthermore, crew impact of piracy can be enormous. Attacks, hostages, injuries, risk of being killed and traumas will lead to possible claims for damages by members of the crew and their relatives. Working in such environment will be less pleasant and can lead to a smaller labour market for the shipping industry. Modern pirates taking advantage of the small size of the crew on modern cargo vessels. Shipping companies have to re-think about the size of their crew. Possible effects are:

- Increasing investment risk premiums;
- Crew impact;
- Claims of crew and family
- Smaller labour pool;
- Less quality maritime transport service;
- Increased workload on board;
- Double-pay danger money;
- Additional costs;
- Increase transport price.

Liability maritime transport

According to OECD (2003), pirate attacks against vessels can be used as a political tool to disrupt vessel passage through certain maritime bottlenecks. This is especially true in the case of the strategically important Malacca Straits where most Middle-East oil exports to Asia and most commerce between Asia and Europe pass. Due to fear of bottlenecks and changing steaming routes, it will lower the liability of maritime transport. It could create the need to count with higher inventory levels due to the potential piracy to cause bottlenecks in world's delivery systems. This will reduce the benefits of just-in-time manufacturing processes and undermining supply chain management. Effects are summed up below:

- Lower liability maritime transport;
- Costs of higher inventory levels;
- Less (grow) of demand maritime transport.



Environmental impact

Piracy could lead to environmental disasters with oil tankers. There are known cases where the bridge left unmanned after an attack. Collision with another vessel or grounding could lead to environmental disasters. The costs of these kinds of disasters can be considered as tremendous. Effects are:

- Environmental and ecological catastrophe;
- Major chokepoint closed for a long period of time.

Political unrest and economic loss for the region

Trade disruption could lead to an economic loss for the region. It disrupts the already disordered economy of the region and threatens the stability of many states that are dependent on foreign imports. Food supply also suffer from piracy in the region. There are known cases in the region of Somalia, where ships delivering UN food aid were attacked. Economic loss for a region is illustrated in the case below: 'Limberg attack'.

Case: October 2002 Limberg attack.

"Immediately following the attack, underwriters tripled insurance premiums for vessels calling on Yemeni ports. These premiums, reaching as much as USD \$300.000 per vessel (and USD \$250 per TEU), led some lines to cut Yemen from their schedules and/or switch to ports in neighbouring countries despite attempts by the government to put in place a loss guarantee program. Yemeni terminals saw throughput plummet (from 43.000 TEU in September 2002 to 3000 TEU in November 2002) and have had to lay off workers. Local sources claim that as many as 3000 people have lost their employment and government estimated losses stemming from attack are USD 15 million per month. Assuming that these losses are sustained over a 6-month period, they would account for nearly 1% Yemen's 2001 GDP."

(OECD, 2003)

Possible effects related to this subject are:

- Disruption import/export;
- Danger to local fishing fleet;
- Danger to food delivery aid;
- Danger to political (in)stability;
- Economic loss for the region.



In this chapter, I have mentioned the possible effects related to piracy attacks on maritime transport. These effects are divided into direct effects and indirect effects such as security costs, insurance costs, possibility of changing steaming routes, reputation damage of maritime transport and the effects of arbitrariness of pirates in respect to their main targets. Direct effects are directly related with an attack themselves and based on the individual incident, while indirect effects are related to the whole chain, like the total shipping industry, shipowners and shippers (owners of the cargo transported).

The effects and therefore the actual cost of piracy can be measured in several ways, human, political, economic, and environmental. I am aware of the fact that for each classification there exist well defined arguments. However, in my opinion the factors of liability of maritime transport, environmental costs and political and economic losses to piracy should not be measured in the calculation of financial piracy costs to the shipping industry. These effects and their cost elements are more vague and can not simply be seen as directly related effects of piracy. Some effects are bilateral, such as the political and economic stability. Low level of political and economic stability is one of the reasons that piracy exist, while an increase of piracy can lead that this instability can decrease further. The liability of maritime transport has to do with the liability of other transport modes and access to other transport options. These effects and their related costs, such as higher inventory levels and environmental disasters, are very difficult to measure. The related costs can be considered as huge. Furthermore, these effects are also affected by a range of other effects and the way of doing business in the world wide economic system. For this reason, I classify these effects under a red line in order to make a distinction to which effects should be the main focus in this research. This classification of the effects and the boundary is illustrated in figure 3.1 on the next page.



3. Possible Effects of Modern Maritime Piracy

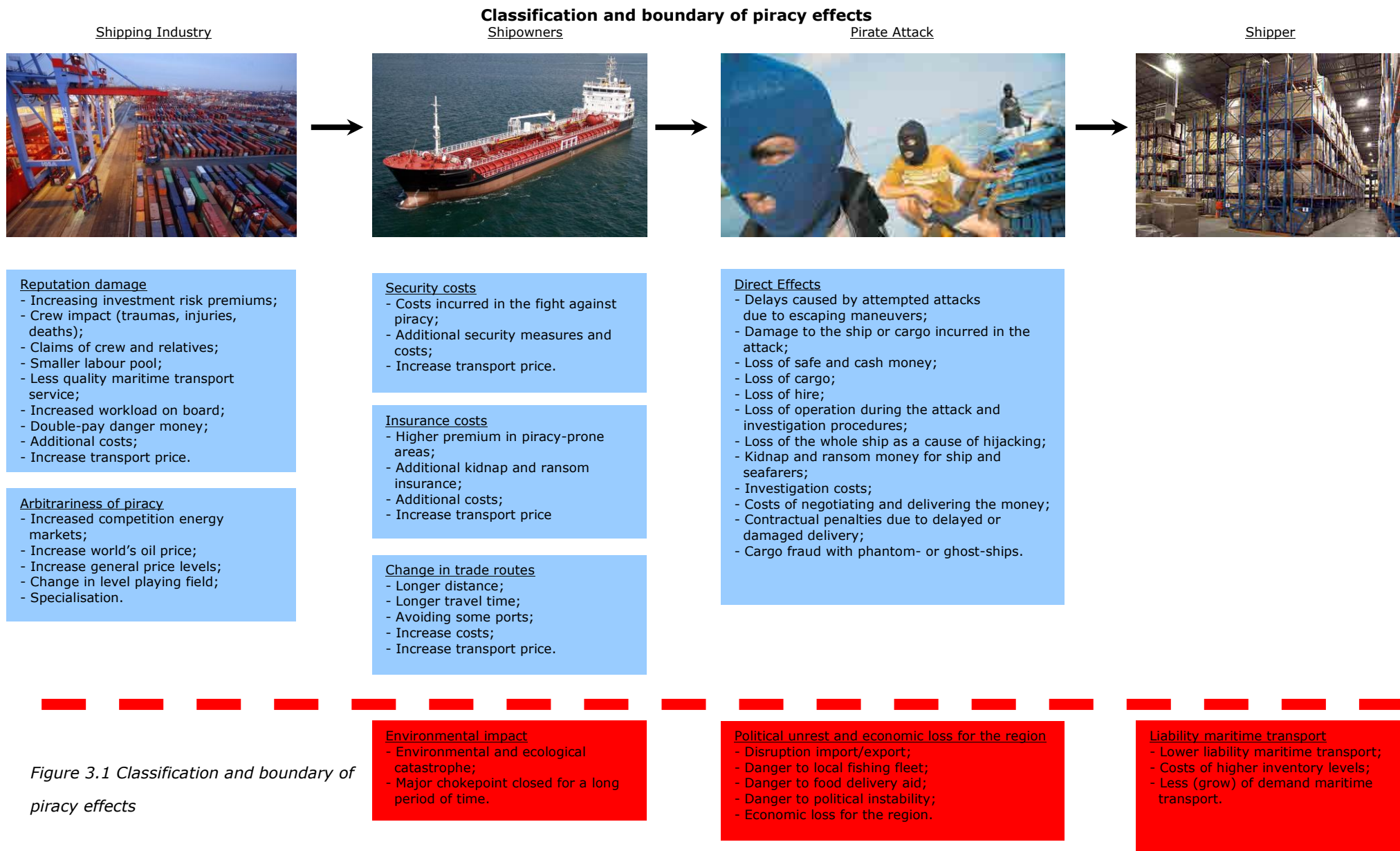


Figure 3.1 Classification and boundary of piracy effects



4. Influence on Shipping Companies

4.1 Survey

A list of possible effects of modern maritime piracy was given in the previous chapter. This chapter will raise attention to the question if these effects have a significant influence on shipping companies. I have made a survey in order to get more information about the possible effects of modern maritime piracy. Besides of that, I have also contacted insurance companies and shipowners associations themselves to share their knowledge about the subject. The survey to the shipping companies is listed in appendix IV. To select shipping companies, I used the list of liner operator abbreviations listed in the Containerisation International Yearbook 2003 and the members list of the national and international shipping associations of the different States. I filtered out the feeder lines, inland navigation services and shipping companies with only coastal or passenger shipping service. Only shipping companies with the following services were selected:

- Commercial merchant trade service;
- Sea or ocean trade service;
- International trade service;
- Servicing with minimal one ship;
- All types of vessels.

Thirty-two useful responses were given to the survey. The results of the survey is described in this chapter. The total amount of vessels of the correspondents was 1870 with a total capacity of 95.349.536 DWT. This is 4.2% of the world merchant trading fleet of 44.500 vessels and 8.6% of the total world DWT. Further information about the correspondents is given in figure 4.1 below.

DWT	Amount	Market	Amount
<100.000	4	Container	7
100.000-200.000	6	Tanker	8
200.000-500.000	9	General cargo	4
500.000-1.000.000	5	Bulk	5
1.000.000-20.000.000	5	RoRo	2
20.000.000-50.000.000	3	Multi purpose	3
		Heavy lift carriers	2
		Tug boats	3

Continent	Amount
World wide	19
South East Asia, Middle East and West Africa	3
East Africa and Middle East	2
Europe, Middle East and West Africa	5
North and South America	3

Figure 4.1. Information correspondents (Survey results, 2008)

Note: some shipping companies doing their business in several types of markets.



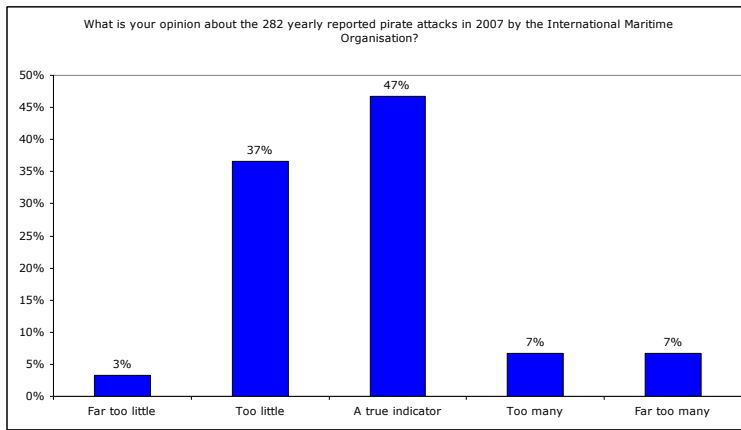


Figure 4.2. Opinion IMO indicator
(Survey results, 2008)

In order to get information about the actual numbers of the pirate attacks, the selected shipping companies were asked to give their opinion about the 282 recorded pirate attacks by the IMO. Referring to figure 4.2, most part thinks that it is a real indicator. However, 40% says that this number is too low. A part of 14% says that this number is even too high. Nevertheless, this part often noticed that armed robbery and theft should not counted as piracy.

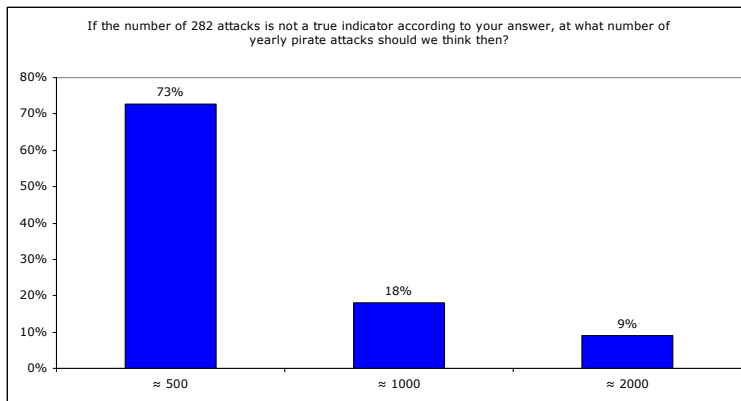


Figure 4.3. Opinion actual number of
pirate attacks (Survey results, 2008)

The part of 40% that says that the IMO indicator is too low have also given their opinion about the real number. This is illustrated in figure 4.3. About twice more attacks say 73%, while 18% say 1000 and 9% noticed that it will be an amount near 2000. At the same time, there is asked if they ever decide not to report an attack and if they were a victim of piracy this year. About 22% say that they have not reported some incidents. Reasons that were noted are that they only report bigger ones and it were not severe losses that this kind of decision highly depends on the different shipmasters, that daily attempted attacks are too many to report or that it will not give any result to report all attacks instead of only extra security measures and costs.

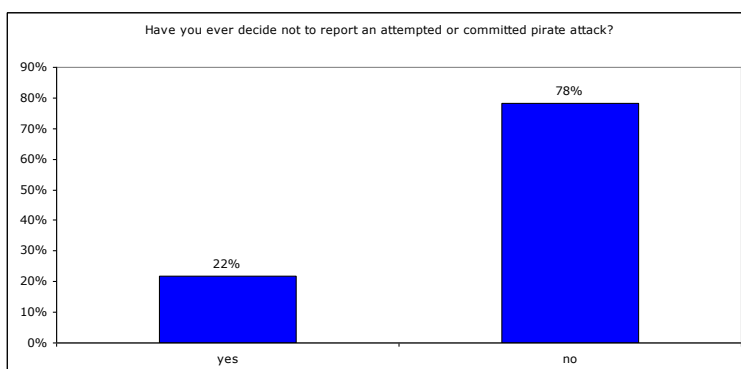


Figure 4.4. Decide not to report
(Survey results, 2008)



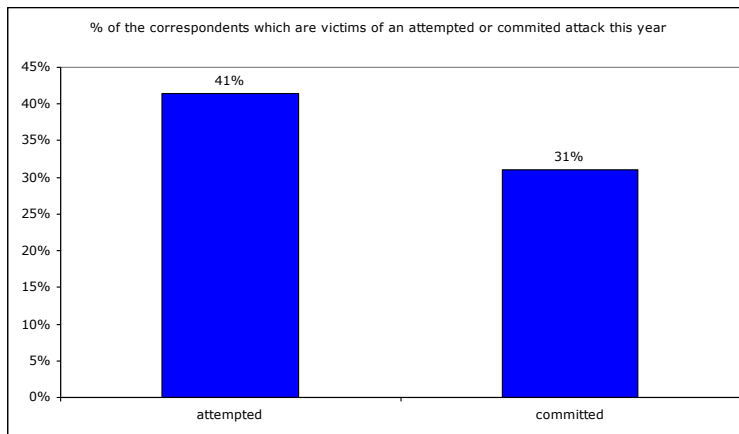


Figure 4.5. Percentage of the correspondents which are a victim this year (Survey results, 2008)

As can be concluded about figure 4.5, 41% were a victim of an attempted attack and 31% of a committed attack this year. Likewise there is asked how many attacks are attempted and committed to their fleet on average per year. The result was 37 attempted and 10 committed attacks this year. This is 3.1% of the total fleet of the correspondents. Counting with a total world fleet of 42.000 merchant vessels, the estimate of pirate attacks in this way is 1300. On page 56, Hand (2007a) states that 22% of the seafarers was involved in a committed or attempted attack. According to this number, and counting with an average crew of 18 members on a ship the pirate attacks per year can estimate to 513 per year. Again these estimations vary widely. Instead, considering figure 4.4 that 22% have ever decide not to report an incident, the number of actual pirate attacks could be an amount of 350 incidents per year.

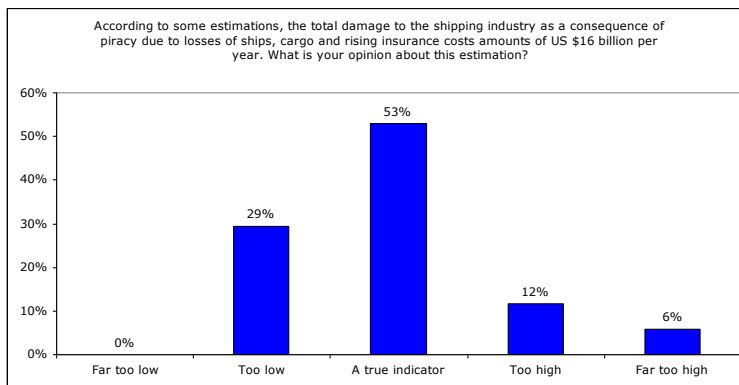


Figure 4.6. Opinion cost of piracy (Survey results, 2008)

In order to get information about the financial costs of piracy, the selected shipping companies were asked to give their opinion about the piracy costs estimations of US \$16 billion done by professionals in the shipping industry. In the beginning, this question was divided into several parts. However, during the period of time no one decide to give information about this question. Therefore, I have changed the question into this one in order to be less privacy sensitive. What can concluded is that most of the correspondents think that it is a true indicator. Nevertheless, 29% says that this number is to low. A part of 18% says that this number is even too high. Numbers which they were think of lies between US \$3 to US \$115 billion.



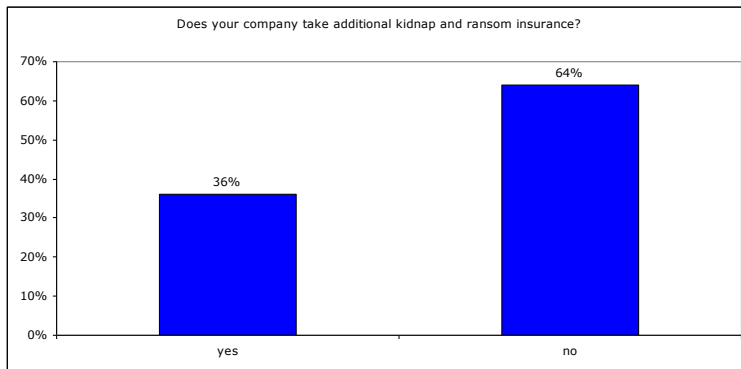


Figure 4.7. Additional K&R insurance
(Survey results, 2008)

The survey had also contained a question if the shipping companies have taken additional kidnap and ransom insurance. A part of 64% says not having this kind of insurance. Most common reason is that they think this is already included in their war or hull insurance coverage.

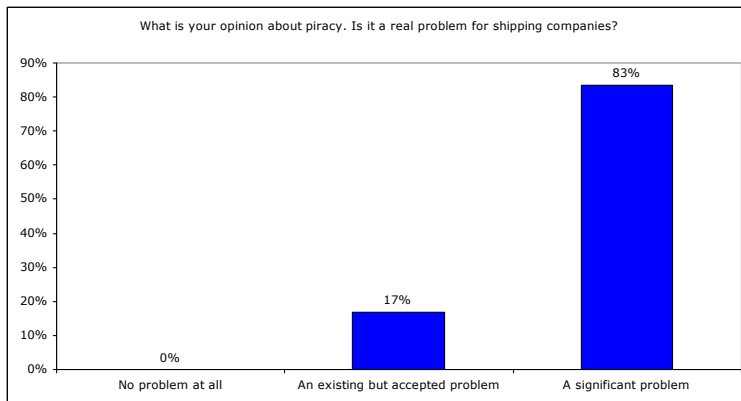


Figure 4.8. Opinion piracy problem
(Survey results, 2008)

Finally there is asked what they think of the piracy problem. A large part, namely 83% says that it is a significant problem for shipping companies. Especially the impact on seafarers and their relatives were one of the main reasons to point piracy as a significant problem.

The final question of the survey was a question based on the effects of piracy. The shipping companies were asked to give their opinion which effect piracy should have or not. This result is illustrated in figure 4.9 on the next page. A significant part says that piracy increase the transport price, leads to more integration with the navy, to increasing sailing speed in dangerous areas, to more security equipment on board, to avoiding coastlines and sailing more nautical miles, to avoiding some ports, to other sailing routes and to an increase of the insurance premiums. About 20% to 30% of the correspondents think that piracy leads to more sailing in convoy, to a decreasing labour market for crewmembers and higher wages. According to the survey piracy have a minimum effect, less than 20%, to less (grow of) demand of maritime transport, to larger vessels, a decrease in the position or liability of maritime transport, that it will have an effect to attract investors or that it will influence the development of their company's global network. A large part of the respondents added that especially the impact to their crew must not forgotten.



4. Influence on Shipping Companies

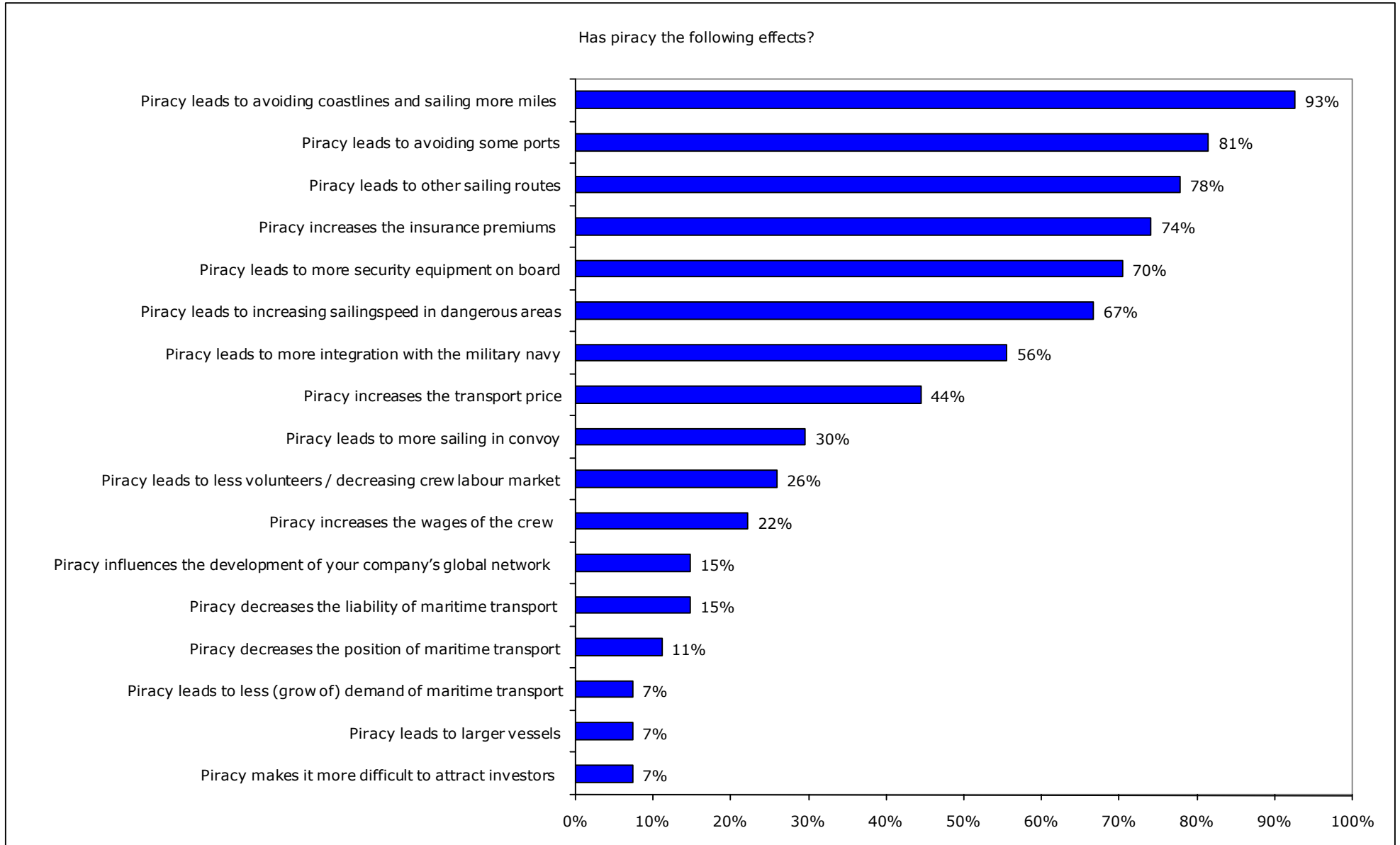


Figure 4.9. Piracy effects (Survey results, 2008)

4.2. Direct Effects

- Delays caused by attempted attacks due to escaping maneuvers;
- Damage to the ship or cargo incurred in the attack;
- Loss of safe and cash money;
- Loss of cargo;
- Loss of hire;
- Loss of operation during the attack and investigation procedures;
- Loss of the whole ship;
- Kidnap and ransom money for ship and seafarers;
- Investigation costs;
- Costs of negotiating and delivering the money;
- Contractual penalties due to delayed or damaged delivery;
- Cargo fraud with phantom- or ghost-ships.

Delays caused by attempted attacks due to escaping maneuvers could lead to a small delay. Zigzagging will lead to extra nautical miles, while increasing speed affect vessel's fuel bill but will also minimise the delay. The survey results that a part of 67% says that piracy leads to increasing sailing speed in piracy-prone areas. As a cause of zigzagging or approximately 10 nautical miles longer and the higher fuel bill, estimations of these costs are according to the survey results (2008) between US \$2.000 and US \$5.000 per attempted attack in open waters.

Bullets, rocket launchers and fire leads to damage of the ship and cargo incurred in the attempted or committed attack. Damage to accommodations, bridge hulls, windows, communication equipment, cabins, doors, locks and containers are some examples. According to the survey results (2008), such damage ranging between US \$10.000 and US \$50.000 per attack. According to Smead (2001), targets of armed robbery and theft are usually cash and portable high-value personal items. Loss of safe, cash money and personal items is estimated on average of US \$5.000 to US \$20.000 per theft.

Loss of cargo is one of the costs which estimations vary widely. According to Munich Re Group (2006) a container vessel of the latest generation, has a hull value of around US \$150 million. However they estimate the cargo between US \$800 million and US \$1 billion. Other sources mentioned estimations of US \$25 million to US \$500 million cargo value. The value highly difference per cargo, size of the ship and the region where it steams. In ICC-IMB reports some cases can found where ship and cargo of 400.000 liters of crude oil where pumped over to other ships. With today's average crude oil price of US \$90 per barrel or 159 litres (Energy Information Administration, 2008) the loss of cargo in these cases can estimated to approximately US \$227.000. Furthermore, in general, vessels and cargo are returned after the ransom is paid.



According to Seltmann (2007), payment of hire can be defined as: "In the event of loss of time from deficiency, and/or default of officers/ crew or deficiency of men or stores, fire, breakdown or damages to hull and machinery or equipment, grounding, detention by average accidents to ship or cargo, dry docking for the purpose of examination or painting bottom or by any other cause whatsoever preventing the full working of the vessel, the payment of hire shall cease for the actual time thereby lost." Loss of operation during the attack and investigation procedures can have a serious effect. Daily vessel operating costs ranging from US \$10.000 to US \$50.000 or more. According to Seltmann (2007) tanker earnings in 2007 are US \$43.000 per day and bulk carrier earnings US \$30.000 per day. The clarksea index gives the average earnings for all the main commercial vessel types. This is illustrated in figure 4.10. With procedures which can easily concede two to three weeks when a ship is hijacked, these costs can be estimated between US \$500.000 and US \$1.000.000 in the worse case.

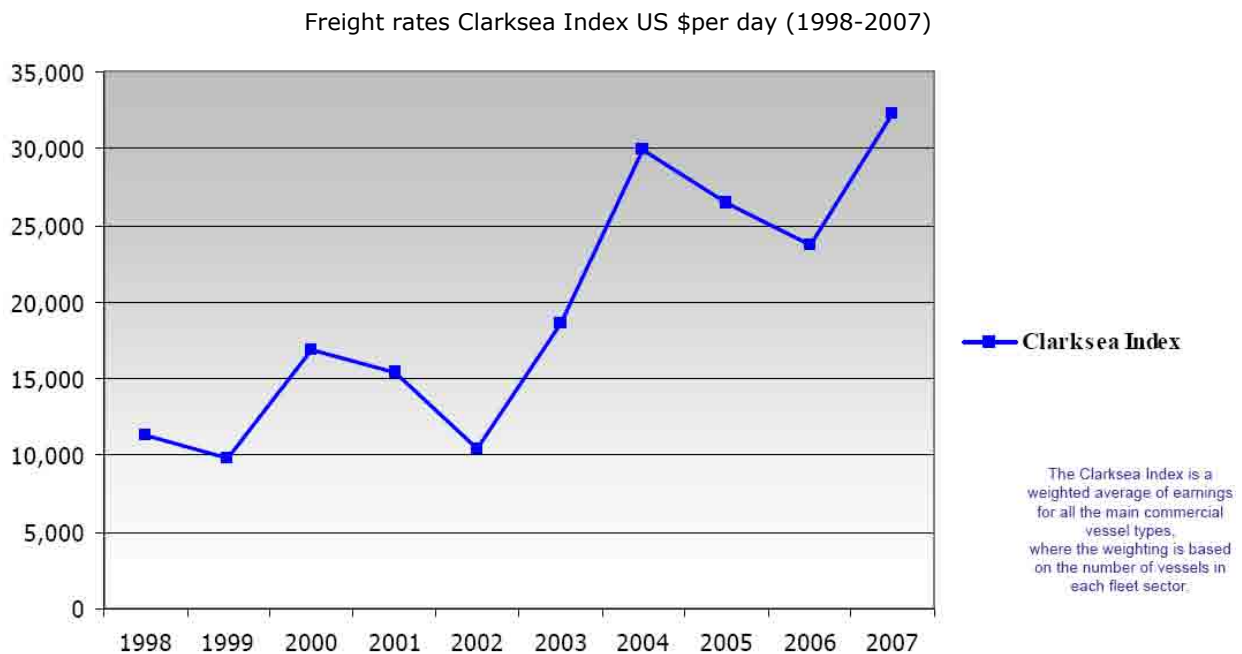


Figure 4.10. Clarksea Index (Seltmann, 2007)

Loss of the whole ship as a cause of hijacking is only the beginning. These ships are common used as 'ghost-ship' which I already noticed in the previous chapters. Thus not only the loss of the ship as well as the related cargo theft and document fraud has to be noticed in this account. Pirate gangs can make 4-5 voyages a year with a life time of two and a half year due to not well maintaining of the ship. According to Seltmann (2007), the vessel values in 2007 in the second-hand tonnage prices for bulk carriers was US \$1,200 per DWT and new buildings US \$900 per DWT. The market for tankers settled at \$700 per DWT for new tanker and a second-hand price of \$800 per DWT. These costs vary widely in respect to the size of the ship.



In relation to the hijack procedure by pirates there can suggest that there are two groups of pirates. The first group physically attacks the ship, boarding the vessel at sea in small, well-armed and often aggressive groups. The second group acts as a watchmen and is responsible for guarding a hijacked vessel until a ransom is paid and the ship released. Appendix XI illustrate hijacked vessels which are identified by satellite. According to Reyes (2008b), in Somalia, last months a ship was hijacked every five or six days. This means that one out of every 330 transits through the Gulf of Aden would end up with a hijacked ship. With 22.000 transits each year this means that 45 hijackings is not a rare number. The portion of hijacked ships each year is illustrated in figure 4.11. Although the amount of hijackings did not say everything about the kidnap and ransom money, it gives an indicator of development of the ransom tactics of today's pirates. Last years there can noticed a tremendous increase in the hijacked strategy. Frank (2008a) noticed that the going rate for ransom settlements is now approaching US \$1 million, compared with less than US \$100.000 last year. Latest articles in newspapers and the IMO itself noticed that today ransom is set at an average of US \$2 million per hijacked vessel. According to Beal (2008), while ransom demands a year ago were around US \$500.000, they now even varied between US \$1 million and even US \$8 million. In 2008 there are already 31 reported hijacks compared with a total of 18 hijackings in 2007.

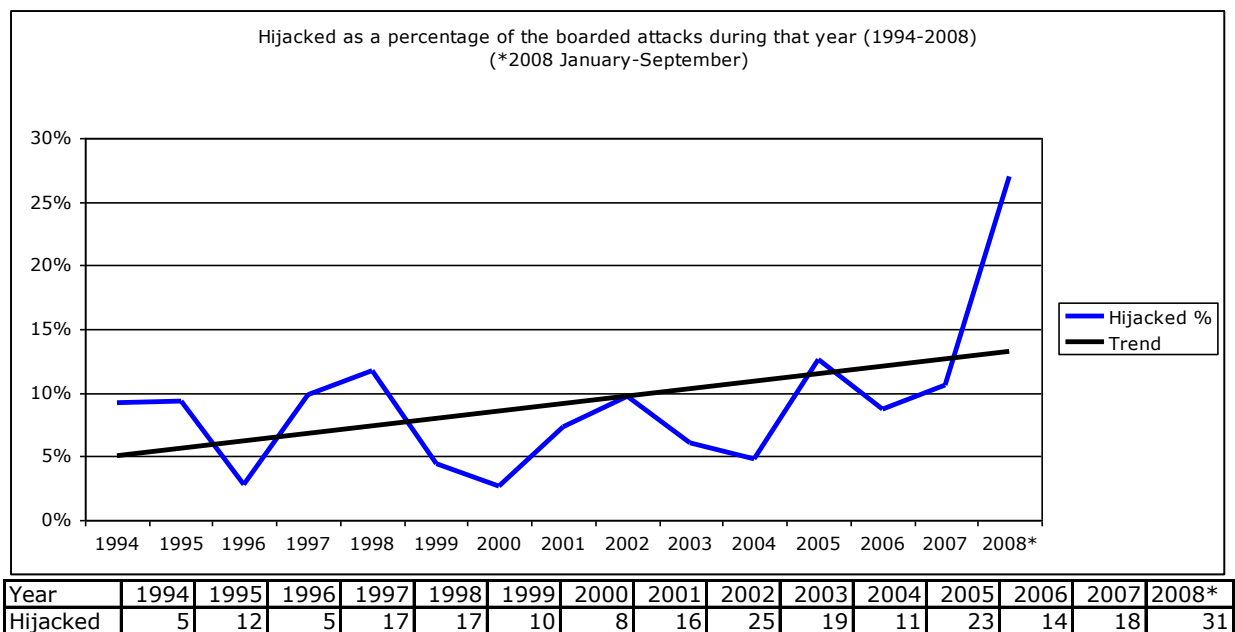


Figure 4.11. Hijacked vessels (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 1994-2008)

In relation with the kidnap and ransom money, one of the little unknown areas is the costs of negotiating and delivering the money. Reyes (2008a) noted that not only ransom driven up the costs, but the procedure to bring the money to the pirates can be a complex task as well. Owners and their insurers forced to contract private security forces to deliver the money. These costs can be estimated to US \$1.000 per man per day. Luckily, these costs can be insured today as well.



Today, Somali pirates demanding that payment are delivered in person instead via intermediaries. In this way it will be delivered directly, which lower their risk. Dealing with pirates is an unpredictable process filled with potential pitfalls. Important points are to contact the right persons, reached an agreement which is both acceptable and settle a place where it can executed discreetly. Reyes (2008b) stated that there is a kind of reluctance and fear to comment in detail on the mechanics of paying a ransom, reflecting the extensive reach of the Somali pirates and the fear that the information could have some effect to possible future negotiations. Shipowners who pay ransoms are effectively rewarding the pirates and encouraging them to do more of the same. Beal (2008) said that through paying for the release of one crew, they are putting others at risk. Despite criticism that owners who pay ransoms encouraging piracy, Reyes (2008a) said there is currently little other option to save their seafarers. Some experts in the maritime industry believe that paying ransoms increase the piracy problem. Investigation costs and contractual penalties due to delayed or damaged delivery are also costs that can mentioned as direct effects of piracy. Unfortunately, very little information is acquired from the piracy survey. There can however noticed that these kind of costs stands in no comparing related with the huge amount of ransom money and the loss of cargo.

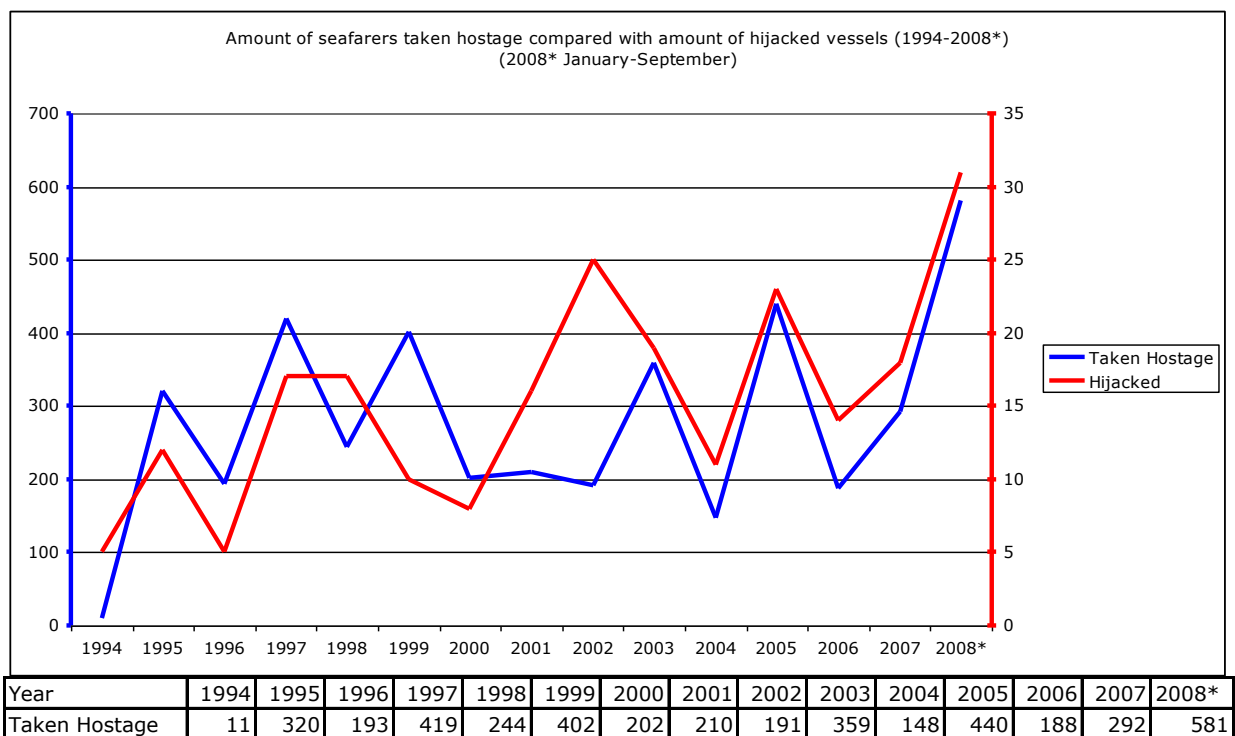


Figure 4.12. Seafarers taken hostage (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 1994-2008)

Figure 4.12 illustrate the amount of seafarers taken hostage compared with the amount of hijacked vessels. Again, the ransom tactics of last year by pirates can clearly concluded in this picture. There is a significant relation between hijacked vessel and the amount of hostages. With 581 seafarers taken hostage between January until September, 2008 shows already a dramatic increase.



4.3 Indirect Effects

4.3.1 Security Costs

- Costs incurred in the fight against piracy;
- Additional security measures;
- Additional security costs;
- Increase transport price.

The survey reveals that a significant part says that piracy leads to more security equipment on board, to more integration with the navy, to increasing steaming speed in dangerous areas, and to avoiding coastlines and even some ports. About 30% of the correspondents say it will lead to more steaming in convoy. The survey also contained a question asking what they were doing about strengthening their safety and security of their vessels to minimise the risks. In spite of the fact that some correspondents say that their policy is confidential and they were not allowed to come in further detail, some points can be concluded about the response. Shipping companies say that they operate in full International Ship and Port Facility Security (ISPS) compliance, follow the official guidelines, observe actual developments and collect port and sea area information, raise security level every time passing dangerous areas, train their crew in security measures and raising their awareness, hiring guards for the ship and implement additional security measures. Some say in the survey that they already install Long Range Acoustic Devices on those vessels that regularly have to transit the Gulf of Aden. Furthermore, they have set up a time schedule for convoy voyage through the Gulf of Aden under military escort. Twice a day at in advance discussed schedules, vessels could gather at a western meeting point to transit the dangerous area towards an eastern meeting point and vice versa, guarded by the Joint Task Force.

Although the correspondents say that the only solution to piracy is a major coalition of Navy forces, they understand that it must provide for its self-protection and to look to private security measures. Osler (2008a) stated that the use of these private measures is growing, especially among large operators. With no doubt, piracy influence on the security costs of shipping companies. Pinto (2005) informed that private security companies count US \$1,000 to US \$2,500 per man per day. He also mentioned that outsourcing the security issue by hiring private security companies for between US \$10,000 and US \$100,000, shipping companies can have armed escort vessels and helicopter scouts to secure their passage. Lloyd List mentioned that hiring a three-man team of unarmed non-lethal deck security personnel for voyages at risk prices ranging from US \$12,000 for a three-day transit to US \$24,000 for five days. Other sources like, O'Meara (2007), defined that value recovered ranged from US \$15,000 to US \$30,000 for a large ship. With total of 87,000 transits in Gulf of Aden and the Malacca strait alone this means a cost of US \$1.6 billion.



Although armed private teams are more common in piracy risk areas, the IMO advises against this trend for two specific reasons. First, as a cause of carrying armed people onboard, the tendency of the pirates to pull a gun and use it with the intent to harm is going to increase if they find out that you have an intent to harm them. Second, on a chemical or gas tanker the last thing you want is a fire fight between pirates and security people onboard. Navy forces already patrol near the coastlines of the dangerous areas. However the areas are so big, that it seems very hard to decrease the piracy business. An example is the Combined Task Force 150 (CTF-150) which is a multinational coalition naval task force to monitor, inspect, board, and stop suspect shipping Fouché (2006) stated that in December 2005 a US \$55 million contract was awarded by the Somali government to an American marine security company to patrol the Somali coastline. On October 17, 2008 a US private military contractor has sent a private sector multi purpose warship equipped with helicopters to the Gulf of Aden. The warship has joined Indian, Russian, Malaysian warships and a multinational western-dominated coalition in the troubled waters.

According to the survey (*Survey results, 2008*), piracy affects the increase of steaming speed. Steaming speed is also related with the world's oil price. Williams (2008) said that with today's high crude oil prices, shipping companies have to decide between less consumption of fuel by reducing steaming speeds or being less vulnerable to a pirate attack by increasing their speed. According to the survey and to Pinto (2005), speed is of the essence above a higher fuel bill. Another point is that fast steaming does not conserve fuel as prices increase. However, this will lower the risk of low burning temperatures of heavy oil, which is one of the major causes of engine damage, higher maintenance bills and loss of earnings.

Training of the crew is a crucial part as well. Burnell (2008) said that a major risk of security to vessels is the absence of discretion by masters and members of the crew. Seafarers should aware of the possibility that attackers are monitoring all kind of communications and using intercepted information to select their targets. Caution is highly recommended when transmitting information on cargo or valuables on board by radio in areas where attacks occur. When crew going ashore in ports in piracy-prone areas, they should not discuss the voyage or cargo information with persons unconnected with the shipowners business.



Another security point regarding the crew is the numerous possibilities to cover crews' identities. Transparency in shipping does hardly exist. According to Pohlit (2004), it is the ship registration process that causes a lack of transparency. In order to operate internationally, a vessel must register in a recognised ship register. Data of OECD (2003) revealed that some incidents of piracy attacks were carried out with the help of seafarers serving among the ship's crew. A significant proportion of the world's commercial fleet is crewed through the assistance of professional crewing agencies. While many of these agencies are reputable and ensure that the seafarers they represent international requirements and pass background checks, some do not. In the case of the latter agencies, it is feasible that seafarers with missing or falsified documents and with criminal backgrounds can be placed on ships. It is very easy according to OECD (2003) to falsify seafarer certificates or to buy identity documents on the black market.

A final point I want to mention related to the crew is the small size of today's crew as a cause of technological development and the low cost strategies in the shipping industry. The smaller crew numbers now found on board of ships favour the pirates. It also means a higher workload for the crew of maintaining high levels of security surveillance. It seems that for many shipping companies, the additional cost of hiring more crew is considered economically out of proportion to the relatively small risk of being attacked. Besides of that, shipping companies who want to enlarge the security team often come for the problem of a decreasing labour market. However, shipping companies have to re-think about their size of their crew. Not only as a part of security but also about the fact that a larger crew can do more maintenance and value added logistics. This is illustrated in the case below: 'Quality pays!'

Quality pays!

"As early as at the newbuilding yard, Concordia's tonnage was planned for long-term maintenance with the goal of maintaining the ships for an "eternal life. The crews maintain the ships at sea so that any decline in quality between dockings is prevented. All the ships are manned by large, well-trained and drilled crews. In addition to the large advantages from the point of view of maintenance, manning with crews that are 30% larger than is normal results in a high level of reliability and the ability to carry out measures immediately in case of a crisis. Major breakdowns at sea often begin as a minor defect which undermanned ship crews do not have time to attend to immediately. On Concordia's ships there is reserve capacity. This increases safety for both us and our customers. Many people are under the impression that Concordia's quality profile is very costly. Naturally, manning ships with 15 men more than our competitors and maintaining very large stocks of spare parts is very expensive. Training and our safety philosophy are also costly. But in our experience, quality pays in the form of hard cash. True, the additional cost of our large crews is at least US \$500/day per ship, but the extra crew working with preventative maintenance while at sea gives us approximately 36.000 more maintenance hours per ship than is the case with standard manning. No work pays such large dividends as work on preventing corrosion and breakdown. We calculate savings totaling several thousands of dollars per day per ship as a result of investing so consistently in onboard maintenance. Safety comes as an extra bonus for the crew, us and our customers. Concordia might have added that the extra manpower could also come in handy when policing the decks in danger areas"

(Lloyd's Shipping Economist, 1996b)



The main security strategies according to Munich Re Group (2006) are greater international cooperation, new technological developments, integrated risk management and clear jurisdiction. They mentioned a number of security measures that were taken in recent years in the fight against piracy and armed robbery at sea:

- *"The Mediterranean has been protected by the NATO mission 'Active Endeavour' since October 2001. NATO warships escort ships through the Straits of Gibraltar and at the Horn of Africa;*
- *In July 2003, the UN International Labour Organisation (ILO) resolved to introduce biometric ID cards for the roughly 1.2 million seamen employed in merchant shipping;*
- *The ISPS Code was introduced on 1 July 2004. ISPS Code make it more difficult for a phantomship to remain unnoticed or to assume a false name;*
- *In Singapore, vessels carrying hazardous cargo receive a military escort by enter and leave the port;*
- *Soldiers from eight countries guard the Arabian Sea to track down terrorists;*
- *Japanese warships patrol Far Eastern shipping lanes and join with Singapore in naval exercises in the Straits of Malacca;"*

Besides minimising ship's safe money, remain in the vicinity of other vessels and prevention through a clear operating procedure, there are several other measures that could be taken in account. The industry has introduced a number of technical solutions in recent years to protect against piracy. Some technologies are mentioned below:

- Use of electric fencing to make it more difficult for pirates to board the vessel (US \$35.000);
- High-security containers to protect the cargo;
- Creation of security zones to protect the crew (doors which cannot be opened from outside);
- Highly sensitive radar systems which can detect approaching pirates at close range;
- Floodlights to illuminate the vessel;
- Special night-vision equipment and heat cameras;
- Miscellaneous acoustic and visual alarm systems;
- Acoustic defence systems (LRAD) (US \$20.000-US \$30.000);
- Movement detectors and light barriers;
- Installation of water guns;
- Satellite-aided tracking systems enabling shipping companies to keep track of their vessels (US \$300 per month per vessel);
- Air surveillance (Eye in the Sky);
- Unmanned remote-controlled robot ships to patrol and monitor threatened sea lanes and to pursue and fight pirate vessels.



One particularly effective system is known as 'Shiploc' which uses a hidden personal computer aboard ship to monitor position by satellite 24 hours a day. One of its applications is that if the crew pushes an alert button, a notification is sent to the ship owner and to the competent authorities. Costs of this system is estimate to US \$300 per month per vessel to install and run. (<http://www.shiploc.com>, 2008)

Besides satellite-tracking devices that alert ship owners, another recent anti-pirate innovation is what's known as 'Secure-Ship', which is a non-lethal, electric fence surrounding the ship and uses 9.000 volt pulse to deter boarding attempts. The fence is collapsible, enabling quick folding against the railing when required. Special quick release gates are used in case of piloting or in the case of launching a life raft. According to Abhyankar (2002), electric fence along a ship costs already above US \$35.000. However, for safety reasons, such an electrifying fence cannot be used on tankers, gas carriers or other vessels carrying inflammable cargo which makes them more vulnerable for pirate attacks.

A final point I want to make is that according to OECD (2003), additional maritime security measures can facilitate trade as well. Due to these additional security measures by shipping companies, all parties in the trade supply chain may benefit from improved productivity and reliability. These savings must accounted by measuring the investment cost. Vessel turnaround times could be shortened, customs clearance would be accelerated and redundant data entry could be avoided and finally maritime theft and fraud could be reduced.



4.3.2 Insurance Costs

- Higher premiums in piracy-prone areas;
- Additional kidnap and ransom insurance;
- Additional costs;
- Increase transport price.

With 74%, a significant part of the correspondents says that piracy leads to an increase of the insurance premiums. However, 64% says not having an additional kidnap and ransom insurance. Most common reason is that they think this is already included in their war and hull insurance coverage. Related to the insurance aspects, the victims of piracy are the crews, the shipping companies or the owners of the vessel, the parties with an interest in the goods carried, and of course the insurers itself. At first sight, the shipping companies, shipowners, and parties with an interest in the goods carried only appear to suffer a slight loss, because they are indemnified by insurers. However, if such incidents become more frequent, the insurance premiums will increase. Though, there can mentioned some notes. First, there is a little chance that cargo will be recovered and that pirates will be brought to court. Second, the business affected by piracy is not only marine hull, marine cargo, and protection & indemnity (P&I) insurance, as well loss of hire insurance (LOH) and special kidnap and ransom (K&R) insurance. Third, the financial burden for the insurance sector is not well reported. For reasons of confidentiality, there can hardly find information regarding the amount expended by kidnap and ransom insurers. In the shipping insurance market, according to Guy (2008a), last years there was a lot of worry for the marine and energy markets. Not only hurricane-force winds, but storm surge and floods increase costs as well. There is some evidence that the frequency and size of these new super waves may be increasing and that could prove to be a major concern for the shipping market, because they have the potential to cause severe damage to vessels and offshore facilities.

With today's piracy in Nigeria, Somalia and the Gulf of Aden, marine underwriters are aware of the potential increase of premiums. Frank (2008a) said that ransoms for the shipping industry could rise to US \$50 million and that it will increase the attacks and the insurance premiums. The success of the Somali pirates is also an important factor behind the rise in attacks in Nigeria and possibly in South America. Shipowners not only face additional war and hull premiums, but also the escalating cost of covering their crew against ransom. Kidnap and ransom risks are not adequately covered by conventional marine hull, war and protection and indemnity products, so it is vital that shipowners are aware that their employees do not have the necessary protection. There is little interest in buying this type of policy. Shipowners should be aware of this aspect. The survey reveals this phenomenon as well.



Frank (2008a) reported that the cost of insuring a voyage against kidnap through the Gulf of Aden and of Somalia has grown tenfold to US \$16.000 per voyage of less than a year and is rising. Two years ago, kidnap and ransom cost for a transit, excluding the Malacca Strait, was US \$1600. The cost for a transit including passage through the Asian sea channel was US \$5500. However, marine insurers now believe the rate of attacks off the East of Africa is a greater threat to shipping, which makes 22.000 transits on its sea lanes per year. These increase of premiums lead to additional insurance costs of:

- Somalia/Gulf of Aden: 22.000 transits x (US \$16.000 – US \$1600) = US \$320 million per year;
- Malacca strait : 65.000 transits x (US \$5500 – US \$1600) = US \$254 million per year;
- With transits to Nigeria and South America these costs can easily estimate to US \$1 billion per year.

Frank (2008c) writes that, ransoms demanded by pirates who hijacked ships, not only focus on the crew members themselves, but even involve threats to offload polluting or valuable cargoes into the ocean. The insurance market offers several kidnap and ransom insurance and trained negotiators which can quickly and react discreetly. The fact that these negotiators are able to provide immediate assistance means that owners can get their business back on course as soon as possible after such an incident. The kidnap and ransom policy not only pays the ransom, but can also secure the early release of the vessel, meaning that the owner will be hit less hard financially from it being out of service. Morrison (2007) stated that shipowners face insurance nightmare as piracy increase. He also mentioned that the ransom itself is only one of the costs that may include anything from hiring expert negotiators and interpreters, paying compensation to victims' relatives, rehabilitation of victims or even the loss of ransom money in transit. Brewer (2007) stated that insurers asked for a 7.5% increase in advance call rates for 2008 and 2009. This policy compares with a 5% rise in 2007. Although not directly comparable with operations in the wider protection and indemnity field, the rise is more modest than the 15% increase that ship operators are facing for mainstream liability cover. The fact that much higher operating costs are being incurred by shipowners and charterers, this will have an even bigger impact on operators' profit levels if there is no financial protection to cover delays suffered by vessels for example as a cause of piracy. In spite of the big rate increases for protection and indemnity insurance, according to Lewis (2008) it is not comparable with the situation in hull and machinery, where losses are a large more.



4.3.3 Change in Trade Routes

- Longer distance;
- Longer travel time;
- Avoiding some ports;
- Increase costs;
- Increase transport price.

Koo (2004) described two factors, time and cost, that affect commercial shipping and its routes from one destination to the next. Time is very important and directly affects global commerce in other industrial or commercial sectors of the economy. That is why there is so much concern about time spending maritime security checks. Such security measures, while helping to deal with the piracy problem, increase transport times and costs. In particular, the delay for security checks for oil tankers may result in further increase of the price of petroleum. Commercial ships, therefore, spend as less time as possible out at sea, taking the shortest and most direct routes to their destinations. Commercial ships usually use pre-determined sea routes giving the shortest traveling time, in respect with wave and weather conditions. Rodrique (2003) have made a rough map presenting the approximate ocean routes for the global maritime transport system. This is illustrated in figures 4.13 and 4.14 on the next page. The planning of ship routes is based on the following factors:

- Steaming linear routes instead of curves;
- Sailing near coasts and port locations whenever possible to avoid unexpected sea conditions;
- Utilizing narrow straits or sea channels that cut down travelling distance;

Thus, it is possible for pirates to make simple plans for selecting and targeting a ship, based on information about the ship's sailing timetable available at several internet resources. During my research, I have experienced that such shipping schedule details can easily be obtained by direct inquiry from various internet resources. I am a little concerned about the ease of getting this kind of information.



Maritime Routes and Strategic Passages

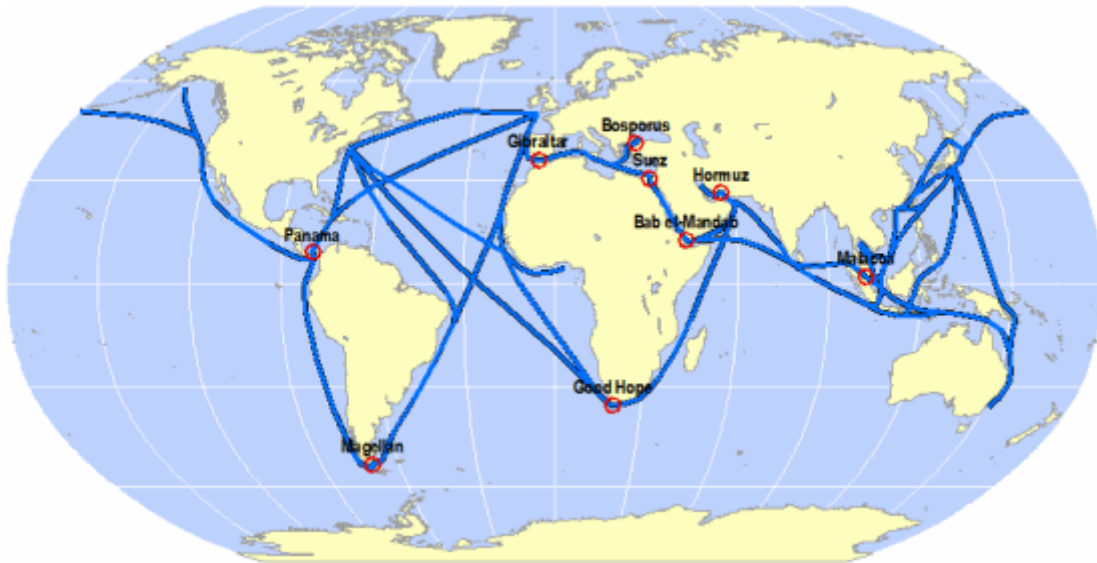


Figure 4.13. Maritime routes and strategic passages (Rodrique, 2003)

Commercial Shipping Activity

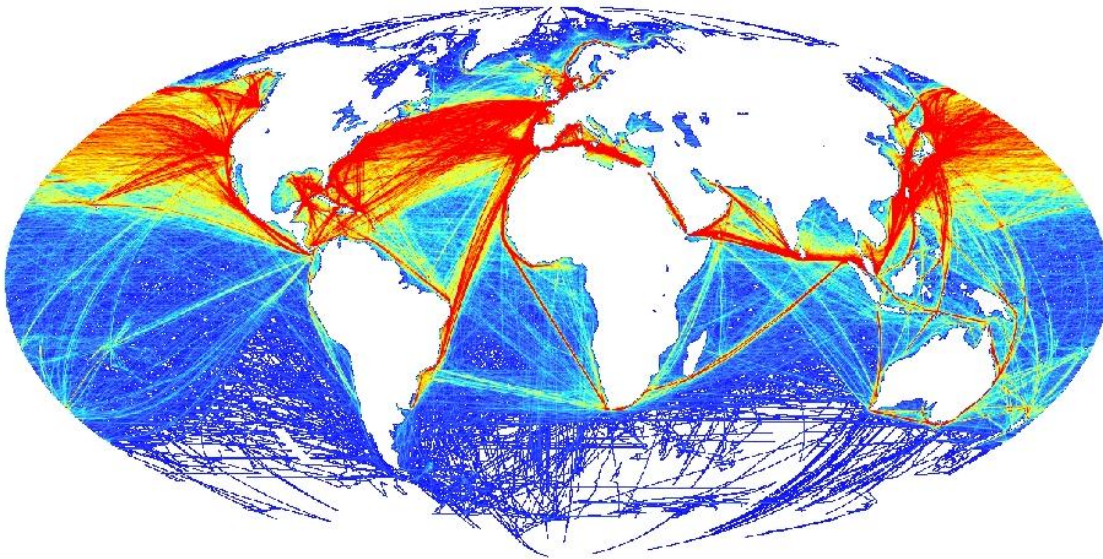


Figure 4.14. Commercial shipping activity (National Center for Ecological Analysis and Synthesis, 2008)



Piracy is of concern to shipping companies and ship owners. However, piracy alone does not deter merchants from continuing to send their ships along widely known established, logical trade routes instead of great curves sea routes to avoid piracy. The oceans are immense, and even in narrow sea straits, the chance of being attacked by pirates looks very small. Escaping is still possible because the sea, unlike land, allows vessels to maneuver in almost any direction desired.

However, a significant part of the correspondents to the survey says that piracy leads to avoiding coastlines and sailing more miles (93%), to avoiding some ports (81%) and to other sailing routes (78%) Wallis (2008) noticed that pirates attacking vessels further off the Somali coast. However, the IMO said that changing navigational routes is not always an option for shipping companies. A change of some degrees happen, but changing routes are costly due to longer distance and time. Existing advice of the IMO and ICC-IMB is that ships should remain at least 250 nautical miles off the Somali coast while Somali pirates operating about as far of 400 nautical miles offshore. Increasing the safety advice is a difficult decision to make, because while it would increase the distance from the coast, the move would also stoke up a vessel's fuel bill.

Frank (2008b) also said that Somali pirates strike deeper on the high seas. He writes about a research done by the London-based risk consultancy which mapped the recent attacks, indicating that they had occurred outside coastal areas and on international shipping lanes. The research indicates that 69% of attacks were successful in piracy-prone areas, compared with 25% of attacks outside this zone. The majority of these attacks by pirates have occurred outside the 40 nautical miles and 100 nautical miles areas. On the next page, I illustrate a figure related to the location of incident with data obtained from the ICC-IMB. Furthermore, in order to get a better understanding about the successful attacks, I have made a figure based on the available data of the ICC-IMB Piracy and armed robbery against ships reports. This is illustrated in figure 4.15. The efficiency of pirates during the years does not vary widely the last 6 years, except of the decrease in 2007 and the increase in 2008.



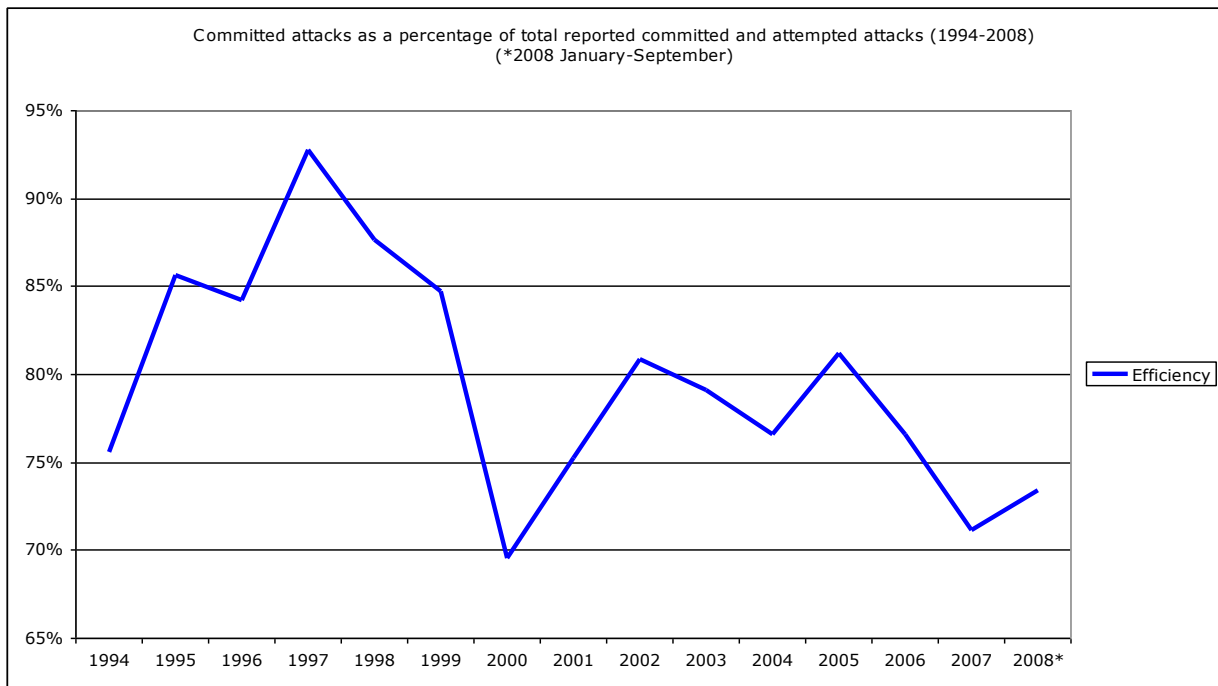


Figure 4.15. Efficiency of piracy (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 1994-2008)

The efficiency is measured as the committed attacks as a percentage of the total reported committed and attempted attacks during the year. From 1994-1997 there were an increase of the efficiency while after this period there can be seen a decrease until 2000. After 2000 the average successfulness of pirates lies between 70% to 80%.

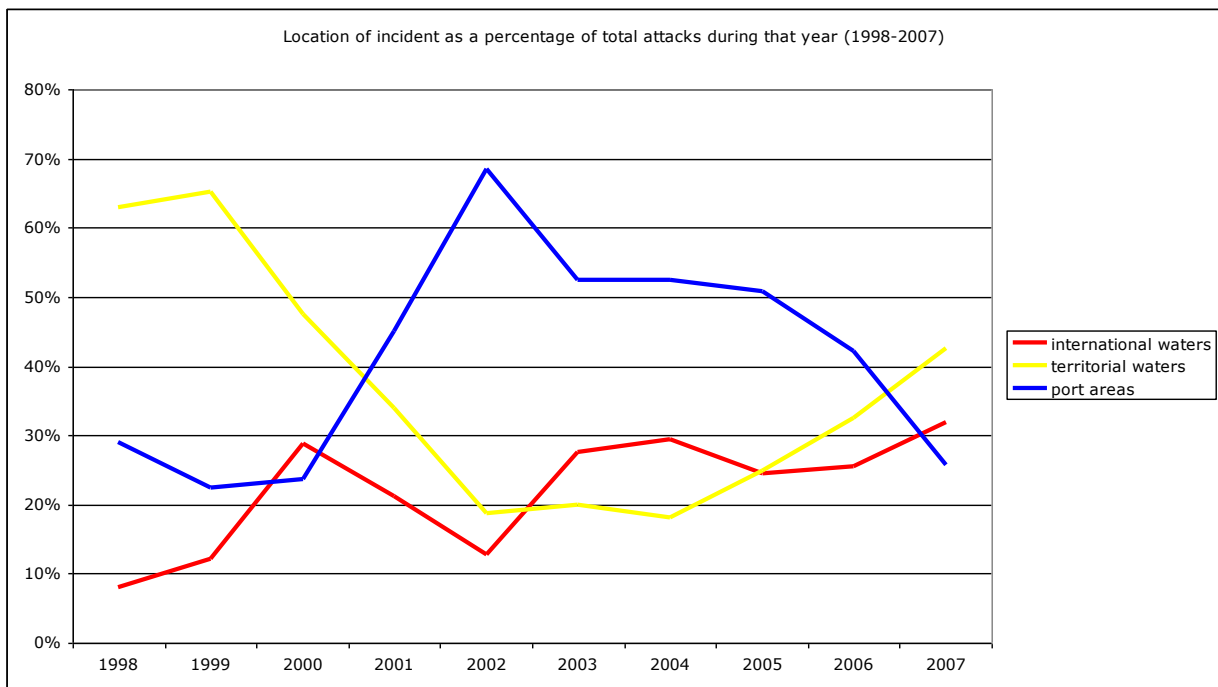


Figure 4.16. Location of incident (data obtained from annual reports IMO, 1998-2007)



Figure 4.16 illustrate the development of the location of incident where the attacks were taken place in the last 10 years. After a period of a decreasing portion of attacks in international and territorial waters and an increase of attacks in port areas in the years 1998-2002, there can be seen a tremendous switch. After 2002 the attacks that have taken place in international and territorial waters as a percentage of the total attacks increased, which have a decreasing result of the amount of attacks in port areas. This confirms the fact that the majority of attacks by pirates are occurred outside coastal areas and on international shipping lanes which is stated by Frank (2008b).

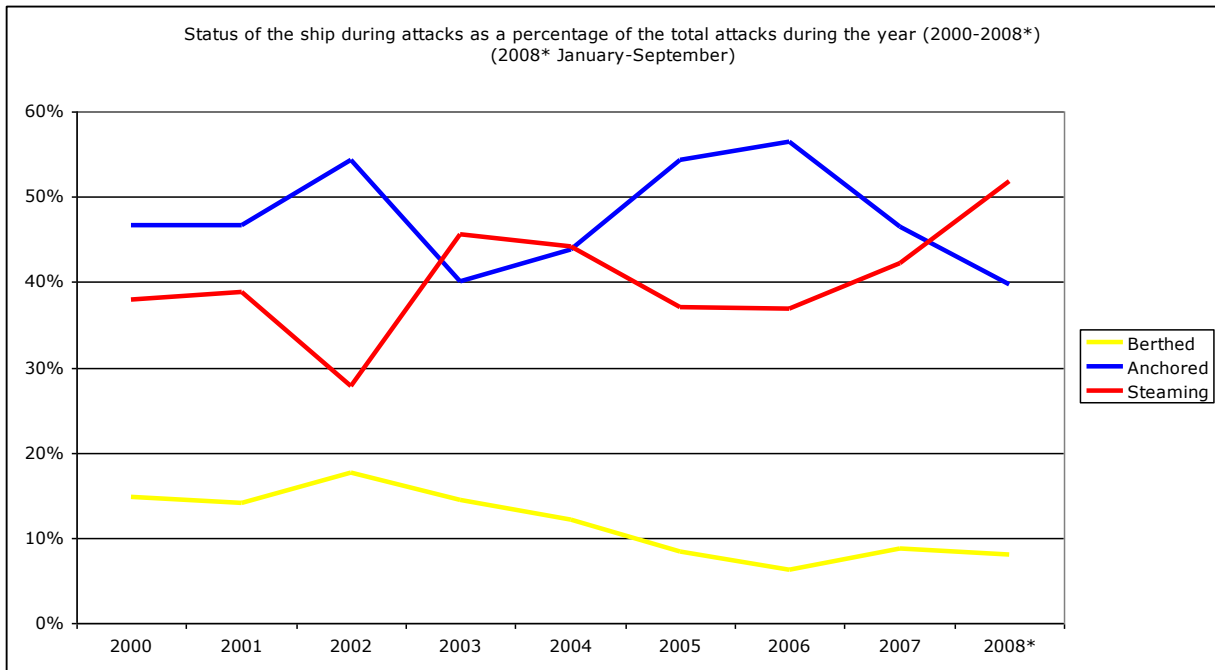


Figure 4.17. Status of the ship during attacks (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 2000-2008)

Figure 4.17 also confirms the fact that the majority of attacks by pirates occur outside port areas. The portion of attacks while berthed decreased during the years. Attacks when ships are anchored decreased the last two years. In this period the attacks to steaming ships increased.



According to Petretto (2008), vessels can either take the risk while paying higher fees or they can take another route if possible, which might even however be the much more expensive choice due to longer distances. On the other hand, shipping companies do loose profit if vessels or cargoes are stolen or ransom had to be paid. Smead (2001) also raise attention to the fact that the vulnerability to piracy affects the trading country as well. Lack of action by affected governments could result in a boycott of its port facilities. Between 1992 and 1995, the British and Japanese Shipowners Associations threatened to reduce and redirect trade until Hong Kong increased its maritime surveillance. Similar movements were expressed regarding Indonesia. Shippers may take the longer sea routes south of Indonesia. The routes may cost more in time but not as much as loss of cargo to pirates.

Tsui (2008) said that the steaming of ships via the Cape of Good Hope, the main alternative East-West route, would cause several consequences for international trade, including increased prices for delivered goods. According to Tsui (2008) there are three stages by which piracy levels became out of control. The first stage is where a handful of marauders using two or three speedboats, machine guns and rocket-propelled grenades attacked merchant shipping. The second phase is where more pirates join in, attracted by the high ransoms paid by shipowners to the initial group of pirates for ships and crews. The third phase is where businessmen and warlords invest in pirate groups. After the third phase, it is out of control. BIMCO (2008) stated in September 2008 that the shipping world made a crisis and that real and immediate action against acts of piracy, kidnapping and armed robbery, carried out with increasing frequency against ships in the Gulf of Aden, by pirates based in Somalia. The shipping industry says that the situation is in danger and is completely out of control. The shipping organisations note that some major shipping companies are already refusing to transit the Gulf of Aden while many others are understandably considering similar steps, going on to warn that continued inaction against these violent acts could cause shipowners to redirect their ships via the Cape of Good Hope, with severe consequences for international trade, including increased prices for delivered goods. The worst case scenario is that the whole shipping industry will change to this route. According to Osler (2008c) some large shipping lines has already instructed their low speed and low freeboard vessels to take this route. Convoys are a possibility, but also then vessels facing expensive waiting time. As such, the effects of piracy in relation to these warnings are longer routes far outside the coastal lines. This is confirmed in figure 4.18. In the case of Somalia, this lead to approximately 200 nautical miles longer or a half day which, at typical time charter rates plus cost of fuel, is a cost of about US \$20.000 to US \$40.000 each time such delay is caused as a preventive measure. (*Survey results*, 2008) In the situation of Nigeria, the ship, whilst awaiting the berthing for cargo operations inside the port, remains often quite far outside the coastal waters, in an attempt to avoid the most negative effects of piracy, which is quite common offshore of that country. The visible part of this expense is counted an additional 6 hours time before vessel actually berths. However, it can argued that this is a distance the vessel would have had to cover even if she would not have had to stay outside.



Execution of the IMO warning advice to stay 250 miles offshore at the Somali waters.

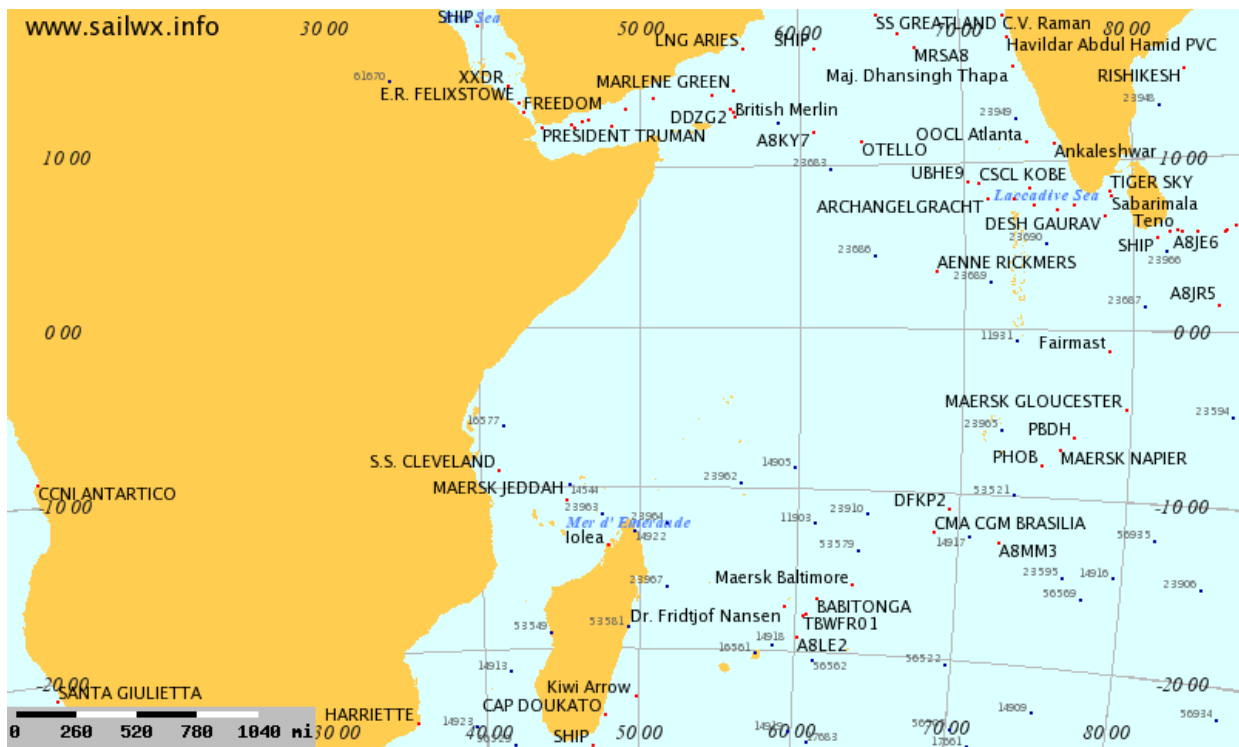


Figure 4.18. Avoiding coastal waters Somalia October 13, 2008 (<http://www.sailwx.info/>)

Figure 4.18 illustrates the impact of the IMO warning to steam far outside the Somali territorial waters. It can easily be seen that instead of the route close to the East coast of Africa almost every vessel steams in a curve. Grey (2008) suggests that a shipmaster who wants to reduce the risks of an attack might see him in conflict with time charterer's expectations and that the master will follow a prescribed course on his voyage, or stay out of areas where war risk premiums apply. There are known cases, which, although widely criticised by marine professionals, saw a court deciding in favour of a charterer rather than a master who elected to take a longer better weather route. It suggests that a master must be able to demonstrate reasons of changing by using well defined arguments. If owners act reasonably, their vessels will remain on hire in the normal way and charterers will pay for additional steaming costs. If, however, the master cannot justify his decision, the owner will have committed the charter party terms in not following the original route. Speares (2008) also said that today, charters have the power giving orders like the geographic route of vessels. Shipping companies must be aware that contracts are correctly worded. Besides of that, piracy in Somalia was not seen as acts of war. But in some war clauses, piracy is included. After an incident of piracy this can lead to a long discussion about the clause and the provisions of the contract. So, piracy insurance is not always clear and varies from contract to contract. War risk insurers would say it was a piracy attack, while hull insurers would say it was an act of terrorism. Underwriters have the power to move piracy risk between war and hull cover as required, using vague and unclear words.



Sharidan (2008) described the impact of Malaysian shipping companies sailing the Far East-Europe trade. Gulf of Aden provides the shortest maritime route from the Far East to Europe. Vessels that choose for an alternative journey will have to pass the Cape of Good Hope, and that will add 12 to 21 sailing days depending on the type of vessel and steaming speed. They have to steam additional 3500 nautical miles by avoiding the piracy-prone area of the Gulf of Aden. Depending on these numbers, additional costs to steam this route can estimate to US \$350.000-US \$950.000 per transit. The passage from Port Kelang to Rotterdam using the Suez Canal and passing the Gulf of Aden would take about 25 days on a ship navigating at 13 knots for the distance of 8.000 nautical miles. Using the Cape of Good Hope would increase the sailing days by about 12 days approximately through a distance of 11.500 nautical miles at the same speed. Again these costs will have a tremendous effect to the shipping industry. Besides longer journey and extra cost, vessels that sail these routes around the Cape of Good Hope would also suffer bad weather conditions. Waves up to 20 meters high are no exception in these waters. Furthermore, there are different and special regulations where shipping companies should be aware of. For instance in these waters, the International Convention for the Prevention of Pollution from Ships are conducted. And then there is even piracy risk nearby the coast of Nigeria. More negative effect is the quality of perishable cargo which of course will be affected as it will take a longer journey which leads to longer vessel turnaround time. This however, would lead to more vessels, and therefore more jobs in the maritime shipping industry, which can mentioned as a positive effect.

Another option is that merchant vessels trading in the Far East-Europe route change, their routes to the North East Arctic passage. This route, which is open for about more than six months per year could lead to less time and distance than the option above. However, the existence of ice can be seen as another obstacle.



4.3.4 Arbitrariness of Piracy

- Increase oil price;
- Increase gas price;
- Increased competition energy markets;
- Increase general price levels;
- Change in level playing field;
- Specialisation of shipping in piracy-prone areas.

Targets of piracy attacks included most classes of vessels. Though, when it comes to cargo, chemical product tankers are one of the most interesting targets. This is illustrated in appendix II and in figure 4.19 below.

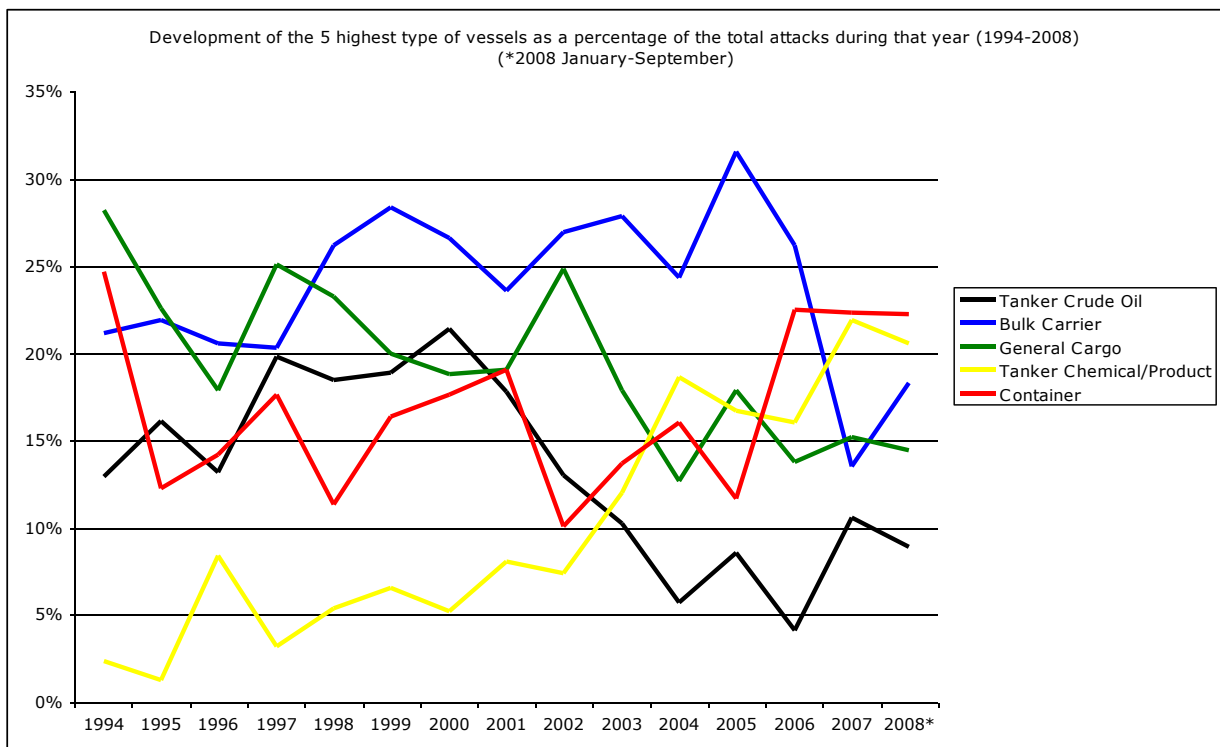


Figure 4.19. Development of the 5 highest types of vessels attacked (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 1994-2008)

The five most attacked types of vessels are:

- Container vessels;
- Tanker chemical product;
- Bulk carriers;
- General cargo vessels;
- Tanker crude oil.



Before giving some conclusions to the illustrated picture, I will mention the difference between crude oil and chemical or product tankers. There are two types of the oil tanker, or also mentioned as petroleum tankers. These types are the crude oil tanker and the chemical or product tanker. Crude oil tankers transport large quantities of unrefined crude oil from its point of extraction to refineries while product tankers are in general smaller and designed to move petrochemicals from refineries to points near consuming markets. Some examples of refined oil products are acid, palm oil, edible oil, fuel, fish oil, vegetable oil, fruit juice, wine, molasses, waste, fresh water, ammonia and chlorine. In the period of 1994 to 2008, crude oil tankers and bulk carriers show a decrease in the portion of attacks. Last three years with exception of 2008, bulk carriers show a tremendous decrease of their portion in the total attacks as well. Container vessels are, as a cause of the last three years increase, the most target vessels by pirates. General cargo vessels show a kind of constant level of attacks during last fourteen years. Furthermore, what is evidently illustrated, is that chemical and product tankers show a dramatic increase in all the years and takes the second place in the list in 2008. In relation with the increased competition in energy markets, this can have an effect on world's oil price. Besides of that, the gas price is coupled to the oil price and will also increase if oil prices increases. One of the reasons behind this trend is that for safety reasons, electrifying fence cannot used on tankers, gas carriers or other vessels carrying inflammable cargo.

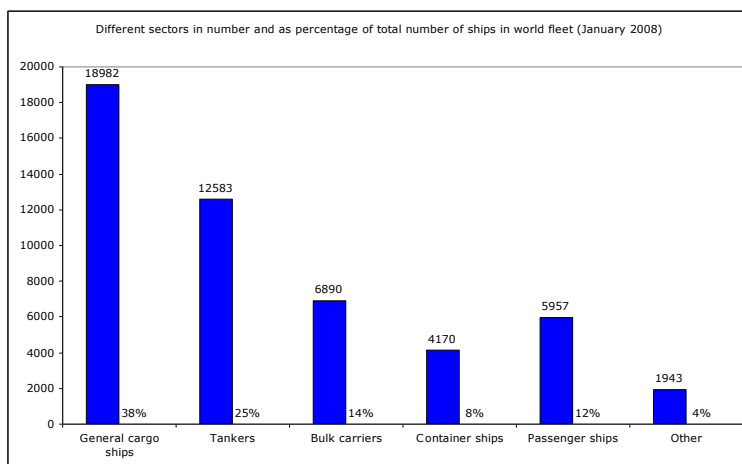


Figure 4.20. World trading fleet (data obtained from Lloyd's Register Fairplay January 2008)

Figure 4.20 illustrate the statistics of world trading fleet at January 2008. The world trading fleet was made up of 50.525 ships, with a combined tonnage of 728.225.000 gross tonnes. There can conclude that in spite of the fact that general cargo ships belong on the top of the list this does not matter in relation with the amount of piracy confrontation.



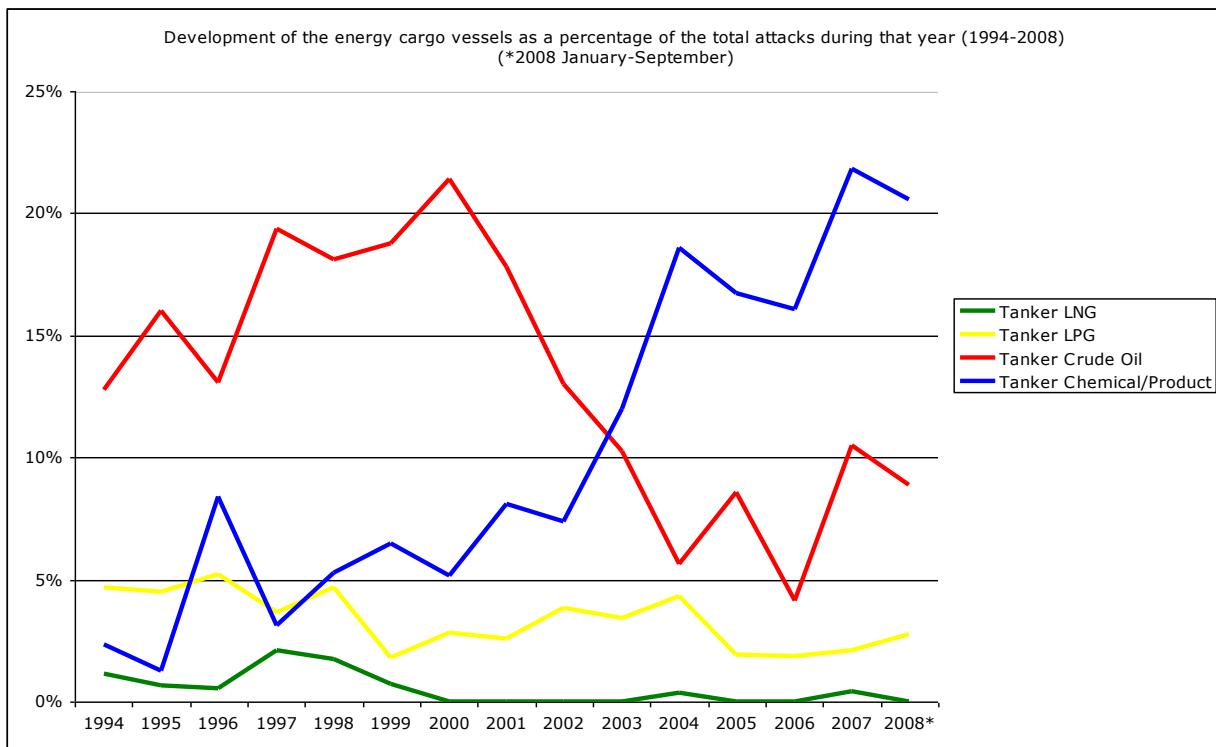


Figure 4.21. Development of the energy cargo vessels attacked (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 1994-2008)

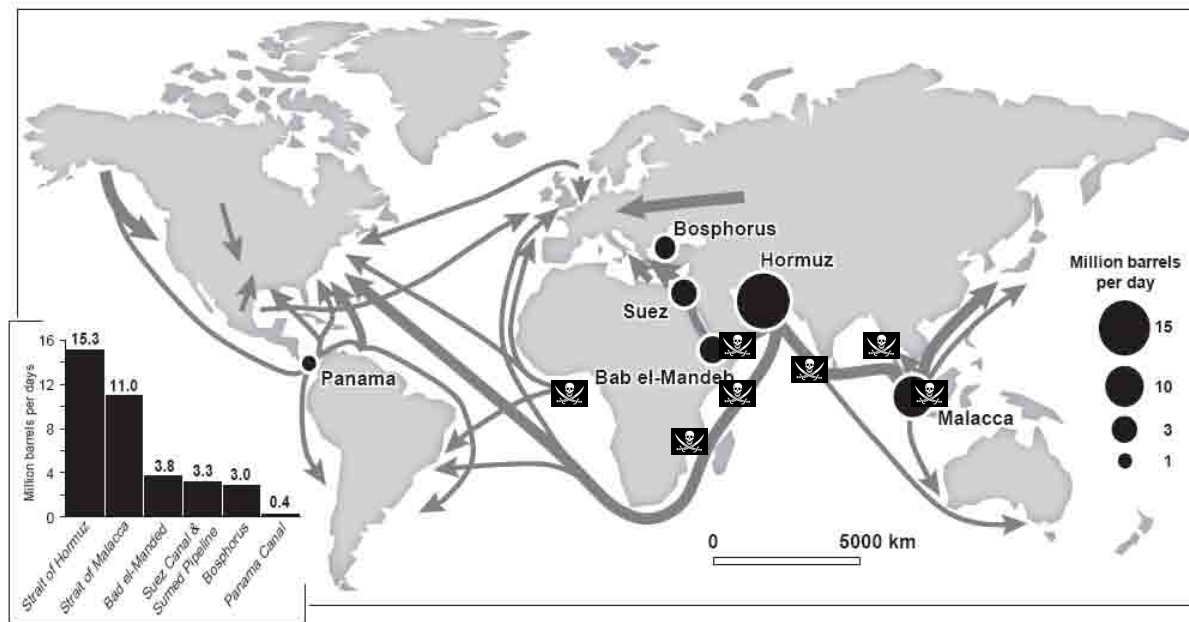
Figure 4.21 gives an overview of the development of attacks to energy related cargo vessels. To obtain a true picture, in order to compare the different years with each other, I calculated the attacks to the different cargoes as a percentage of the total attack during that year. The following trends can be noticed. First, the attacks to LNG tankers have always been very low. Second, there can be seen a decreasing amount of attack to LPG tankers. Nevertheless, after a tremendous decrease of attacks to crude oil tankers, this type of cargo attacked more and more since 2006. The most important element in this illustration is that the portion of attacks to chemical and product tankers show a dramatic increase every year. Pirates targeting these kinds of vessels due to the fact that they can pump over the cargo very easy and sell the cargo at almost every market or use them for their own use.

Piracy is especially dangerous for energy markets. Most of the world's oil and gas is shipped through the dangerous piracy regions. Oil products is one of the most transported commodities. The routes are known as chokepoints due to their potential for closure. Disruption of oil flows through any of these export routes could have a significant impact on world oil prices. One of the major oil transportation chokepoints is the Persian Gulf which is a major origin and from this point maritime routes are reaching Europe through the Suez Canal, Japan through the Strait of Malacca and North America through the Cape of Good Hope. Other important oil shipments are from Africa to North America and Europe, from the North Sea to Europe and from South America to North America. Commercial maritime ships follow wide known patterns because it makes sense to do so. They are in the business of making money, and the margins are very small. If you think of a single voyage as consisting of a sequence of events like



leaving port, transiting a straight or other choke points, crossing the open ocean, and entering a harbour, you can identify movement and other activity patterns that correlate with these events. Appendix III illustrate shipping lanes and strategic passages in the Middle East and in Pacific Asia. Figure 4.22 illustrate the major chokepoints and the locations where piracy were most often reported.

Oil flows, major chokepoints and oil transited at major strategic locations



Own selection of IMB records: locations with more than 10 reported attacks per year between 2005-2007

Figure 4.22. Strategic passages and piracy locations (Rodrique, 2003)

Fouché (2006) stated that South Africa is a potential target for pirates because of the chokepoint which requires ships, in terms of insurance requirements, to pass within about 12 nautical miles of the Southern-most point of Africa, creating a high density of shipping in a relatively confined space. As illustrated, piracy is most common at major chokepoints and strategic small straits. In the end this is could be a dramatic consequence for the consumers of all products. Today pumping over refined products has become a serious coordinated business at the East of Africa. In the end, the consumer will pay these extra costs. Guy (2008c) described that the increasing price of oil and the continued dependence on maritime trade to economies that are increasingly relying on just-in-time delivery have put the energy and shipping firms at the top of piracy and terrorist target lists. As an example the attacks on oil firms in the Niger delta have made oil operations in the region extremely expensive. However, world oil price is affected by a range of other effects in the world wide economic system, such as production and oil supply. For this reason, I can hardly conclude that piracy has a significant effect on world oil price.



Large ships with freeboard of more than 10 meter and speed above 20 knots (37 km/u) are more difficult to capture for pirates. Easy targets are small container vessels with low speed and a small distance from the water line to the deck. According to Bulkeley (2003) only the most expensive or well-equipped shipping companies will find it economically feasible to bring imports into dangerous waters. Osler (2008a) confirmed that the use of private security measures is growing especially among large operators. As a result, due to the possible arbitrariness of pirates there can be expected a change in level playing field. One reason therefore is that it is easier for large operators to adapt piracy security measures for several relative smaller vessels in the dangerous areas than small operators. Due to this knowledge there could be a kind of specialisation of shipping in piracy-prone areas. However, according to the survey results (2008), piracy has a minimum effect to larger vessels or that it will influence the development of shipping company's global network. In spite of that, Hand (2006) said that small tankers are most at risk from piracy. His analysis was based in the region of the Malacca Strait. He found that most attacks were against ships less than 20,000 GT with smaller product tankers topping the list. Fewer attacks occur on vessels above 20,000 GT and when these do occur, they are mostly on bulk carriers that may tend to be more vulnerable because they are slower or otherwise take fewer precautions against attack. Somali pirates usually target small and medium-size vessels travelling at maximum speeds of 17 knots. Bigger vessels, such as containerships, on the other hand, travel at speeds of 23 knots making them too fast and too big for the speedboat-borne pirates to intercept. However, Somali Pirates have shifted their primary operation from the East coast of Somalia to the Gulf of Aden and use of mother-ships is rising. They also target larger cargo, oil, gas and chemical tankers. Approaches and attacks take place from 2-3 small speedboats with 3-5 armed persons each. The number of boats involved in each incident seems to increase.

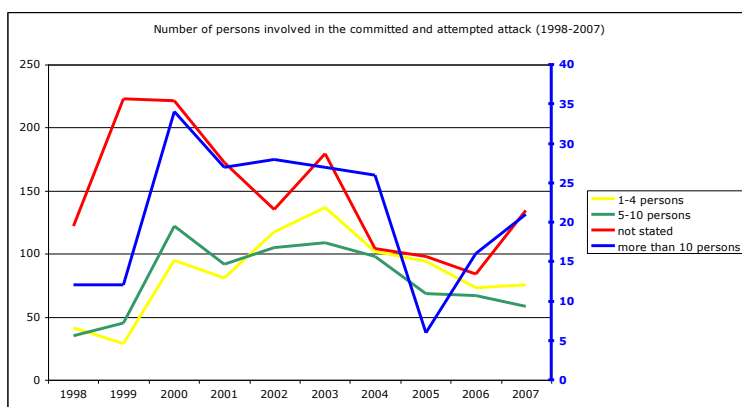


Figure 4.23. Number of persons involved in attacks (data obtained from annual reports IMO, 1998-2007)

Figure 4.23 illustrates the number of persons involved in the reported attacks. To give a better picture of the situation, I filtered out the numbers of non-stated reports and 2005, which is illustrated in figure 4.24 on the next page.



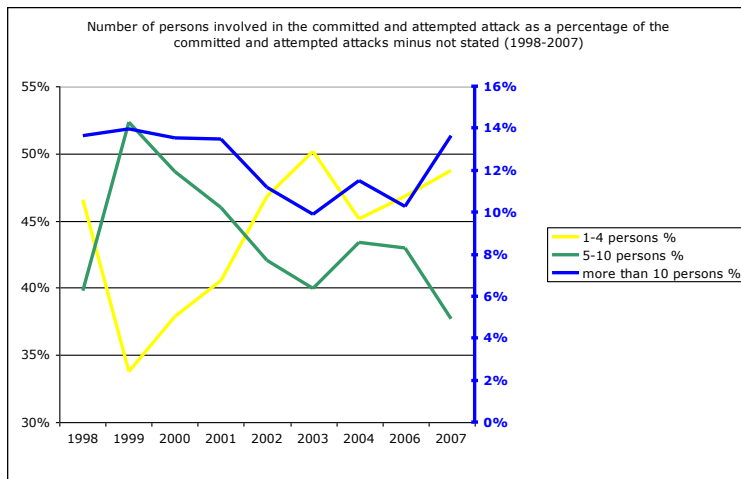


Figure 4.24. Number of persons involved in attacks as a percentage (data obtained from annual reports IMO, 1998-2007)

Since 1999, there can be seen a decrease of pirate groups with 5-10 persons. Attacks with 1-4 persons are most common with more than 50% of the portion in 2007. Large groups of more than 10 persons also increase but with 14% it remains a slight part. I must notice that today's strategy exist of 3-4 small pirate boats with small groups in order to give a better chance of boarding a ship. When reporting such an attack shipmasters must choose between 1-4 persons or more than 10 persons to report. This can affect the liability of the above illustrated picture. There is also some arbitrariness of piracy related to nationalities where the ship is managed or controlled. Especially German vessels, with already 38 attacks in 2008, are major targets as pirate gangs believe their owners are more willing and able to pay ransoms for the return of the crew and the vessel. This is confirmed by the data available of the ICC-IMB reports, which is illustrated in figure 4.25.

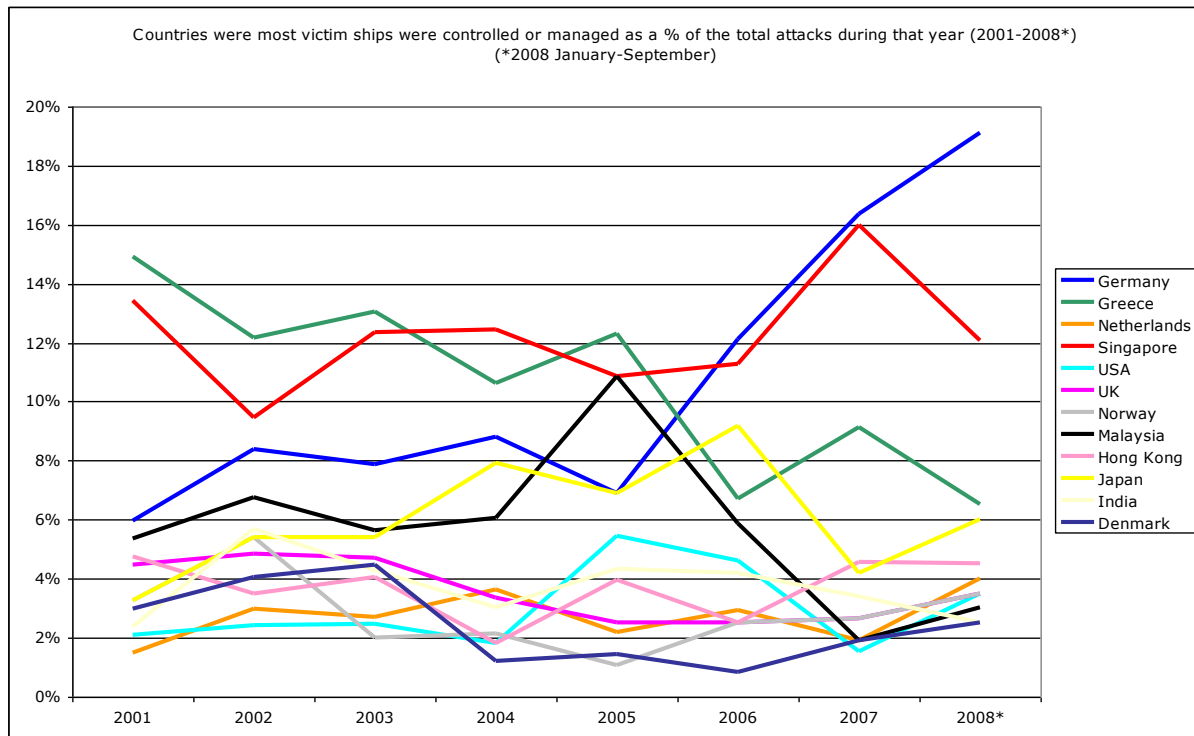


Figure 4.25. Countries where most victim ships were controlled/managed (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 2001-2008)



4.3.5 Reputation Damage

- Increasing investment risk premiums;
- Crew impact;
- Claims of crew and family
- Smaller labour pool;
- Less quality maritime transport service;
- Increased workload on board;
- Double-pay danger money;
- Additional costs;
- Increase transport price.

Figure 4.26 illustrate the development of violence and types of arms used against crew. The portion of used knives, crew killed and assaulted show a constant percentage during the years. Crews that are threatened and injured decreased, while the amount of used guns increased every year.

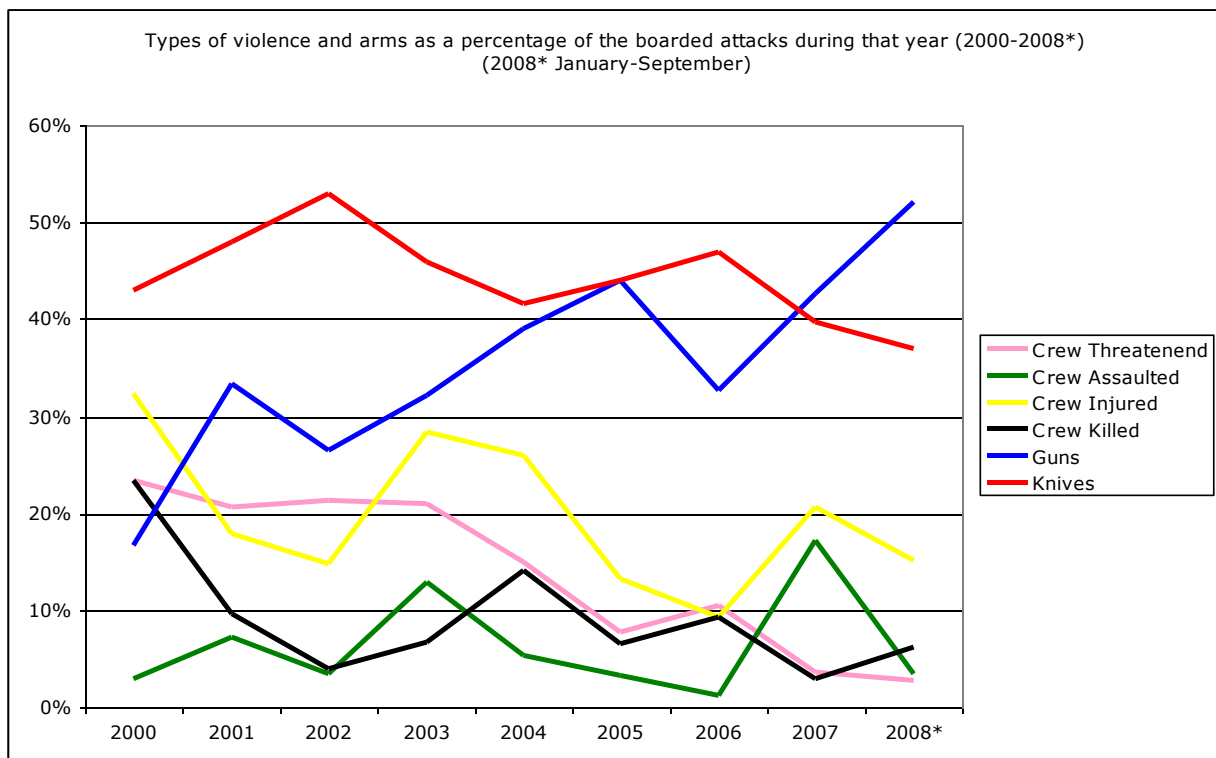


Figure 4.26. Types of violence and arms (data obtained from ICC-IMB Piracy and armed robbery against ships reports, 2000-2008)



According to the survey piracy has a minimum effect to attract investors. About 26% of the survey correspondents think piracy leads to a decreasing labour market for crewmembers and higher wages. Although this can be considered as a small effect, a large part of the respondents added that especially the impact to their crew must not be forgotten. Unfortunately this effect was not included in the survey. They say that deaths, injuries, traumas, kidnapped crew, stolen personal items, pressure on crews, stress, feeling of helplessness, fear among ship crew and extra duties and risks to safety of seafarers, demoralises crews and puts undue pressure on their families when they find out that their family members are transiting pirate attack areas.

This perhaps could contribute to the global crew shortage, if that phenomenon continues or enlarges in the future. As a cause of piracy, vessels steam different routes than the most economical for the simple reason that safety of the crew and vessels always come first. For the past 60 years, the IMO has been the security organisation of the safety of seafarers and the ships they serve on and the protection of the marine environment. Cockroft (2008) added that attracting new young workers to begin a career at sea and keeping existing seafarers in the industry is a major problem today. The maritime industry is becoming aware of the growing shortage of qualified seafarers. Forecast of growth seagoing trade is estimated for about 60% by 2020. A highly competitive globalised shipping market and cutting costs strategies will lead to more intensive work for longer hours and at the same time higher technical standards from seafarers to enable them to cope with advanced technology. Expectations of an adventurous life, visiting and going ashore in interesting ports with a rewarding and fulfilling secure career are long gone. The image of today's shipping industry in the eyes of young people is a poor public image, high personal training costs for an entrant, often excessive hours of work with little quality of social life, no access to the modern communication systems which all must take for granted, over-regulation, port automation and a risk of being a victim of piracy.



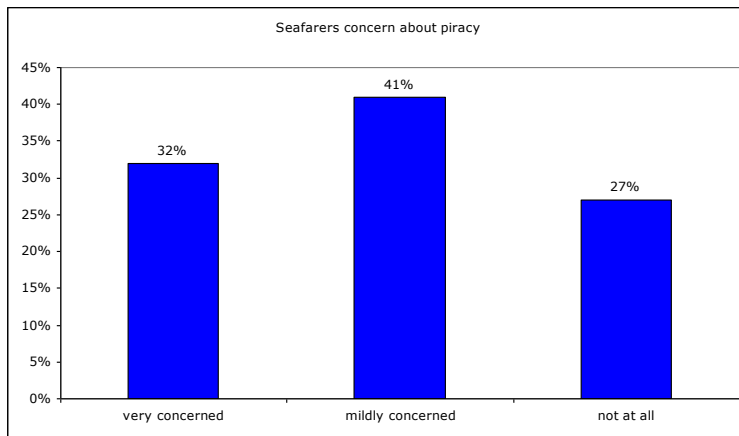


Figure 4.27. Seafarers concern about piracy (data obtained from Hand, 2007a)

Hand (2007a) writes about a survey that reveals the human cost of piracy in the eyes of seafarers. This survey says that 32% were 'very concerned' about the threat of piracy, another 41% were 'mildly concerned' and 27% 'not at all'. The survey was answered, in many cases in great detail covering a huge range of trading areas and vessel types. Of those who answered the survey, 22% were on a ship that was involved in a piracy incident or attempted attack. Asked if the threat of piracy affected how they felt about working the industry 11% says 'a lot', 49% 'not much' and 39% 'not at all'. With the well-documented shortage of seafarers, Hand (2007a) said the industry could not afford to have 11% seriously worried about piracy.

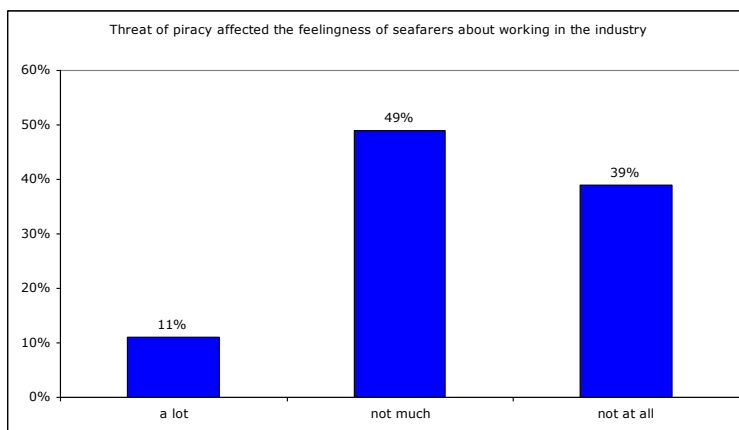


Figure 4.28. Feelingness of seafarers about working in the industry (data obtained from Hand, 2007a)

The level of crew qualification is one of the main challenges for tanker shipping operation. However, there was an increase in the number of problems involving crew members in all shipping sectors over the last two years. Spurrier (2008) raised attention to the human error which is one of the main causes to tanker accidents. Accidents involving tankers had begun to increase since 2003. An investigation of the causes show that more than half were caused by human error. It cannot simply be explained by the increase in maritime transport and traffic. The human element plays a very important role. Another source like Brewer (2005) said that lack of sea recruits will cause problems in the future. Marine hull claims increase as crewing quality decrease.



Frank (2008d) also highlighted the global crewing crisis, with figures from the International Shipping Federation (ISF) showing that there will be a 46.000 crew shortfall by 2010. Besides of that, 20.000 new crew members are needed for new ships. Shipping companies seek to short-term recruitment solutions and driving wage inflation. Training a well-trained shipmaster takes 8-10 years while a ship can be built within two years. Short-term solutions will not work considering this kind of information.

Lewis (2008) said that in spite of the big rate increases for protection & indemnity (P&I) it is not comparable with the situation in hull and machinery, where losses are starting to impact the accounts of many insurers. For the shipping industry, two continuing key risks threaten to increase the size and cost of claims. These risks are crew shortages and a small pool of skilled officers in the marine industry. The shipping industry could result in increasing claims due to human error. At the same time, shipyards are working at full capacity on new builds and these additional ships will exacerbate the existing crew shortage, especially for complex vessels such as the new generation of LNG tankers. Bigger ships, tankers and dredgers are creating bigger concentrations of risk and magnifying the potential scale of disaster for P&I, liability and cargo insurers as well as hull underwriters.

In last months, there can add a new cost element, namely, the double-pay danger money for seafarers. In October 2008, the Philippine Overseas Employment Administration (POEA) declared the Gulf of Aden as a high risk zone and provided double pay and double compensation to Filipino seafarers which contain about 227.000 seafarers in 2007. Seafarers, sailing within the declared high-risk zone, receive double the amount of their basic wage, overtime pay, and leave pay. On any death, injury or illness while sailing within the high risk zone, the seafarer shall also be entitled to a double amount of compensation and benefits. The shipping industry's International Bargaining Forum (IBF) has also point the Gulf of Aden as a high-risk area with double pay for seafarers. Crews on ships transiting the Gulf of Aden and covered by a global labour agreement are now getting a war bonus of double pay. The International Labour Organisation (ILO) basic minimum wage for seafarers was established at US \$530 a month at January 2008. An increase from US \$530 to US \$545 a month is expected at the end of 2008. However, in practice, the majority of the world's 1.25 million seafarers receive wages that are significantly higher than the ILO minimum. With yearly 22.000 transits through the Gulf of Aden and East of Africa and counting with an average of 18 seafarers on a single vessel and a two days transit this represents 792.000 person working days. A rough estimate of these additional costs is:

- $792.000 \times (45-25) = \text{US } \$15.840.000$ or US \$16 million per year additional wage costs.

Osler (2008b) count with an average rating pay of US \$30 per day. According to this estimation as a cause of the decision to raise seafarers' rates by the ITF and ship owners this could cost the shipping industry additional costs of US \$24 million per year without ship officers and master ratings included.



4.3.6 Liability Maritime Transport

- Lower liability maritime transport;
- Costs of higher inventory levels;
- Less maritime transport.

Fear to disruption of vessel passage through certain maritime bottlenecks it will lower the liability of maritime transport. It could create the need to carry higher levels of inventory due to the potential piracy to cause bottlenecks in delivery systems. This will reduce the benefits of just-in-time manufacturing processes and undermining supply chain management. According to the survey piracy have a minimum effect to less (grow of) demand of maritime transport. A decrease in the position or liability of maritime transport as a consequence of piracy is also being considered as low.

Cockroft (2008) said that growth forecasts of seagoing trade are estimate for about 60% by 2020. According to Frank (2008d) the number of vessels in the world fleet will almost double over the next five years. In spite of that prognoses, he warned that some attention have to be made to shifting global trade patterns, high oil prices, regulatory change and a lack of qualified crew. He does not refer to the threat of piracy and armed robbery. Today, container rates are falling due to over-supply, high bunker costs, rising port duties, lower Chinese exports and weakening Asia-Europe trades. The evolution of the growth rates is illustrated in figure 4.29. Maritime transport will grow further and further, and the existence of piracy will not decrease this trend. The year of 2008 already started with 728,225 mGT.

Evolution of the growth rates (GT, DWT, and Number of ships of > 300 GT) between 1995 and 2007

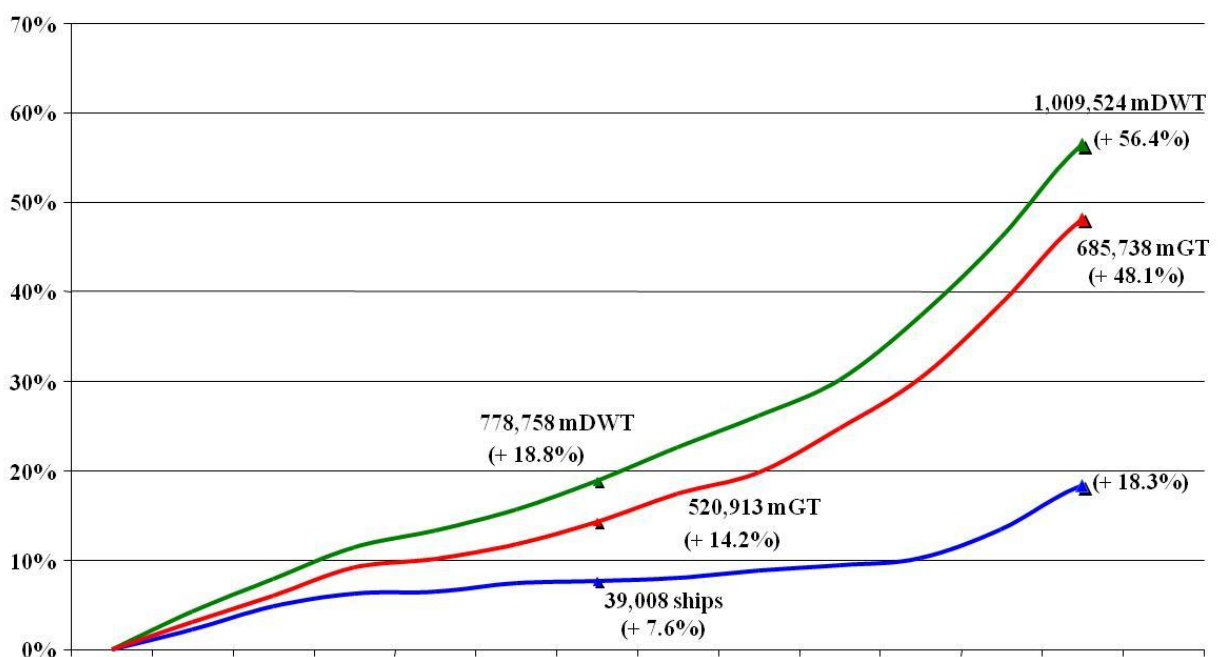


Figure 4.29. Evolution of the growth rates (Forsmo, 2007)



Cost of higher inventory levels is not only related to the liability of maritime transport but even to the longer transits as a cause of changing routes as well. The area of Gulf of Aden provides the shortest maritime route from the Far East to Europe. Vessels that opt for an alternative journey will have to pass the Cape of Good Hope, and that will add 12 to 21 sailing days depending on the type of vessel and speed travelled. This means that also the inventory levels will increase in order to sustain the reliability of supply. Counting with 10% of the vessels change their schedule to this route, three weeks delay, 8% interest of inventory costs, and the export value of Middle East and china to Europe only, these costs is roughly estimate to US \$300 million.

An example of a case were there is chosen for another transport mode than shipping is the construction of an oil pipeline which will build to the Malacca Strait. Hand (2007b) noticed that the construction of this US \$7 billion oil pipeline will reduce tanker traffic by 20% in the Malacca Strait. The entire project will be completed in 2014. The theory behind the pipeline is that tankers from the Middle East Gulf will offload cargoes on the west coast of Malaysia, where they will be pumped through the pipeline and loaded back on to vessels on the eastern coast to head to north Asia. It would cut three days from vessel voyages add substantial times for loading and unloading vessels. The issue of avoiding piracy in the Malacca Straits was raised as a plus point for the pipeline.



4.3.7 Environmental Impact

- Environmental catastrophe
- Major chokepoint closed for a long period of time

Piracy could lead to environmental disasters with oil tankers when the bridge left unmanned after an attack and then collides with another vessel or runs aground. More than half of the world's annual merchant fleet tonnage passes through the Straits of Malacca, with the majority continuing into the South China Sea. Oil flows through the Strait of Malacca rose to 9.5 million barrels per day in 1997, and rising demand for oil in Asia could almost double these flows over the next two decades. Two-thirds of the world's liquefied natural gas (LNG) trade also takes place in this region. Violence on ships in the region could lead to an environmental catastrophe, a major oil spill or, even more threatening, an explosion on a LNG tanker. There are known reports of crews being tied up during pirate attacks, leaving the ships, including very large crude tankers and LNG carriers, in danger of groundings or collisions. In addition, the use of increasingly powerful weapons by pirates has brought the danger of potentially devastating ecological disasters. A direct attack on an oil or chemical tanker could cause a breach of the vessel's hull and result in a catastrophic spill or explosion. Zou (2005) stated that many piratical attacks have taken place in areas of natural beauty or of international environmental significance, such as the South China Sea.

Petretto (2008) also raised attention to piracy's cause of environmental disasters. In many cases, pirates do tie up the whole crew while robbing and also leaving behind the then guideless vessel. If the attack takes place on a chemical or oil tanker and furthermore in a crowded choke point like the Malacca Straits or Bar El-Mandeb where approaching vessels do not have enough room and time for maneuvering, a crash can happen quite easily. This could not only have a huge effect to maritime and coastal areas or in the worse case to a major choke point. Sea routes might to be closed for a certain time for the purpose of cleaning up the damage. The economic effects of such an incident are huge. If a gas tanker explode or an oil tanker grounded, the loss could result into billions. The environmental damage caused by the two most expensive tanker accidents to date, namely the Exxon Valdez in 1989 and the Prestige in 2002, totaled approximately US \$9.5 billion and US \$1.2 billion. Although the actual indemnity paid by insurers was far less as a consequence of limits permitted under applicable liability conventions, these two incidents in spite of that, have had a huge impact to the insurance industry compared with the estimated worldwide premium income for P&I which is currently only around US \$2.2 billion a year.



4.3.8 Political Unrest and Economic Loss for the Region

- Disruption import/export;
- Danger to local fishing fleet;
- Danger to food delivery aid;
- Danger to political stability;
- Economic loss for the region;
- Social climate of fear and terror.

In the appendix VII and VIII a political and economic risk map of 2008 and a terrorism threat map 2007 created by Aon Risk Insurance are attached. This map illustrate the (in)stability of certain regions in the world. According to Petretto (2008), piracy can lead to a spiral of weakness in the respective region. It can considerably undermine the already existent instability of the region when piracy is used as a way of living. It encourages already present corruption when authorities such as police or military are underpaid and offered big rewards for working together with the pirates. State instability can further increase the condition for maritime piracy. According to Donna (2008) there is a relationship between global pirate attacks and failed state indicators. He noticed that in 2007, 98.4% of all pirate attacks occurred in either moderately or highly failed states and 23.2% of all moderately or highly failed states experienced at least one pirate attack. Smead (2001) stated that corruption among elected officials can undermine and weaken political stability as well. China and Indonesia was heavily criticised in this respect. He further acknowledged that it is an open secret in regional shipping circles that some elements in the Indonesian military and police have a hand in the problem. A nation that relies on safe shipping lanes for a significant portion of its economy will feel the most direct impact of piracy in the region. Economic loss for the region of Yemeni ports is well illustrated by the case of the 'Limberg attack'.

Case: October 2002 Limberg attack.

"Immediately following the attack, underwriters tripled insurance premiums for vessels calling on Yemeni ports. These premiums, reaching as much as USD \$300.000 per vessel (and USD \$250 per TEU), led some lines to cut Yemen from their schedules and/or switch to ports in neighbouring countries despite attempts by the government to put in place a loss guarantee program. Yemeni terminals saw throughput plummet (from 43.000 TEU in September 2002 to 3000 TEU in November 2002) and have had to lay off workers. Local sources claim that as many as 3000 people have lost their employment and government estimated losses stemming from attack are USD 15 million per month. Assuming that these losses are sustained over a 6-month period, they would account for nearly 1% Yemen's 2001 GDP."

(OECD, 2003)



Smead (2001) also noticed that the major Japan imports of oil is from out of the Middle East. Significant independency to the flow of this oil could be a direct threat to its national security. Piracy not only affects the larger nations that can afford massive super tankers. A lot of pirate attacks are directed to fishing trawlers. These fishing fleets provide the basic food supplies to the local region. An interruption can have a severe effect on these often called third world nations whose economies already are not well function. Smead (2001) even said that lack of any deterrent action by the affected government could result in a boycott of its port facilities. Between 1992 and 1995, the British and Japanese Shipowners Associations threatened to reduce and redirect trade until Hong Kong increased its maritime surveillance. Similar movements are being expressed in regard to Indonesia today. Shippers may take the longer sea routes south of Indonesia. The routes may cost more in time but not as much as the inconvenience of losing a cargo to pirates. In the case of the Suez Canal, Egypt could suffer a loss of revenue from canal dues, which, alongside tourism, represents one of its top two sources their earnings. With today's piracy in the international navigation route in the Africa Horn and Gulf of Aden it would have a negative impact on international cargo companies as these companies will raise the cost of insurance they pay for their ships.

The high cost of insurance that companies pay for their commercial ships will lead to an increase in the price of items, noting that citizens in for example Yemen will pay for this economic burden. Fouché (2006) mentioned that any disruption of services in South Africa's seaports, due to attacks against ships, could have serious repercussions for South Africa and could lead to a suspension of trade. The passage around the Cape of Africa includes five million tons of oil every month. Attacks against ships in this region could pose a serious threat to South Africa's political and economic stability, peace and could lead to the destabilisation of the region. Many oil firms already moved their operations from the Niger Delta, where pirate and rebel groups are particularly active, to Lagos. There is a strong possibility that several of the narrow but extremely busy seaways would be closed to shipping and fishing for years, potentially devastating the economy in the region. Economic loss for the region is also well illustrated by Kane (2008), who said that a sharp rise in piracy along Nigeria's coast and within its waterways have had the effect that many fishermen refused to work until the threat was decreased, which has led to food price inflation and a collapse in government revenues. One local council estimated its weekly income had declined more than 50% because of the struggling fishing industry.



5. Financial Costs

To avoid some misunderstandings, I must notice that there exists different kind of classifications of the terms million, billion and trillion. The United States use million, billion and trillion. However, in the Netherlands we are used to use for the same terms million, milliard and billion. In this paper I make use of the classification of the US terms million, billion and trillion.

Estimates of the cost of piracy vary widely. According to Smead (2001), piracy will cost the shipping industry US \$1 billion (= US \$1000 million) per year. However, the actual cost of piracy can be measured in several ways, human, political, economic, and environmental. The disagreements in which factors to include in the calculation, is one of the reasons why estimations vary widely.

At its most basic level, it is a danger to the lives and welfare of human kind. Death, injuries and traumas to crews and seafarers are usually the result of an attack. The three components of maritime industry most affected by piracy are the shippers (owners of the cargo), the carriers (owners of the vessel), and insurers of both the ships and the cargoes. Financial costs are direct costs varying according to size of the attack, its target and its location. These costs vary from the relatively small cost of a damaged or destroyed vessel to large costs of loss of life and massive property damage. According to NUMAST (2004), in 1996 a report by Lloyd's Shipping Economist estimated the financial costs of attacks on merchant shipping around US \$200 million a year, while the Asia Foundation produced a figure of US \$16 billion per year lost in cargo, ships and rising insurance premiums. In 1998, the average loss per reported attack was in the order of US \$50.000.

In spite of these estimations, losses due to piracy are relatively small in relation to the total value of goods transported by the shipping industry. Almost 90% (ICS, 2008) of the world's cargo is transported by sea. DFAT (2003) estimated piracy costs to US \$73 million or 0.0032 per cent of all trade in 1997. They also estimate that if the United States has to carry 10% percent cent more in inventories and pay 20% more for commercial insurance premiums as a result of increased piracy, it would cost 0.1% and 0.3% of GDP or US \$7.5 billion and US \$30 billion per year. In the end, the indirect costs of piracy are tremendous. The question will be to what end we must account the effect and the related costs. Today, cargo or even the entire vessel disappears which rise the losses to hundreds or millions of dollars. According to Munich Re Group (2006), a container vessel of the latest generation has a hull value of around US \$150 million while the cargo is worth between roughly US \$800 million and US \$1 billion. According to Percival (2005), the total damage as a consequence of piracy due to losses of ships and cargo amounts of US \$16 billion per year. But in this number the costs of ransoms and rising insurance costs are not even added. Although Luft (2004) included the rising insurance costs, he estimates the costs to US \$16 billion per year as well.



However, from an economic perspective, piracy barely makes a dent in the US \$7.8 trillion industry of maritime commerce. According to Vallar (2000), there is little financial incentive for companies to deal with the problem. Counting the numbers with today's estimations of piracy costs of US \$16 billion per year, this will estimate to approximately US \$20 for every US \$10,000 of goods shipped. Petretto (2008) also said that economic implications can get considerable high but not yet account for the whole business of global shipping. The estimated losses of up to US \$25 billion don't really seem to fall into weight. For the shipping companies and their clients piracy does indeed reflect on their account balance. However, economic losses were and maybe still are too small for shipowners to take action on their own. Woodman (2005) stated that world trade accepts an annual loss variously estimated as between US \$60 and US \$250 billion. In answer to whether piracy is a threat to commerce, threat exists but is not significant in respect to the financial costs.

After mentioning a number of estimations by several authors, I will now give my own estimation of the piracy costs to the shipping industry. The amount of average attempted, committed, and total attacks per year during the period 2000-2008 is 80, 230 and 310 respectively. However, due to the many reasons of not reporting piracy incidents as noted in 2.4.2, I rectify these numbers with the obtained survey information. A part of 47% says that the number of 282 piracy attacks in 2007 was a true indicator and 40% says that this number is too low. A part of 14% says that this number is even too high. Nevertheless, this part often noticed that armed robbery and theft can not be considered as pirate attacks. The part of 40% that says that the IMO indicator was too low, 73%, noticed that it will be an amount near 500. Therefore I count the average total attacks to:

- $(47\% \times 310) + (40\% \times 500) / 87\% = 400$ attacks.

Which lead to 300 committed attacks and 100 attempted attacks. I have not made a correction in relation to the average hijacked vessels per year of 20 incidents, for the simple reason that these incidents can not easily sustain unreported.

Average numbers

2000-2008	Amount
Average total attacks per year	400
Average committed attacks per year	300
Average attempted attacks per year	100
Average hijacked vessels per year	20
Average amount of seafarers taken hostage	290

Figure 5.1. Numbers used in the estimation



Estimation of the financial costs of modern maritime piracy

Effects	Average	Multiplier	Per Year	Cumulative
Direct Effects				
Delays due to escaping maneuvers	\$ 3.000	x average attempted attacks per year	\$300.000	
Damage incurred in the attack	\$ 30.000	x average total attacks per year	\$12.000.000	
Loss of safe and cash money	\$ 15.000	x average committed attacks per year	\$4.500.000	
Loss of cargo	\$ 2.500.000	x 5% average committed attacks per year	\$37.500.000	
Loss of hire	\$ 20.000	x average committed attacks per year	\$6.000.000	
Loss of operation	\$ 500.000	x average hijacked vessels per year	\$10.000.000	
Loss of the whole ship	\$ 5.500.000	x 5 times a year	\$27.500.000	
Kidnap and ransom money	\$ 2.000.000	x average hijacked vessels per year	\$40.000.000	
Investigation costs	\$ 15.000	x average committed attacks per year	\$4.500.000	
Costs of negotiating and delivering the money	\$ 20.000	x average hijacked vessels per year	\$400.000	
Contractual penalties	\$ 30.000	x average committed attacks per year	\$9.000.000	
Cargo fraud with phantom- or ghost-ships	\$ 2.500.000	x 10 vessels x 4 voyages per year	\$100.000.000	+
		Subtotal	\$251.700.000	\$251.700.000
Indirect Effects				
Security Costs				
Security bounty of 10% cargo when transit	\$ 20.000	x 80.000 transits in piracy-prone areas/ports	\$1.600.000.000	
Delay due to maritime security checks	\$ 20.000	x 80.000 port arrivals in piracy-prone areas	\$1.600.000.000	
Additional security equipment and crew training	\$ 50.000	x 20.000 vessels in piracy-prone areas	\$1.000.000.000	
Delay due to waiting time for convoy schedule	\$ 30.000	x 22.000 transits Gulf of Aden	\$660.000.000	
Private military state contracts navy forces	\$ 50.000.000	x 2 contracts a year	\$100.000.000	+
		Subtotal	\$4.960.000.000	\$5.211.700.000
Insurance Costs				
Higher premiums in piracy-prone areas	\$ 15.000	x 80.000 transits in piracy prone areas/ports	\$1.200.000.000	
Additional kidnap and ransom insurance	\$ 7.500	x 35% of 80.000 transits	\$210.000.000	+
		Subtotal	\$1.410.000.000	\$6.621.700.000
Change in Trade Routes				
Steaming in a curve to avoid coast lines	\$ 30.000	x 22.000 transits Somalia	\$660.000.000	
Other sailing routes	\$ 500.000	x 3000 voyages round the Cape of Good Hope	\$1.500.000.000	+
		Subtotal	\$2.160.000.000	\$8.781.700.000
Arbitrariness of Piracy				
Increase oil and gas price	-	No significant evidence have been found	\$0	
Increase general price levels	-	counted in economic loss for the region	\$0	+
		Subtotal	\$0	\$8.781.700.000
Reputation Damage				
Increasing investment risk premiums	-	No significant evidence have been found	\$0	
Claims of crew and family	\$ 50.000	x average amount of seafarers taken hostage	\$14.500.000	
Crew shortfall, less quality and productivity	\$ 10.000	x 40.000 crew shortfall	\$400.000.000	
Double-pay wage money	\$ 30	x 800.000 person working days Somalia	\$24.000.000	+
		Subtotal	\$438.500.000	\$9.220.200.000
Liability Maritime Transport				
Higher inventory levels	\$ 300.000.000	transits Middle East, China to Europe	\$300.000.000	
Less maritime transport	-	No significant evidence have been found	\$0	+
		Subtotal	\$300.000.000	\$9.520.200.000
Environmental Impact				
Environmental catastrophe	\$ 10.000.000.000	Once upon a period of 10 years	\$1.000.000.000	
Major chokepoint closed	\$ 10.000.000.000	Once upon a period of 10 years	\$1.000.000.000	+
		Subtotal	\$2.000.000.000	\$11.520.200.000
Political and Economic Loss for the Region				
Economic loss for the region	\$ 200.000.000	x 6 regions of states in piracy-prone areas	\$1.200.000.000	+
		Subtotal	\$1.200.000.000	\$12.720.200.000

Figure 5.2. Estimation of the financial costs

According to the estimation which is illustrated in figure 4.34, the total cost of direct effects is about US \$250 million. Near my opinion, the effects of additional security, insurance costs, the chance of changing trade routes and reputation damage can also be seen as piracy costs to the shipping industry. This cost is estimate to US \$9 billion. Considering the total costs of the calculation above, estimations of US \$16 billion by several authors can not noticed as a rare number. However, effects and costs such as lower liability of maritime transport, environmental costs and economic losses to piracy affected regions or more vague and can not simply be seen as a direct related effects of piracy. Some effects are bilateral, such as the political and economic stability. There can be mentioned endless effects of piracy. Somewhere there must put a line. My considerations and motives in this aspect are already described in chapter 3.



6. Conclusions

6.1 General Conclusions

Modern maritime piracy is a serious issue nowadays. Piracy has become increasingly more violent. Besides armed robbery, hijacking the whole ship and cargo is a routine job for today's pirates. The main objective of this research was:

- *To determine if modern piracy has a significant influence on shipping companies' behaviour patterns in doing their business and if there can be found significant economic effects.*

This objective has been translated in a main research question:

- *What is the influence of modern piracy on maritime commercial transport?*

In order to get an answer to this question I researched the actual situation concerning modern maritime piracy, the possible effects, and the direct and indirect consequences for shipping companies and the financial costs of piracy to the shipping industry.

The perception that the international community has eliminated sea piracy is far from true. Today's pirates are trained fighters and drugged teenagers aboard speedboats, equipped with satellite phones and global positioning systems, armed with automatic weapons and rocket-propelled grenades. Modern piracy is a violent, bloody and ruthless practice. Different legal and practical definitions of piracy exist as an effort of several institutions like the UN, IMB and IMO. In spite of the fact that piracy has increasingly linked with terrorism, there can still made a well argument distinction. Similarities between piracy and terrorism are that both can be seen as acts of international or transnational crime, that the same tactics and methods are used and that both use same types of equipment, weapons and violence in achieving their objectives. Due to the fact that piracy has become more violent it becomes closer to an act of terrorism. However, piracy is a crime, motivated and based on financial gain, instead of political goals. Pirates want to avoid attention and will inflict only as much harm and damage as necessary to accomplish their objective.

Piracy can classified into three basic categories, namely 'Low level armed robbery', 'Medium level armed assault and robbery' and 'Major criminal hijack'. Piracy can be divided in five specific forms, varying according to different regions, namely 'Asian piracy', 'South American' or 'West African', 'Piracy with military or political feature', 'Hijacking' and finally 'Phantom- or ghost-ship'. A new trend in piracy is characterized by the fact that pirates attacked and kidnapped crewmembers and demanding ransom for their safe return.



The problem of piracy is an ongoing and ever changing problem. Each area has their own features and requires their own solution for their specific situation. Similarities between these regions are socio-economic issues, poverty, social instabilities and an absence of effective law. The most piracy-prone waters are 'South East Asia and the Indian Sub Continent', 'Gulf of Aden and Southern Red Sea' and 'South and Central America and the Caribbean waters'.

Reasons why piracy occurs are political corruption, economics of the third world, willingness of shippers to pay the costs of piracy rather than higher insurance premiums, failure to develop international protection and today's small crews working on vessels as a consequence of cost saving tactics. Published figures on piracy not reflect the true extent of the problem. Dark figures suggest about 20% to 70% higher than the statistics reveals. The true number of actual pirate attacks could be close to double the official numbers.

Last years there is an increase of pirate attacks in East Africa and West Africa. Other trends are that pirate attacks moving away from the normal coastal attacks towards the open waters and that it has become more violent. In respect to a comparison of the monthly attacks, there can not be seen a significant seasonal patron.

Piracy effects are divided into direct effects and indirect effects such as security costs, insurance costs, the possibility of changing steaming routes, reputation damage of maritime transport and the effects of arbitrariness of pirates comparing to their main targets. Direct effects are directly related with an attack themselves and based on an individual case while indirect effects are related to the whole chain, like the total shipping industry, shipowners and shippers. The effects and therefore the actual cost of piracy can measured in several ways, human, political, economic, and environmental. However, near my opinion the factors of liability of maritime transport, environmental costs and political and economic losses to piracy should not measured in the calculation of financial piracy costs to the shipping industry. The possible effects of modern maritime piracy was revealed by a survey with a total amount of 1870 vessels and a total capacity of 95.349.536 DWT or 4.2% and 8.6% of the world merchant trading fleet. The main body thinks that the actual numbers of the pirate attacks is a real indicator. However, 40% say that these are too low which 73% of them think about twice more attacks. Furthermore, about 22% say that they have not reported some cases. In total, 41% were a victim of an attempted attack and 31% of a committed attack this year. Most of the correspondents think that piracy costs estimations of US \$16 billion is a true indicator. Nevertheless, 29% says that this number is to low. A part of 18% says that this number is even too high. In respect to insurance, 64% say not taken additional kidnap and ransom insurance. Furthermore, the main body, namely 83% say that it is a significant problem for shipping companies. Especially the impact on seafarers and their relatives were one of the main reasons to point piracy as a significant problem.



What can be concluded about the piracy effects is that, a significant part say that piracy increase the transport price, leads to more integration with the navy, to increasing sailing speed in dangerous areas, to more security equipment on board, to avoiding coastlines and sailing more nautical miles, to avoiding some ports, to other sailing routes and to an increase of the insurance premiums. About 20% to 30% of the correspondents think piracy, leads to more sailing in convoy, to a decreasing labour market for crewmembers and higher wages. According to the survey piracy have a minimum effect, less than 20%, to less (grow of) demand of maritime transport, to larger vessels, a decrease in the position or liability of maritime transport, that it will have an effect to attract investors or that it will influence the development of their company's global network. A large part of the respondents added that especially the impact to their crew must not forgotten.

A trend in piracy-prone areas is the tremendous increase in the hijacked strategy. There is a significant relation between hijacked vessel and the amount of hostages. With 581 seafarers taken hostage between January until September, 2008 show already a dramatic increase. Other trends that can be mentioned are that Somali pirates strike deeper on the high seas. After 2002 the attacks that taken place in international and territorial waters are increased while the amount of attacks in port areas decreased. Therefore, the portion of attacks while berthed are also decreased and attacks when ships are anchored are decreased in last two years. In this period the attacks to steaming ships are increased. Furthermore, evidence show that shipping companies practices the IMO warning to steam in a curve far outside the Somali territorial waters.

Easy targets are small and medium-size vessels travelling at maximum speeds of 16-17 knots and a low freeboard. The five most attacked types of vessels are container vessels, tanker chemical product, bulk carriers, general cargo vessels and tanker crude oil. Last three years with exception of 2008, bulk carriers show a tremendous decrease of their portion in the total attacks. Container vessels are the most target vessels by pirates. General cargo vessels show a kind of constant level of attacks during last fourteen years. Furthermore, what is evidently illustrated, is that chemical and product tankers show a dramatic increase in all the years and takes the second place in the list in 2008. Danger exists due to the fact that the most of the world's oil and gas is shipped through the dangerous piracy regions. However, there is no significant relation comparing the boarded attacks and hijacked vessels with the development of the world crude oil price. However, comparing the oil price with the amount of seafarers taken hostage during the years, there can be stated a small relation. During decreasing amount of hostages, world oil price are steady while both show increasing numbers in the same years. However, these effects can be the result of huge media attention and are bilateral as well. There is also some arbitrariness of piracy related to nationalities where the ship is managed or controlled. Especially German vessels, with already 38 attacks in 2008, are major targets, as pirate gangs believe their owners are more willing and able to pay ransoms for the return of the crew and the vessel.



Furthermore, the efficiency of pirates during the years does not vary widely the last 6 years. After 2000 the average successfulness of pirates lies between 70% and 80%. Since 1999, there can be seen a decrease of pirate groups with 5-10 persons. Attacks with 1-4 persons are most common with more than 50% of the portion in 2007. Large groups of more than 10 persons also increase but with 14% it remains a slight part. Concerning the development of violence and types of arms used against crew, there can be noticed that the portion of used knives, crew killed and assaulted show a constant percentage during the years. However, crews that are threatened and injured decreased while the amount of used guns increased every year. Dead, injured, traumas, kidnapped crew, stolen personal items, pressure on crews, stress, feeling of helplessness, fear among ship crew and extra duties and risks to safety of seafarers, demoralises crews and puts undue pressure on their families when they find out that their family members are transiting pirate attack areas. This perhaps contributes to the global crew shortage and the poor public image working in the maritime industry. A survey about the human cost of piracy in the eyes of seafarers reveals that 32% were 'very concerned' about the threat of piracy, 41% were 'mildly concerned' and 27% 'not at all'. Of those who answered the survey, 22% were on a ship that was involved in a piracy incident or attempted attack. If threat of piracy affected how they felt about working the industry, they answered 11% 'a lot', 49% 'not much' and 39% 'not at all'.

Last months there can be added a new cost element, namely the double-pay wage money for seafarers. Furthermore, if lack of solving the problem continuous, shipping companies will choose for alternative journeys which means that inventory levels increase in order to sustain the reliability of supply. Piracy could also lead to environmental disasters with oil tankers when the bridge left unmanned after an attack and then collides with another vessel or runs aground. This could not only have a huge effect to maritime and coastal areas or in the worse case to a major choke point. The economic effects of such an incident are huge. Furthermore, piracy can lead to a spiral of weakness in the respective region. It can considerably undermine the already existent instability of the region when piracy is used as a way of living. Evidence shows that there is a relationship between global pirate attacks and failed state indicators. Evidence show that 98.4% of all pirate attacks occurred in either moderately or highly failed states and 23.2% of all moderately or highly failed states experienced at least one pirate attack.

According to my own estimation the total costs of direct effects is about US \$250 million. Together with additional security, insurance costs, the chance of changing trade routes and reputation damage piracy costs to the shipping industry US \$9 billion. Estimates of the cost of piracy vary widely and ranges between US \$1 billion and US \$16 billion per year. In relation with the US \$7.8 trillion industry of maritime commerce piracy costs US \$20 for every US \$10.000 of goods shipped. There is stated that world trade accepts an annual loss variously estimated as between US \$60 and US \$250 billion. Concluding, in answer to whether piracy is a threat to commerce, threat exists but is not significant in respect to the financial costs. It is however a significant problem in respect to human safety on vessels in piracy-prone areas.



6.2 Final Remarks

The strength of a survey research is that with low cost a lot of data from a large number of persons can be acquired. By using standard questions, information can be easily analyzed using quantitative methods. However, it also has some limitations. Weaknesses are the validity and reliability of the responses. The responses provide verbal descriptions of what respondents say they do or how they feel about something and not actually do or really feel about something. Furthermore, there can be an endless discussion which effects are considered as causes of piracy.

Further remarks considering piracy are that shipping companies have to re-think about their size of their crew. Not only as a part of security but also about the fact that a larger crew can do more maintenance and value added logistics. Furthermore, the main security strategies in the future are collecting better piracy statistics by an independent, industry-funded body which puts pressure on governments to act over the issue of greater international cooperation, new technological developments, integrated risk management and clear jurisdiction. Secondly, for pirates it is very easy to make simple plans for selecting and targeting a ship, based on information about the ship's sailing timetable available at several internet resources. During my research, I have experienced that such shipping schedule details can be easily obtained by direct inquiry from various internet resources. The shipping industry should be concerned about the ease of getting this kind of information. Third, shipping companies must be aware that insurance contracts are not correctly defined. Piracy insurance is not always clear and varies from contract to contract. Underwriters have the power to move piracy risk between war and hull cover as required, using vague and unclear words.

Furthermore, the shipping industry must be aware of the ever-changing problem of piracy. According to Kane (2008), attacks in the waters off northeast South America and the southern Caribbean, could develop as the new piracy-prone area in the future if regional and international trade increases. Pirates can easily hide in the coves and rivers along the coast from where they can launch attacks on passing boats. If Brazil becomes a major player in export markets, piracy can develop from armed robbery and theft into the West African kidnap and ransom strategy. Furthermore, in the future, another new form of piracy in relation with the fast technological development and the minimum crew size according to Menachof (2000) could be a group of pirates of computer hackers which capture automatic remote controlled vessels.

Today, the shipping industry believes that the main solution to piracy is that more nations have to commit naval vessels in the area to engage effectively, actively and forcefully against any act of piracy, and to intercept and bring to justice the criminals in order to re-establish safety and security to strategic important shipping lanes. The industry believes there is currently a lack of political will on the part of governments to give military forces the clear rules of engagement they need.



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IMO Reports on piracy and armed robbery against ships	http://www.imo.org/
ICC-IMB Piracy and armed robbery against ships reports	http://www.icc-ccs.org/
- Annual and quarterly reports	http://www.icc-ccs.org/main/publication.php
- Weekly reports	http://www.icc-ccs.org/prc/piracyreport.php
- Live reports	http://www.icc-ccs.org/extra/display.php

Organisations:

Baltic and International Maritime Council (BIMCO)	http://www.bimco.org/
Comité Maritime International (CMI)	http://www.comitemaritime.org/
Energy Information Administration (EIA)	http://www.eia.doe.gov/
European Community Shipowners' Association (ECSA)	http://www.ecsa.be/
European Sea Port Organisation	http://www.espo.be/Home.aspx
ICC International Maritime Bureau (ICC-IMB)	http://www.icc-ccs.org/imb/overview.php
Intercargo	http://www.intercargo.org/
International Chamber of Shipping (ICS)	http://www.marisec.org/
International Group of P&I Clubs (IG P&I)	http://www.igpandi.org/
International Maritime Organisation (IMO)	http://www.imo.org/
International Transport Workers Federation (ITF)	http://www.itfglobal.org/seafarers/index.cfm
International Union of Marine Insurance (IUMI)	http://www.iumi.com/
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Maritime Security Council	http://www.maritimesecurity.org/index.htm
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Ocean Schedules	http://www.oceanschedules.com/
Oil Companies Marine Forum (OCIMF)	http://www.ocimf.com/
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United Nations Institute for Training and Research	http://unosat.web.cern.ch/unosat/
World Shipping Council	http://www.worldshipping.org/

