Hedging Oil Prices
A case study on Gotlandsbolaget

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Abstract

With the increase of volatility in financial markets and leading to financial risk and corporate failures, organizations are showing keen interest in managing financial risk, one of the most commonly used technique to minimize financial risk is hedging. Hedging of oil prices has also become a common practice especially in shipping. Financial risk managers are busy in saving the industries from expected risk and volatility in oil prices through hedging. Therefore we have decided to look into shipping industry and specifically to study the hedging oil prices with respect to a case study on Gotlandsbolaget.

Our case study will also focus on the relationship between oil and ticket price ratios in Gotlandsbolaget, TT Line and Adria Ferries Ltd. In order to collect empirical data we have done interviews with the companies and worked closely with Destination Gotland and Nordea bank.

The results of the study show that Gotlandsbolaget hedge oil prices to protect themselves from volatility of oil prices. Regression analysis showed that there is a positive relationship between ticket prices and oil prices in the companies operating in Sweden while a relatively weaker relationship exists for the Adria Ferries Ltd. This study will help the shipping companies, who are either new in hedging or want to minimize and avert the risk and volatility in oil prices through hedging.
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1. Introduction

1.1 Background

Fuel hedging is a practice that companies use to protect themselves from volatility of fuel costs. Between the years 1987–2005, oil price has fluctuated more than other commodity prices. Since then hedging has become a common practice in dealing with volatility. Empirical evidence does not provide clear findings whether hedging is profitable for the company (Allayannis and Weston, 2001). In our study we have focused on the hedging of oil prices since our case study is comprised of shipping company, Gotlandsbolaget. Moreover our study will also focus on relation between ticket prices and oil prices which we will discuss in the later part of the background.

There has been a continuous increase of trend of hedging oil prices, especially in shipping and airline business and it has been profitable for many companies. A best example which stands in airline sector is that of Southwest airlines which has had big profits, by using good hedging policies Carter et al., (2004). Shipping companies like Frontline ltd., Teekay Corporation and Stena line have seen profits and losses from the hedging of the oil prices. In fact in an academic survey of International Swaps and Derivatives Association (ISDA) in 2004, 99 % of the participants agreed that the impact of derivatives on the global financial system is beneficial. An explanation for this fact can be that the oil price has been continuously fluctuating since the discovery to use it as a source of energy. Year 2008 has brought so many changes around the world due to the economic crisis; oil prices have been soaring up and climbed up to almost $150 per barrel. Therefore due to high oil prices and continuous fluctuations many companies were facing high oil costs and eventually companies have decided to hedge oil prices as a risk management strategy. But again the point is that if the prices decrease then companies will face the loss. So hedging always put company and management in the risk position (Morrell and Swan, 2006).

Furthermore, using hedging policies in the oil price sector consists of facing the risks associated with it. In hedging, liquidity is one of the main issues to be taken under consideration. In many industries it has a great importance and it helps companies to reduce the risk and cope up with the changes. In this way a company has to choose between liquidity and higher oil prices. According to the International Swaps and Derivatives Association
(ISDA), most of the academicians argue for hedging. In order to accomplish that, there are many methods and achieving a full hedge for a company is far from reality. Subject of dispute has been also that whether hedging generates or adds shareholder value.

Companies use different approaches to hedging derivatives. Hedging derivatives and their integration, i.e. futures, forwards, swaps and options, in the cash market make the major part of the oil company’s operations in the global oil market (Mattus, 2005). Companies choose the hedging tool according to their own needs and required strategies. Above mentioned derivatives are consist of different time periods, some consists of shorter hedging period and some consists of longer time period as shown in the Figure 1.

Figure 1. Oil Market Trading Horizons (Long, 2000)

One of the very important changes that have been noticed in the current scenario of oil market is the extension and increment in the length of trading horizons from forward to future contracts. In the beginning it was hard for the oil companies to set the prices for the future deliveries until the introduction of the forward and future contracts in the market (Mattus, 2005). In that scenario the entire burden was put on the spot market, where the decision related to the trade may have affected the time horizon as the spot time period might range from day 1 to any time in the future that could only add to the price volatility (Long, 2000).
1.1.1 Relation between oil price and ticket price

Oil price volatility has an adverse impact on ticket prices because oil price and ticket prices are often seen as being connected in a cause and effect relationship. As oil prices move up, the ticket prices also increases and when oil price moves down ticket prices follows the same direction. The main reason why this happens is that oil is a one of the major input in the economy. A general concept is that if input costs rise, the cost of end products will also rise (Hooker, 1996). For example, if the price of oil rises then it will cost more to the company to buy the oil, then the company will then pass on some or all of the rising cost to the consumer, which results in rising prices. Ticket prices generally fluctuates with the fluctuation in the oil prices, though changes in the ticket prices can also be caused by other factors like inflation rate, taxes and liberalization (Bergman, 2002 and Swedish Competition Authority Report, 2003). According to the ECORYS Transport report (2006), the price of passenger transport has a clear and direct relation with the price of oil. However, this relation is also influenced by other elements like demand, taxes, duties and value added tax (VAT).

In our study we will also focus on the relationship between oil prices and ticket prices of three companies, namely Gotlandsbolaget, TT Line and Adria Ferries Ltd. Gotlandsbolaget and TT Line operate in Sweden whereas Adria Ferries Ltd. operates in Albania. These companies have been operating in their regions for more than 6 years. The dependency of these shipping companies on a source of energy is increasing more and becoming more costly to produce. The dependency on oil may also result in the rising oil prices as hardly there are any alternatives of the source of oil. According to the Hummels (2009) there is hardly a discovery of oil alternate that overcomes the reliance on oil. Therefore it can be said that rising consumption of oil will push prices steadily upwards.

Oil is one of the major factors that affect the ticket prices but competition is also another main factor of ticket price fluctuation. Due to the high competition many companies are forced to change the prices according to market situation and consumer needs (Klemperer, 1989) but still oil has been one of the major aspects of changing ticket prices. Therefore this study will enlighten the understanding to what extent these three shipping companies are affected by substantial and sudden increases in the oil prices.
1.2 Problem statement

The element of fuel hedging has increased recently in shipping industry. It is interesting to know that if the hedging is only a fashion statement or it really provides some value and benefit to the companies. Usually it has been known that companies do hedge to protect fuel cost (Jin and Jorion, 2006). The protection is basically against the loss from the increased fuel prices but simultaneously it limits from gaining profits from decreasing fuel prices. The other reason of hedging oil could be stabilizing the costs because fuel prices are more volatile than other costs and expenditures therefore companies hedge in the oil to cover other costs (Morrell and Swan, 2006).

In our study we will focus on shipping company fuel hedging and why shipping companies hedge. Usually they hedge oil on future contracts. Such as some companies purchase oil future contract at $50 per barrel and in near future the oil price rise up to $75 per barrel then it can be said that oil future contract has protected company from the loss of about 50%. The scenario is that different companies have different approaches to future contracts. Depending on their requirements some hedge 2 months forward, some 3 months forward and a few of them 6 months or more. So it would be interesting to find how and on what basis companies select time period of the contracts. It is generally assumed that longer contracts i.e. 12 months or more indirectly affect the profits in the longer run. In other words, long forward contracts are negatively correlated with profit. So companies with long term contracts may be too cautious about the losses and they may not want to take any risks. In fact, Benet (1992) suggests that shorter hedging contracts produce more effective hedging results.

There are different kinds of financial instruments or hedging methods available. Different companies use different strategies according to their aims. So the risk of the fuel price fluctuation can be managed from different methods. The available hedging methods are forward fright agreements, future contracts and swap (options, collar etc.) or not to hedge at all. In practical terms the forward contracts are known as “forward fright agreements” which occurs between two parties and where one party buys the fixed amount of oil at a fixed price for the oil to be delivered at a future date from the other party (Morrell and Swan, 2006). The agreement of the future contracts is usually made on crude oil and fuel oil and is the most commonly used among the shipping and airline companies. Future contracts are more important because they are used for both trading and hedging and there exists a well develop
market for trading them. In future contracts one party delivers the standardized quantity of oil at an agreed or strike price to be delivered at an agreed future date. But the flexibility in future contract is that it can be reversed before the due date before the delivery takes place. Swap contracts are usually termed as the tailor-made contracts where the exchange of the future payments between the two parties is made on the basis of the oil or fuel price (Morrell and Swan, 2006).

Hedging of oil has become a very common phenomenon and this initiated interest and aspired us with intellectual curiosity. We have decided to use Gotlandsbolaget as a case study where we will find relevant knowledge in order to contribute to the research field. We will study the objectives of this company of oil hedging, as how much this measure is beneficial in the long run for the company.

1.2.1 Oil price and ticket price relation

Oil is one of the major energy sources that functions the global economy and supplying 95% of the total energy fuelling of the world transport. In current era sea transport relies heavily on oil for carrying passengers and goods from one place to another. With over 80% of the volume of global trade being carried by sea and shipping passenger traffic has increased by far in recent years therefore the question of how changes in oil prices affect shipping rates is of considerable relevance (ECORYS Transport report, 2006) The broader question regarding the implications of rising and volatile oil prices for passenger shipping is very important since the sea transport costs are already high and may go to its peak. The elasticity of oil price and ticket price is evident since many passenger ferries have started to operate in different regions. Higher oil prices clearly impacts consumer spending (Mehra and Petersen, 2005)

The significant increase in the passenger ferry rates and the simultaneous increase in oil prices during the recent years have created curiosity to identify relationship between ticket prices of passenger ferries and oil prices. Therefore we have conducted the study on Gotlandsbolaget, TT Line and Adria Ferries to find the relationship by regression model. At the practical level, the better understanding of the relationship between ticket prices and oil prices can improve operational management and budget planning decisions of the companies. The objective of the study is to understand the effect of rising and volatile oil prices on 3 shipping companies.
To be very specific, we have formulated the following research questions for hedging of oil prices and relation between oil prices and ticket prices.

1. Why and what are the reasons for Gotlandsbolaget to hedge oil prices? Which hedging methods does the company use to hedge oil prices?

2. Is there any significant relation between oil price and ticket price?

1.3 Purpose of study
The purpose of this study is to identify and examine the objectives of hedging of oil prices by Gotlandsbolaget and to know why Gotlandsbolaget hedge oil prices as there is also possibility of profits to be deemed. In our study we will also examine relation between oil price and ticket prices of Gotlandsbolaget, TT Line and Adria Ferries Ltd. Towards this objective, we will use the regression analysis to estimate the ticket price by oil prices.

1.4 Limitations
Gotlandsbolaget officials were reluctant to provide us spot rates and forward rates of year 2009. We have also contacted Nordea bank officials through email but due to the confidentiality issues they have provided very less information and data regarding hedging.

1.5 Research outline
Our study is consists of five chapters. The first chapter gives an insight of hedging practice and relation between oil and ticket prices. We have constructed the problem statement which is supported by research questions, then the purpose of study and limitations. The second chapter consists of the literature relating to hedging of oil by shipping and airline industry. The third chapter consists of research methodology and hypothesis. The fourth chapter consists of the analyses of the hedging and regression analyses of ticket price and oil price. In the end the fifth and the last chapter sums up the whole research in the form of conclusion and recommendations.
2. Literature review

Hedging of oil prices has been seen as the important activity to minimize the risk that occurs from the increased fuel prices. But hedging is defined by many authors in a different manner. Faruqee et al (1996) views the hedging as the instrument of managing price risk that involves the selling and buying of financial assets whose values are linked with commodity market. James (2003) defines the hedging term as equal and opposite effect in terms of fuel price changes. Kaminski (2004) defines hedging as any market participant who wishes to sell or buy commodity in some future time to manage the uncertainty of the market. Mattus (2005) says that firms using the hedging consider that hedging enables better financial management and planning and it protects the sellers and buyers of the commodity from the uncertain future shock of the market.

Hedging activity is highly practiced by shipping industries today. Shipping companies usually hedge the oil prices to cover the risk from the sudden raise of prices as it has been known that oil prices are volatile. So companies usually hedge to stabilize the oil costs and protect themselves against sudden volatility in the oil market which prevents them from huge loss (Morrell and Swan, 2006). Carter et al., (2001) suggest one mechanism to manage the oil price volatility and that is to increase the ticket fares which might cover the risk that comes from the uncertain oil price market. But according to them if traveling fares are raised then it will affect the competition strategy as consumers may switch and consume the services of other companies. As Warren Buffett reported that the companies who are in a commodity business cannot be the high cost producer but sometimes it is not even good to be the low cost producer. The profits of both the shipping and airline companies are highly volatile because of two reasons. The first reason is that, shipping and airlines are incapable of adapting their operating cost very quickly to change in demand and operating revenues. And the second reason is that many airlines today finance their assets through the debt or the lease, so that little changes in operating profits produce large variations in the cash available to stockholders (Morrell and Swan, 2006). So that is why shipping and airlines companies opt to hedge in the oil market due to the large volatility in the profits. Though there are exceptions also i.e. many companies like to remain not hedged and still earn high profits but many companies still prefer to hedge and this is important to investigate.
There are different hedging methods used by the companies i.e. few companies use derivatives to hedge a certain risk in the future (Lien and Tse, 2002). That particular risk may be linked with the foreign exchange rate to the price of the commodity. According to Hull (2003) a derivative is an instrument whose price is derived from and depends on the prices of the other assets. Culp (2002), Cuthbertson and Nitzsche (2001) also focused on the derivatives as the strategy used by the different companies. The opinions of these authors are consistent with the opinion of the Hull (2003). Natenberg (1994) in his study also put emphasis and give long and in-depth explanation on derivatives but particularly on options. Clubley (1998) provides some overview on the oil industry development and explains how derivatives i.e. options, futures and forwards conduct the business. The approach of companies varies according to the usage of the hedging. It has been well-known that the most common oil hedging method is purchase of future oil contract. Future contract method has been established firmly over the past decade. Oil Future contracts are very suitable and useful for both the hedging and trading as they are dealt through the exchange which set the standard contracts (Morrell and Swan, 2006). Most of the future contracts are not completed (no physical delivery) so they are used as the tool of price risk management. In practice the producer who sells the commodity, hedges by selling the futures and in that case the position of producers is long cash and short futures and the consumers who buy the futures are short cash and long futures (Mattus, 2005). Another method is issuing forward contracts which plays the complementary role to futures and contains advantage over future contracts. The forward contracts are traded around the clock. The physical delivery of the commodity is usually completed and oil transaction is usually produced in a large quantity (Long, 2000). Forward contracts are not traded through the exchange but it is done on the principles between the two parties who must regulate by themselves (Kaminski, 2004). The third hedging instrument is the swap and it is normally used to hedge the interest risk (Cuthbertson and Nitzsche, 2001) but later on it has been found out that it does not only hedge the interest risk but also transfer the price risk on different assets so swap instrument has also expanded rapidly in the oil hedge market (Mattus, 2005).

Usually companies hedge between one and two-third of their fuel costs. Most of the shipping companies hedge 6 months oil future and few of them hedge more than a year but hardly any company hedge more than 2 years (Morrell and Swan, 2006). There are several views on the
selection of the time period of the hedging contract. Lee et al., (1987) suggests that if near-month contract is used for hedging then hedge ratio will be higher than if it would have been used with a longer maturity. In his study Benet (1992) has found out that shorter hedging contracts produce more effective hedging. These future and forward contracts have eased the situation in the oil market scenario. In the beginning there were future contracts and all the trade used to be done in the spot market which considered to be a very ambiguous future scenario in the absence of future and forward contracts because the length of the time period usually ranges anywhere from day 1 to anytime in the year that could only give the uncertain price fluctuations (Mattus, 2005). Therefore the oil market has been extended with the introduction of the forward contracts and future contracts. This extended trading horizon has given the benefits to the oil companies of setting up the effective means of the future deliveries.

Oil has been the world’s most used commodity ever since its discovery and advancement of the technological developments. The importance of oil has increased and prices have started to rise and since then the concept of hedging of oil has started to become the trend of protection from the losses due to the huge volatility in the oil prices. Many companies have started to keep large quantities of oil reserves for hedging Chang et al., (2005). Oil reserves generally have a negative (positive) impact on stock returns when the oil prices are decreasing (increasing). Jin and Jorion (2005) finds that the oil reserves can be prove to strengthen the relationship between stock returns and oil prices.

Investors like to hedge to protect themselves from any unforeseen loss. Different investors hedge oil keeping different strategies in mind. One of the main assumptions in Froot et al., (1993) framework and findings is that the firm’s investment opportunities are valuable in terms of the positive net present value. Tufano (1998) on the other hand finds that firms can also consider the value reducing investment opportunities therefore management usually hedge to keep the capital for the investment in negative net present value (NPV) projects. So eventually it leads management to be able to fund negative net present value (NPV) projects or value reducing investments with its preserved capital.
2.1 A review of oil price and ticket price relation

Oil is one of the major inputs of the economy. Oil price fluctuations can disrupt the economic structure of any country. Oil costs constitute roughly 10-12% in the operating expense of shipping and airline industries even in the good times. Every penny increase in the oil price, costs the airline industry about $180 million a year and approximately little less to the shipping industry ECORYS Transport report (2006). Many shipping companies pass these costs to the passengers in the form of high fares. Ticket prices of the passenger transport usually change with the fluctuation in oil prices. Oil price fluctuation has always an impact on almost all kinds of passenger transport. Higher oil costs for transport operators may be reflected in ticket prices, depending on the market situation. In his study, Hamilton (2003) has mentioned that oil price increases matter for the passengers but oil price declines do not. Mehra and Petersen (2005) findings are consistent with Hamilton’s (2003). According to them oil price increases have a negative effect on ticket prices while oil price declines have less impact on fares. Because when oil prices decrease most of the companies do not decrease the ticket prices or they decrease less amount. But this situation varies differently in different regions and markets according to the situation.

In ECORYS Transport report (2006), it is mentioned that there is a clear and direct relation between oil prices and ticket fares. Oil price fluctuation is not the only factor that effect the ticket prices but there are many other factors i.e. inflation rate, taxes, liberalization and competition Bergman (2002). According Swedish Competition Authority report (2003), different factors affect the price trend i.e. demand, taxes, duties and value added tax (VAT). Furthermore Bergman (2002) has mentioned about the liberalization as an introduction of new categories of the passenger ticket. According to him the trend of liberalization has increased in Sweden and abroad that has increased the competition. Due to the competition changes in the ticket prices is expected. According to the Klemperer (1989), competition is one of the major factor that force companies to change their strategies. Many companies change the tariff structure due to the competitive conditions. Therefore there are many factors that affect the ticket prices of shipping companies and shipping companies pass these rising costs to the consumers.
3. Research methodology

3.1 Research design

Research design contains the information on research framework and methods and instruments that are to be used for data collection i.e. questionnaire, sampling plan, and sampling size.

Bryman and Bell (2007) mention five types that the research can be designed namely: experimental design, cross-sectional design, longitudinal design, case study design and comparative design. We have selected the case study research design. Case study deals with a specific and detailed analysis of the case in question (Stake, 1995). Moreover, it provides to the reader in depth analysis (Bryman and Bell, 2007) and it can result in development of new concepts and theory generalization (Mitchell, 1983 and Yin, 1984). We examine the case of Gotlandbolaget. Specifically, the subject is the impact of hedging of oil prices on the company in terms of managing exposure to risk of volatility of oil prices and ultimately the pros and cons from the usage of this method. We will also study the relationship between ticket prices and oil prices of Gotlandbolaget, TT Line and Adria Ferries Ltd.

There are 3 categories of research design: exploratory, descriptive, and casual. Exploratory research is conducted when the problem is adequate and not well-defined. The basic aim of the exploratory research is the competence to observe and extract information and create rational illustration. In descriptive research the problem is well-defined and well structured to understand the issue in depth. Casual research explores the effect of one variable on another. It measures the impact of particular change that will have on a variable (Ghauri et al., 1995).

3.2 Data collection

The method we have selected for data collection is a mixed method i.e. qualitative and quantitative. This concept was mentioned by Hammersley (1996) who described it as one research strategy used to aid another research strategy. But particularly we have employed a qualitative and quantitative research is used to aid the first one, a concept described by Bryman and Bell (2007). By applying the qualitative approach we were able to generate hypothesis and test it through a qualitative research strategy. Another reason of employing mixed methods is to fill in the gaps and enforce the confidence of the results. In addition,
Silverman (1985) claims that quantification of results obtained from qualitative research might help to define better the findings eliminating the ambiguity of the generalization of the case that qualitative strategy often produces. Quantitative method is used for examining relation between ticket prices and oil prices.

The data collection in this specific case has to be gathered through primary and secondary data. The primary are to be collected from Gotlandsbolaget headquarter office in Visby and the secondary data will be accessed through the company’s website. In this manner direct access to company data and interviews are necessary. The questions constructed are more of a semi structured as well as open ended ones. As another source, Nordia bank was contacted since they were involved in providing information regarding hedging oil prices for Gotlandsbolaget. In the case of finding relationship between oil prices and ticket prices of Gotlandsbolaget, TT Line and Adria Ferries Ltd., we will use secondary data i.e. ticket prices and oil prices.

3.3 Data Analysis

In first part we will analyze hedging of oil by Gotlandsbolaget. We will make observations through interviews and analyze the tables and charts provided by Gotlandsbolaget and Nordea bank to answer the first research question regarding hedging of oil prices. In second part we will find the relationship between ticket price and oil price. Towards this objective, we will use regression model to analyze the data. The purpose of using regression model is to check the significant relationship between the ticket price and oil price of three companies.
3.4 Hypothesis development

3.4.1 Hedging motives

It is generally known that hedging is a practice to minimize the risk and protect the company from the sudden effect of price volatility. Few authors consider it as; hedging minimizes the risk and protects the company from any sudden loss that eventually leads them to the profit. And hedging indirectly helps in stabilizing the profits. Hedging stabilizes profits, and cash flows (Morrell and Swan, 2006). Different shipping and airline companies have made profits by hedging oil prices with different derivatives i.e. Stena Line shipping company hedge for longer period of time i.e. 5 years and are currently making good profits. Airline companies like Southwest airlines gained more than 3 billion US$ since 1999 (Associated Press 2008), British Airways gained about £300 million by the end of the March 2001.

In broad, hedging is locking in the cost of future fuel purchase. The basic idea of the hedging is to minimize the risk and protect the company from the sudden losses which incurs from continuous oil price fluctuations. Hedging is not done for making profits but to stabilize the fuel costs (Horsnell, Brindle and Greaves, 1995). Usually companies hedge the oil prices to remove the volatility pattern (Jin and Jorion, 2006). Many companies hedge to minimize or cut the cost by hedging oil prices. The reason is that oil price fluctuates very frequently so many companies opt to hedge oil prices as a cost cutting method. Over the years commodity market that also includes oil prices, have been very volatile (Pindyck, 2001). And that high volatility and irregular patterns of oil prices made companies to hedge in the oil prices to cope up with rapid oil price changes.

H1: The aim of hedging is to minimize risk.

3.4.2 Oil price and ticket prices relation

Oil price and ticket prices are often seen as being connected in a cause and effect relationship. As oil prices move up or down, ticket prices follow the same pattern. The main reason why this happens is that oil is a one of the major input in the economy. A general concept is that if input costs rise, the cost of end products will also rise (Hooker, 1996). For example, if the price of oil rises then it will cost more to company to buy the oil, then
company will then pass on some or all of the rising cost to the consumer, which results in rising prices.

The other perspective is that ticket prices generally fluctuates with the fluctuation in the oil prices, though changes in the ticket prices can also be caused by other factors like inflation rate, taxes and liberalization (Bergman, 2002 and Swedish Competition Authority Report, 2003). According to the ECORYS Transport report (2006), the price of passenger transport has a clear and direct relation with the price of oil. However, this relation is also influenced by other elements like demand, taxes, duties and value added tax (VAT). Competition is also another main factor of ticket price fluctuation. Due to the high competition many companies are forced to change the prices according to market situation and consumer needs (Klemperer, 1989)

H2 a: Oil price volatility is a major factor of change in the ticket prices.

H2 b: Oil price volatility is not a major factor of change in the ticket prices.
4. Analysis and observations

Gotlandbolaget was on the verge of collapse before 1970 because they could not recover the oil cost from the passengers. It was then that the government intervened and decided to subsidize the oil for the company. Later in 1998, Destination Gotland started operations for passenger transportation under the Gotlandbolaget. They have an agreement with the Swedish government about the shipping route from Nynäsham to Visby and Visby to Oskarshamn. The company has different kind of ferries, 2 large and 2 small sizes of ferries. The bigger has the capacity about 1500 passengers and smaller has approximately 700 to 800.

There has been a discussion about the oil prices and its hedging because oil cost is a major costs in shipping industries. If the oil prices are increasing, the cost will be reflected in fares which passengers have to bear. Until 2008 rising oil prices did not affect the passengers because the government took all the cost as decided in the agreement for subsidiary on the oil prices. But since 2009 there has been a new agreement between government and Gotlandbolaget which states that 50% of the cost will go to the ticket prices and the remaining 50% to the government. Before it was the government who used to take the decision of hedging of oil prices but currently the scenario has changed from the company’s perspective because now the company has to take the decision to hedge oil prices or not. Since 2009, the situation has become quite interesting because Gotlandbolaget has the possibility to shift the rising cost to the ticket price. In that manner, the company has its transparent stance in a way that 50% of the costs will government take and 50% of the cost the company will take. Therefore, the discussion during that period was about how Gotlandbolaget should manage the rising oil price and their 50%. Should passengers pay volatility of the price or should the company have a fixed price each year? The managerial board finally decided to hedge the oil prices in year 2009 to protect from rising oil prices and not to put the burden on the passengers. The company signed contract to hedge in fuel oil and gasoil.

When the traffic agreement was made in 2006 the oil prices were rather high due to the political instability around the world because of the Iraq war. In 2008-2009 the oil market was very volatile. The oil prices went up to $145 per barrel in 2008 and came down to $40 per barrel in 2009. Gotlandbolaget and government agreed to hedge oil prices as they thought that that the market had reached its trough. In that period government took a clear stance...
stating that if the oil prices keep on rising, they would not cover all the rising oil prices. The length of the new agreement between Swedish Government and Gotlandsbolaget is 6 years long from year 2009 to 2015 and that agreement mainly specifies that Gotlandsbolaget can hedge 100% of the oil and from that 50% of oil cost government will take and the rest is up to the company to tackle with the rising prices. Gotlandsbolaget can also make longer hedge contracts until 2015, to secure the cost and passenger price.

Gotlandsbolaget hedged 50% of the oil prices from May to December 2009 to stabilize the costs effect. Gotlandsbolaget buys oil from ST1 Marine company but they did not hedge through the oil company instead they signed hedging agreement with Nordea bank. Nordea bank analyzes the oil price trend for Gotlandsbolaget. In 2010 government did not hedge their part while the company had the option of hedging solely if they wanted to. The decision of the company was that if government does not hedge then they would not hedge as well. The shipping company has proven to have strong financial base reflected in their balance sheets through the years. For this reason it is not a big question for the company’s economy to hedge but it is a matter of taking responsibility as traditionally the company has been a low risk taker following a sustainable development pattern. Gotlandsbolaget closely cooperates with the Swedish government and in 2010 government decided to remain unhedged. This shows the cooperation and influence of the government in the company as they are ultimate subsidizer.

In 2010 hedging decision was very much dependent on the analysis and speculations of Nordea bank. They estimated the price of approximately $80 per barrel in 2010 but in reality prices rose up to $100 per barrel. Later in the year they speculated that there is a higher risk because oil price will rise up to $130 per barrel and may even come down to $75 per barrel. The situation was uncertain in year 2010 because market was not prepared for hedging and it would have been bad decision if Gotlandsbolaget had hedged at this point when oil price was $80 per barrel. Nordea bank speculated that oil prices can go either up or might go down which created uncertainty within the decision makers. Therefore company management finally decided not to hedge in the year 2010 and it favored the company in the end.

In an agreement with government it is also mentioned about the roof price, it says the price cannot be higher than the roof price. If oil price exceeds the roof price then company may shift them to the passenger fares. Now the price is distributed in such a way that $1/4^\text{th}$ of the price is depending on the oil price and $3/4^\text{th}$ of the price depends on the inflation. The roof
price guarantees that prices cannot be higher than that. Roof prices are categorized differently. People who live in Gotland have a lower roof price and tourist have higher roof price. In this way tourists have to pay higher ticket fares and Gotland residents get special benefits. The changes in roof prices are followed every 3 year.

Gotlandsbolaget has quite a different scenario than other shipping companies. The other shipping companies do not have government subsidiary regulations. Many believe that there may be fewer profits under the government regularities because government has to buy the traffic and assign roof prices that restrict the companies from gaining more profit. According to the agreement, the company who signs the agreement with government will get SEK 300 million and on the other hand government refuses to take all the rising oil prices. Since Gotlandsbolaget has signed agreement with the government it has benefits but is also bound to restrictions.

4.1 Hedging instrument of Gotlandsbolaget

As it concerns hedging method, the company and Nordea bank officials kept it confidential to provide clients’ personal information to third parties. We assume that Gotlandsbolaget may use a vanilla swap method as expressed from one of the Nordea bank official quoted during conversation:

“No particular method, derivative or strategy is superior to another as it always comes down to an individual client’s situation and needs. Assuming you know your consumption/production well in terms of volume/size a plain vanilla swap is most often used since it is easy to budget with and also beneficial when it comes to communicating exposures internally” (Johan Bauhn).

Vanilla swap method is opposite of exotic instrument. It alters the components of traditional instrument, results in more complex security. Gotlandbolaget prefers the technique which is easy to budget because this company is low risk taking and low budgeted. Another thing we have observed in our study is that Gotlandsbolaget only hedge the oil prices when there is also a possibility to hedge the currency since they buy the oil in US dollars. In this manner facing high currency exchange fluctuations rate, it is advisable to consider hedging the currency. Moreover hedging of currency rates can be more profitable since the volatility of currency can
be more predictable comparatively to the oil price change. US dollar is mainly determined through the market demand and supply with the American Federal Reserve bank having a direct effect while oil price is very much dependent on the supply of oil and because of that it is considered a scarce good. Hence, many oil supplying countries can threaten the economic system in the world in case of political disagreements. Because of this reasons, experts argue that it is more difficult to predict the oil prices since there are more world factors and events involved in its determining.

4.2 Hedging analysis of year 2009

The table shows that Gotlandsbolaget has made a hedging in 2009 during the months from April to December. The two different types of oil were fuel oil and gasoil which are shown horizontally in rows in units of volume in Appendix 1.

For fuel oil it was a better decision to hedge since the price of hedging was slightly higher for two months from April to June but later on it was lower than the hedged. In Appendix 1 the real prices respectively are 2675 units and 2960 units with a trend to increase until reaching 3536 units in December, while the expected prices predicted are on average 3045 units. Hence, for the fuel oil there was a better correlation between the expected and the real price indexes. Concerning the gasoil contract we do not observe any clear reasons why the company decided to hedge because the difference between spot and forward price was very high. The real prices were starting from 3636 units up to 4372 units in December, while the expected prices were on average 5184 units. Although, an explanation can be that specialists expected a higher increase in gas oil prices, still the expected price should had been closer and better correlated with the real index price.

The result from the total cost is that it was almost the same to hedge or not to hedge. In fact by hedging, company lost an amount of 970.700 units of money from which a gain was made from fuel oil and a slightly higher loss from gasoil. In fact, it would have been better not to hedge at all for the gasoil, since the forward price was comparatively very high.

Hedging is a kind of insurance that company makes. It is difficult to draw final conclusions but it is clear that if the hedging was done before the prices go up, it would have been
profitable. Figure 3 show that they had hedged the fuel oil in a good period since the curve was going upwards till the end of the hedging contract. As shown in the Appendix 1 they had made profits of about 2million from fuel oil but only due to the gasoil the overall profits of hedging declined.

It is difficult to forecast the oil price because, it fluctuates 5 to 6 dollars in a single day. Every day the price goes up and down depending on any single event that may happen. For example, when the prices of cars decrease it pushes the demand for cars to go up. Eventually the oil consumption and demand for oil increases resulting in higher oil prices. In another case, the car production industry slows down or new oil resources are found which tend to shift the price down. So there can be many events which can disrupt the oil market.

**4.3 Hedging analysis of year 2010**

Usually Gotlandsbolaget hedge the oil from April to December. Figure 2 shows that during April to December 2010 there was a flat trend with many downward variations. This trend shows that Gotlandbolaget made the right decision not to hedge in year 2010 otherwise they would have been exposed to the loss. Reasons behind can be that after examining the trend from previous years in history the prices had never been higher except of the boom and recession in 2007 and 2008. Under this argument the management and advisers agreed to remain unhedged for 2010 and it proved to be a good decision as the prices fluctuated from 450 units per barrel in April to 470 units per barrel in December with an average of below 450 units.

To point out is that the company is only willing to hedge just before the summer season when there is high traffic. By doing so, they may lose better positions offered during other periods of the year. Figure 2 shows that in January 2011 the oil prices were low but later the trend continued to grow high until April 2011. Because of that it would had been a better decision if they hedged in January 2011. The company may have also considered Middle East tension and expected the oil price to rise up.
4.4 To hedge or not to hedge in year 2011

Currently there has been a discussion in the company about the oil prices and hedging for year 2011. In this discussion with the government, Gotlandsbolaget management has to take a decision before the peak season i.e. summer. The measure has to be taken before, since they plan to sign agreement for 7-9 months starting from April. The hedging must take place before the start of the peak season and the high tourism traffic. Currently the discussion between the advisers and the management is that if oil prices increases more than current price of $120 per barrels as shown in the Appendix 2, Gotlandsbolaget should hedge. Referring to another perspective, oil prices are already high and the question is that if the price will not rise more and it is time where a trough is expected then the oil prices will go down and it is not the proper time to hedge.

As stated earlier Nordea bank analyzes and speculates the oil price pattern for Gotlandsbolaget and provides indications and guidelines of possible hedging. Nordea bank has analyzed that oil price can go up to $150 per barrel or may decrease to $70 per barrel while currently it is $120 per barrel. The question for the company is to decide which measure is better to undertake. Hence, referring to Appendix 2, if Gotlandsbolaget fixes the price at
$120 per barrel then they will be paying the same price for rest of the year shown in the forward market curve. If the oil price goes down the company management will face criticism and they may reflect the losses on the ticket prices for the passengers. This may result in putting an additional burden to the customers. Whereas referring to Appendix 2, if the oil prices goes up to light blue area i.e. anywhere near $180 or $200 per barrel, then company will make profits and will not increase the prices. In this way, the company will also be more competitive in the passenger transportation market. Another alternative is to let the prices fluctuate corresponding to the oil market prices. However, Gotlandsbolaget has agreed with the government to impose a roof price and get subsidize and there will be a limit that they can absorb the high costs. If they do not do it, fewer tourists would come to Gotland. Moreover, some of the tourists would use other means of transportation like aero plane companies and some may not come at all which is the reason why government decides to subsidize 50% of Gotlandbolaget oil price.

In Appendix 2, the historical price (the green line) has followed a slightly downward curve and it joins with the forward market (red line) during the month of the March. There are expectations that oil prices will not go up further because it has already gone so high, but these are just speculations and no one knows exactly the oil price volatility.

The fall of oil prices is based on many factors. Currently there has been political turmoil going on in the Arab countries which are major oil producers in the world. After Egypt crisis, the political instability has scattered in many Arab countries including Tunisia, Syria and Libya where conditions are worsen. Therefore, until the crises in these countries remain unsolved, the oil prices will continue to be high. Once these crises are over the oil prices will fall down and consequently it would be better not to hedge. However, it is difficult to predict for how long this political instability will continue.

Figure 3 shows that historically whenever there is tension in Middle East and Arab countries the oil prices go up. The decade of 1970’s is the best example when Arab countries had decided to embargo the oil and oil prices had raised up to approximately $45 per barrel. Later on during the Iraq and Iran war the oil prices had reached their highest peak of approximately $70 per barrels.
Figure 3. Showing oil price affected by political instability in Middle East (WTRG economics)

But if we speculate on the perspective that the tension will spread to other Arab countries then it would be a good decision to hedge since the oil prices may reach to their highest level. Moreover there would be a lack in the supply of oil in the world. Instable market is not in the interest of the big powers so ultimately they want to stabilize the market and governing rules in the Middle East. So one assumption is that oil prices are closely related to the political instability.

Making a decision whether it is the best for the company, to hedge or not to hedge is dependent on various factors. Is it best to hedge oil prices at current level of $122 per barrel? If Gotlandsbolaget will hedge at this point then they have to pay also a premium to Nordea bank.

Considering all the factors, there can be gains for Gotlandsbolaget if the tension in the Middle East continuous and the oil prices go up in the range, up to $200 per barrel. If Gotlandsbolaget don’t hedge and oil prices go up and since by agreement they cannot adjust the prices then they would make losses. In such condition, it would be better to hedge. Otherwise, if the price decreases and the company have hedged, it would not lose much from the ticket fares since
they have previously fixed the roof prices. But there will be lots of criticism if they hedge and prices go down because the company has to act for the benefit of the passengers. Furthermore, from companies’ research they have found out that customers react negatively to actions taken by management and are indifferent to continuous price increase that they experience every day.
4.5 Regression analysis

In this section, we present the results and statistics of ticket prices of Gotlandsbolaget, TT Line and Adria Ferries Ltd. The routes covered are respectively 1 car + 1 person return ticket Visby-Nynashamn-Visby, 1 car + 1 person return ticket Trelleborg-Rostock-Trelleborg and 1 car + 1 person single way ticket Durres (Albania) - Bari (Italy). The ticket price is measured by calculating the yearly averages.

This study applies the ordinarily least square regression test, based on the specifications given in the equation below:

\[ \Delta \text{ticket price} = \alpha + \beta \Delta \text{oil price} + \varepsilon_t \]

In linear function, \( \Delta \) ticket price stand for the change in ticket prices and \( \Delta \) oil price stands for the change in oil prices. The values are expressed in Swedish krona. The estimated equation explains the dependent variable ticket price on an independent variable which is oil price, \( \alpha \) is the value of \( \Delta \) ticket price when \( \Delta \) oil price =0. The \( \beta \) \( \Delta \) oil price is the change in ticket price for one unit change in oil price. Residual value \( \varepsilon_t \) is the error term founded by the difference between the observed and predicted values of the dependent variable \( Y \) for a given value of \( X \).
Table 1. Regression analysis output

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Estimated time period (2001-2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gotlandsbolaget</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>0.54 (3.32)</td>
</tr>
<tr>
<td>$\beta$</td>
<td>0.38 (2.83)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>53%</td>
</tr>
<tr>
<td>$F$</td>
<td>8.03</td>
</tr>
<tr>
<td>$N$</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: T statistics in parenthesis, R-square describes the goodness of fit for the observations that have been adjusted for the sample.

As shown in Table 1, the R-squared for the oil price ratio of Gotlandsbolaget is 53%; this suggests that the price of oil is a good explanatory variable for the change in the ticket price. The results also indicate that 47% of the sample variability in ticket price can be explained by factors other than oil prices i.e. inflation, taxes and liberalization etc. Referring to the liberalization, the increment in price differential is a result of the several ticket categories created (Swedish Competition Authority Report, 2003). The unreported adjusted R-squared is 47%, which suggests that the simple regression model is fit for our sample data and it shows a relatively strong and positive linear relationship between ticket prices and oil prices. The beta coefficient of the oil price ratio is 0.38, which is statistically significant. The estimated equation reflecting the period from 2001 to 2010 shows that oil price has a great impact in explaining Gotlandsbolaget ticket prices. For instance, if there is a change of 5% in oil price then the total change in the ticket price will be 55.9%.

For the TT Line, the R-squared for the oil price ratio is 51%; this suggests that the rate of change of the oil price ratio is also a good explanatory variable for the change in the ticket price. According to this result 49% of the sample variability in ticket price can be explained by factors other than oil prices. As stated earlier the other factors can be inflation rate, taxes.
and introduction of new ticket price categories. According to the Bergman (2002), over the years price categories has have successively increased in both Sweden and abroad due to the introduction of several new categories. The unreported adjusted R-squared is 0.44, which suggests that the simple regression model is probably a fit model. The beta coefficient of the oil price ratio is 0.29, and is also statistically significant. According to the above estimated equation, for example, for a 5 % change in the oil price, the ticket price is estimated to change by 67 % from period 2001 to 2010.

Table 1 also presents the results of shipping company operating in Albania Adria Ferries Ltd. The model shows different results compared to previous analysis of Gotlandsbolaget and TT Line. The R-squared for the oil price ratio is 10%. This implies that only 10 % of the change in ticket price is explained by the change in oil price ratio and the remaining 90% of the change depends on other factors. It shows a weak linear relationship under the principles of ordinary least squares (OLS) assumptions. The unreported adjusted R-squared is -12%, which suggests that the simple regression model is probably not the best fit model for our sample data. The beta coefficient of the oil price ratio is 0.17, but the test is not statistically significant. For Adria Ferries Ltd as an example, the change of 5% in the oil price is estimated to affect the ticket price by 86%. As shown in the Figure 1 Adria Ferries Ltd has the highest alpha value while Gotlandsbolaget has highest variables coefficient Beta. It indicates that when there is larger amount of change in the oil price, Gotlandsbolaget ticket price is affected more while for smaller changes Adria Ferries Ltd produces a higher value.

The result of our regression calculation shows a positive relationship between ticket price and oil price as the coefficient figure is positive for the Gotlandsbolaget and TT-Line but there is a weak relationship for Adria Ferries Ltd. Our results proved that oil price is a major factor in predicting the change of the ticket price. The above results are consistent with previous research of Poulakidas and Joutz (2008), Hummels (2009) and Chiang et al., (2011). This confirms the validity of our findings.
Table 2. Correlation Gotlandsbolaget

<table>
<thead>
<tr>
<th></th>
<th>Oil prices</th>
<th>Ticket prices</th>
<th>Change in oil prices</th>
<th>Change in ticket prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil prices</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket prices</td>
<td>0.04</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in oil prices</td>
<td>-0.39</td>
<td>-0.29</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Change in ticket prices</td>
<td>-0.45</td>
<td>0.73</td>
<td>0.73</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3. Correlation TT Line

<table>
<thead>
<tr>
<th></th>
<th>Oil prices</th>
<th>Ticket prices</th>
<th>Change in oil prices</th>
<th>Change in ticket prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil prices</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket prices</td>
<td>0.58</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in oil prices</td>
<td>-0.39</td>
<td>0.40</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Change in ticket prices</td>
<td>-0.25</td>
<td>0.71</td>
<td>0.71</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4. Correlation Adria Ferries Ltd.

<table>
<thead>
<tr>
<th></th>
<th>Oil Prices</th>
<th>Ticket Prices</th>
<th>Change in oil prices</th>
<th>Change in ticket prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Prices</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket Prices</td>
<td>0.31</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in oil prices</td>
<td>0.79</td>
<td>0.50</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Change in ticket prices</td>
<td>0.14</td>
<td>0.69</td>
<td>0.31</td>
<td>1</td>
</tr>
</tbody>
</table>
The correlation results reflect some interesting findings. Table 2 and table 3 present the coefficient of correlation of Gotlandsbolaget and TT-Line with the values 73% and 72% respectively. It indicates that the relation between ticket prices and oil prices is strong in the case of companies operating in Sweden. Hence we can say that increase in oil prices is associated with increase in the ticket prices. Table 4 presents the coefficient of correlation of Adria ferries that is 32%. It shows a positive but weak relation. Therefore, in the case of Adria Ferries Ltd. we can say that change in the oil prices is associated with the change in the ticket prices but other factors are more dominant unlike the case of Gotlandsbolaget and TT-Line.

The results of the correlation suggest that the relationship between ticket price and the oil price is positive and strong for the two European companies but contrary to expectations there is a weaker relation in the case of the company operating in Albania.

4.6 Comparative analysis

Table 5 presents the ratio of oil price and ticket price. It is calculated as second price over first price and so on. According to table 5 one would expect that there must be a positive effect of the oil price in explaining the ticket price. This is valid for Gotlandsbolaget and TT line but in the case of Adria Ferries Ltd. this relation does not hold the same value. It is a comparatively weaker relation. As stated earlier, changes in the ticket prices can also be caused by other factors such as: inflation rate, taxes and liberalization (Klemperer, 1989 and Swedish Competition Authority Report, 2003).

For the Gotlandsbolaget in the route Visby- Nynashamn-Visby the competition was tough and they accepted to be on the market only after government provided them subsidies. As for big companies operating in longer routes it is easier to implement surcharges. Stena Line in a report in 2005 stated that, they would increase the surcharge of oil and ticket price would follow the trend of the oil price. Adria Ferries Ltd. operates in a less competitive market as compared to Scandinavian region. The collapse of communism in 1992 in Albania gave space for development of free market. In the route Durres-Bari-Durres, Adria Ferries Ltd. were able to find a new business region and gradually establish dominion in the market. However, Albania lacks efficient associations to protect consumer rights and eventually they do not force companies towards better fares. Whereas, European Union have a well developed governance
system protecting and monitoring consumer rights and fostering market competition. Another reason which explains the high ticket prices of route Durres-Bari can be the slow reaction of self-adjustment of the market.

As shown in the table 5, in the case of Gotlandsbolaget and TT line the relationship between oil ratio and ticket ratio is better explained. This is also positive for the companies which can better explain the trend to the consumers and the associations for the increases in the prices. Adria Ferries have kept relatively high prices and a reason can be that of the economic growth (GDP) in Albania which has been growing by average 5% yearly in the last 10 years. Furthermore, the demand has increased as the number of passengers both domestic and foreign tourists have increased.

<table>
<thead>
<tr>
<th>Years</th>
<th>Oil price ratio</th>
<th>Gotlandsbolaget</th>
<th>TT Line</th>
<th>Adria Ferries Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1.15</td>
<td>1.05</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>1.19</td>
<td>1.02</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>1</td>
<td>0.96</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>1.57</td>
<td>1.04</td>
<td>1.05</td>
<td>1.1</td>
</tr>
<tr>
<td>2005</td>
<td>1.15</td>
<td>1</td>
<td>1.03</td>
<td>1.18</td>
</tr>
<tr>
<td>2006</td>
<td>1.16</td>
<td>1.02</td>
<td>1.03</td>
<td>0.8</td>
</tr>
<tr>
<td>2007</td>
<td>1.45</td>
<td>1.02</td>
<td>1.04</td>
<td>1.09</td>
</tr>
<tr>
<td>2008</td>
<td>0.71</td>
<td>0.71</td>
<td>0.79</td>
<td>0.99</td>
</tr>
<tr>
<td>2009</td>
<td>1.28</td>
<td>1.2</td>
<td>1.17</td>
<td>1.23</td>
</tr>
</tbody>
</table>
5. Conclusion and recommendations for future research

Hedging is more of a risk management and risk avert. It depends on how strong is the company’s financial basis as some companies cannot take risk because they cannot manage it. Historically Gotlandsbolaget has been low risk avert company and they have done good business and before 2009 they have been fully subsidized from the oil prices by government. Gotlandsbolaget has stable economic structure as government bear 50% of the cost of hedge so they have good opportunity of hedging. After the 2009 agreement, Gotlandsbolaget being exposed to the high oil price volatility risk and then decided to hedge. It proved to be a good experience as long as the decision was justified by the circumstances which in the case of fuel oil predictions were based on good reasons as there was a strong correlation between expected and real prices but for the gasoil we could not find clear rational behind the hedging motive. Concerning 2010, company despite not having experience in hedging made the right decision not to hedge which we find out to be based in good arguments following the historical oil price track. For 2011, Gotlandsbolaget should not hedge as the prices have started to fall down and Middle East political conditions are gradually stabilizing. Hedging is generally beneficial to most companies, especially when it comes to low margin businesses exposed to highly volatile commodity prices. Hedging can never be expected to beat the market, but it can provide to a company valuable time to change the way it operates in order to adjust to a new cost situation. It smoothes the troughs and the peaks and helps in creating stability. Company can better prepare its budget since they already know what the price is going to be.

Hedging becomes necessary as oil price is a major cost in explaining the ticket cost per passenger. Our results show that there is a positive relation between oil prices and ticket prices though; other factors also affect the ticket price. This relationship is reflected differently in Sweden and Albania. The Swedish market being a part of the EU trade market has the characteristics of a highly competitive and low friction market. In Albania market is comparatively not so well developed allowing the company to deal better with the oil price as the ticket prices are already high. While in EU market the high competition leads towards achievement of best practices and therefore hedging is a measure that companies need to consider to survive and succeed in the market.
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## APPENDIX 1

### Hedging description year 2009

This table shows the hedging and unhedging position of Gotlandbolaget during year 2009. It also shows the purchase price of fuel oil and gas oil.

<table>
<thead>
<tr>
<th>Hedged volume Fuel oil</th>
<th>800</th>
<th>900</th>
<th>900</th>
<th>1300</th>
<th>1100</th>
<th>800</th>
<th>800</th>
<th>700</th>
<th>700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedged volume Gasoil</td>
<td>200</td>
<td>200</td>
<td>400</td>
<td>800</td>
<td>500</td>
<td>200</td>
<td>200</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Calculation of index (2006-09-29 = 1)**

<table>
<thead>
<tr>
<th>Index price Fuel oil/Straight Run SEK</th>
<th>2675</th>
<th>2960</th>
<th>3552</th>
<th>3308</th>
<th>3473</th>
<th>3194</th>
<th>3340</th>
<th>3494</th>
<th>3536</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedged price Fuel oil SEK</td>
<td>3088</td>
<td>3063</td>
<td>3062</td>
<td>3060</td>
<td>3033</td>
<td>3024</td>
<td>3022</td>
<td>3020</td>
<td>3030</td>
</tr>
</tbody>
</table>

| Index price Gasoil SEK                | 3636 | 3665 | 4340 | 4117 | 4275 | 3891 | 4249 | 4329 | 4372 |
| Hedged price Gasoil SEK               | 5184 | 5184 | 5184 | 5184 | 5184 | 5184 | 5184 | 5184 | 5184 |

**Calculated costs**

| Fuel oil/Straight Run without hedging | 2 140 000 | 2 664 000 | 3 196 800 | 4 300 400 | 3 820 300 | 2 555 200 | 2 672 000 | 2 445 800 | 2 475 200 | **Sum 26 269 700** |
| Fuel oil with hedging                 | 2 470 400 | 2 756 700 | 2 755 800 | 3 978 000 | 3 336 300 | 2 419 200 | 2 417 600 | 2 114 000 | 2 121 000 | **Sum 24 369 000** |

| Gasoil without hedging                | 727 200  | 733 000  | 1 736 000 | 3 293 600 | 2 137 500 | 778 200  | 849 800  | 432 900  | 437 200  | **Sum 11 125 400** |
| Gasoil with hedging                   | 1 036 800 | 1 036 800 | 2 073 600 | 4 147 200 | 2 592 000 | 1 036 800 | 1 036 800 | 518 400  | 518 400  | **Sum 13 996 800** |

| Total, without hedging                | 2 867 200 | 3 397 000 | 4 932 800 | 7 594 000 | 5 957 800 | 3 333 400 | 3 521 800 | 2 878 700 | 2 912 400 | **Sum 37 395 100** |
| Total, with hedging                   | 3 507 200 | 3 793 500 | 4 829 400 | 8 125 200 | 5 928 300 | 3 456 000 | 3 454 400 | 2 632 400 | 2 639 400 | **Sum 38 365 800** |
APPENDIX 2

Oil price speculation for year 2011

The market now prices in a huge possible price range

Brent Crude probability range, 29 March 2011
Based on implied volatilities in the options market

Source: Bloomberg
APPENDIX 3

Oil price speculation for year 2011

The market was not prepared for this year’s events
APPENDIX 4

Fuel oil price volatility pattern from year 2000 to 2011
APPENDIX 5

Shows ticket prices and oil prices during years 2001 – 2010. The oil prices and ticket prices are given in Swedish Krona and calculated as average of every year.

<table>
<thead>
<tr>
<th>Years</th>
<th>Oil prices</th>
<th>Gotlandsbolaget</th>
<th>TT-Line prices</th>
<th>Adria Ferries Ltd.</th>
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<tr>
<td>2001</td>
<td>116,26</td>
<td>850</td>
<td>2482</td>
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<tr>
<td>2002</td>
<td>134,6</td>
<td>896</td>
<td>2415</td>
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<td>2003</td>
<td>161,17</td>
<td>916</td>
<td>2331</td>
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<tr>
<td>2004</td>
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<td>884</td>
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<td>1137</td>
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<td>2005</td>
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<td>1251</td>
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<td>1480</td>
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<td>2676</td>
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<tr>
<td>2008</td>
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<td>1300</td>
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<td>2009</td>
<td>350,53</td>
<td>674</td>
<td>2230</td>
<td>1290</td>
</tr>
<tr>
<td>2010</td>
<td>451,47</td>
<td>812</td>
<td>2624</td>
<td>1599</td>
</tr>
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