

# **IMPACT OF BIASED PERSPECTIVE ON RISK MANAGEMENT: A CASE STUDY ON SOUTHWEST AND CHINA EASTERN AIRLINES**

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## **ABSTRACT**

Controlling transportation costs becomes one of the operations strategies that can significantly influence and enhance the company's competitiveness in the airline market. Southwest and China Eastern Airlines has saved multi-billion dollars in fuel costs through the hedging program but also incurred a mountain of loss due to the rapid decline of the oil prices in the past. Investigations will be conducted to detect and analyze the realities of fuel hedging of the two companies and their financial results, which reflect their biased perspectives on risk management. Hence, a better understanding can be achieved on how biased perspectives affect information processing and decision making.

**Keywords:** Energy risk management; Decision making; Energy derivatives market; Real option

## **INTRODUCTION**

The aviation industry is facing its biggest challenge ever due to an outmoded air-traffic-control system and competition from low-cost carriers. The major U.S. airlines, American, United, Delta, US Airways, Northwest, and Continental, reported substantial losses in 2005 [1]. Extraordinary circumstances, such as the 9/11 disaster and fluctuating oil prices, accentuated this crisis.

While most U.S. airlines companies posted record losses and some of them even emerged from bankruptcy, Southwest Airlines reported a profit year after year. According to Mutzabaugh [2], Southwest Airlines posted a profit for the 34<sup>th</sup> consecutive year. It also carried the largest number of domestic passengers among the U.S. airlines according to the report from the International Air Transportation Association. Unlike other major U.S. airlines, Southwest has a unique operations strategy for controlling its fuel costs and pricing policy. However, in the third quarter of 2008, Southwest Airlines reported its first quarterly loss in 17 years [3]. Since the success of Southwest Airlines is a well-known case in the past few decades, we are more interested than ever in knowing the story behind the very first failure experience.

Both Southwest and China Eastern Airlines are the notable examples of making long-term hedging contracts of crude oil at reasonable prices to manage the overall fuel expenses in the United States and China, respectively. Witness the impact that Southwest Airlines had when it started making long-term hedging contracts with a reasonable price; Southwest Airlines paid much less than the market price for its fuel while the spot price of oil reached its peak. Before July 2008, Southwest was one of the few airlines making a profit. However, the rapid decline of the oil prices backfired on Southwest's cost program, which incurred a mountain of loss on the value of its fuel-hedging program. What make the two airline giants, who used to make "smart" decision, fail this time? By observing the situations of the two airlines, the aim of this study is therefore to answer the following questions: (1) What is the effect of

energy derivatives to an airlines corporation? (2) What are the success factors for the implementation of energy risk management? (3) What lesson do we learn from Southwest and China Eastern airlines?

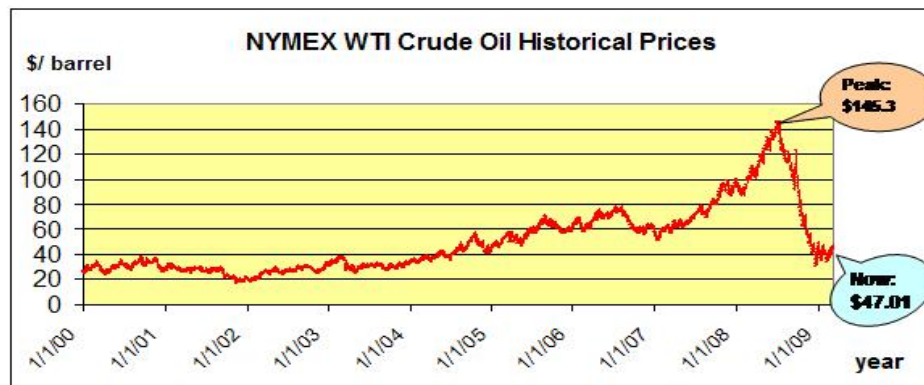
### ENERGY DERIVATIVES MARKET

In the last few decades, derivatives have become more and more important in the financial world and are now traded actively on many exchange markets throughout the world [4]. Researchers have developed various theoretical frameworks which can instruct firms on the applications of derivative products.

Since the late 1970's, several nations have devoted to the deregulation and globalization in the world of finance. More new and innovative financial products were created to fulfill the needs, which also made commerce more competitive; a wider range of participants entered the energy markets, prompting the development of the first exchange-traded energy derivative securities [5]. Although derivative securities provide economic benefits, the downsides of the financial deregulations are that they increased the degree of uncertainty for the energy prices and shifted the government's responsibility for winning and losing in the market [5] [6]. Currently, there are three main types of derivative products: *futures contract*, *forward contract* and *option* [4] [7]. Meanwhile, as one of three main types of trading activities in the derivatives market, *hedge* intends to diminish or eliminate the market risk associated with the price of asset by operating derivatives products.

The oil market has had dramatic increases in price volatility with the continuing deregulation of the energy markets, especially in the last decade. This is because crude oil price is highly correlated with jet fuel price. In addition, financial derivatives backed by crude oil have a very active trading market. Therefore, airline companies frequently use those financial derivatives as hedging vehicles. Figure 1 exhibits the NYMEX, West Texas Intermediate (WTI), light sweet crude oil prices since 2000. From 2000 to 2003, the daily price of crude oil has fluctuated between \$17 and \$38 per barrel. However, an upward movement in the price of crude oil has occurred since the beginning of 2004. On July 3, 2008, the price of crude oil hit a record high of \$145.3 per barrel in the NYMEX market. Since then, the daily price of crude oil rapidly dropped back to \$30 per barrel at the end of 2008. Within half a year, the price of crude oil per barrel has fallen approximately \$115 [8].

**FIGURE 1: NYMEX WTI CRUDE OIL SPOT PRICES SINCE 2000**



Data Source: US Department of Energy, Energy Information Administration (EIA)

Many scholars such as Fleming and Ost diek [5] have demonstrated that derivative securities provide an efficient means of transferring risk and promote information dissemination. Since the information will influence the underlying commodity prices, and because of price, the commodity production, storage, and consumption decision will change as well, the derivatives market plays an important role on resource allocation in the financial and economic system. This also holds true for energy market.

## CASES OF SOUTHWEST AND CHINA EASTERN AIRLINES

### Southwest Airline

Both Southwest and China Eastern Airlines have built a successful business in the aviation industry in the United States and China, respectively. Like Southwest Airlines, China Eastern Airlines also adopt the hedging strategy to smooth out fluctuations in the fuel prices. In order to lock in the low prices of crude oil for the future usage, both companies also faced the risk on deciding how much fuel they should hedge, what price they should settle, and when they should exercise the contract. According to Southwest Airlines' 2000 annual report [9], it has been successfully taking advantage of crude oil prices appreciation, reducing the volatility of crude oil prices, and boosting its profitability since 1973. Moreover, according to the 2007 annual report [9], Southwest Airlines has saved more than \$3 billion in fuel costs through the hedging program during the last few years. The report also states that at that time the company had hedged approximately 70% and 55% of expected fuel needs at the average price of \$51/bbl in 2008 and 2009, respectively, about 30% at \$63/bbl in 2010, around 15% at \$64/bbl in 2011, and roughly 15% at \$63/bbl in 2012. In response to projections of increased crude oil prices, Southwest Airlines kept on fuel hedge (see Table 1).

TABLE 1: ENERGY DERIVATIVES CONTRACTS

	2008 (4 <sup>th</sup> Q)		2009		2010		2011		2012	
	%	\$/bbl	%	\$/bbl	%	\$/bbl	%	\$/bbl	%	\$/bbl
24-Jul-08	80	58	70	66	40	81	20	77	20	76
16-Oct-08	85	62	75	73	50	90	40	93	35	90

Data source: Southwest Airlines second quarter and third quarter financial results

Even though crude oil price has increased dramatically from \$50/bbl in January 2007 to \$145/bbl in July 2008, the price of the crude oil has dropped rapidly back to \$30/bbl short after the commodity hit its peak price (see Figure 1). This extraordinary circumstance therefore becomes one of the triggers for Southwest Airlines' first quarterly loss in 17 years [3]. Compared with the corresponding period of last year, Southwest Airlines' net income decreases \$282 million, or is down 74%.

Southwest Airlines has been U.S.'s leading discount carrier and made a consecutive profit for decades while a financial crisis threatened other carriers' survival. Southwest has long been aggressively using oil futures contracts to hedge against a rise in the jet fuel price. The money that Southwest has saved from the hedging program since 1998 is equal to about 83% of the company's profit over the last 10 years according to [10]. Hence, it is no doubt that hedging is a good strategy to manage and control the future uncertainty, and hedging helps a corporation to minimize the risk and have sufficient funds to take advantage of investment opportunities. However, as Froot, Scharfstein, and Stein [11] suggested, such hedging would be, at best, only partially correct. The airlines company may end up paying more than the spot market price for its contracted fuels.

Even though Southwest Airlines has posted a profit for the 69<sup>th</sup> consecutive quarter, Ishikawa and Naka [13] point out that "The knowledge a corporation has accumulated over a period of time may instantly become an unprofitable asset". In the third quarter and fourth quarter 2008 earning conference calls, Southwest Airlines reported back-to-back quarterly losses, mostly tied to fuel contracts bought earlier before oil prices plunged. Southwest's Executives have acknowledged that 2008 was one of the most difficult years in the company's 38-year history and for the entire industry [14]. Furthermore, in the first quarter 2009, Southwest has hedged more than 75% of estimated fuel needs for 2009 at the average price of \$73/bbl; the closing price for the NYMEX light sweet crude oil was \$47.01/bbl on March 9,

2009, and the price has fluctuated between \$35 and \$50 per barrel since 2009. Experts predicted that the oil market in 2009 is still not stable and the global economic condition is still not clear.

### **China Eastern Airline**

China Eastern Airlines is one of three biggest Airline companies in China. As a major player in China's Airline industry, China Eastern has also been substantially impacted by rapid increase of oil price. In 2008, fuel cost of China Eastern reached 18.4 billion RMB (2.6 billion US dollars), a 22% increase from previous year [15]. Under continuous pressure of fuel cost eroding profits, China Eastern has turned to financial derivative market for fuel-hedging strategy. Unlike Southwest, China Eastern's fuel-hedging strategy primarily depends on oil option contracts rather than oil futures contracts. Since 2003 China Eastern has got into contract with several investment banks. The contract includes taking a long position on call options and taking a short position on put options at the same time. Taking a long position on call options allows China Eastern to lock fuel cost at a desired level. Meanwhile, taking a short position on put options covers China Eastern's expense on purchasing those calls. From 2003 to 2008, China Eastern has successfully carried out this strategy by buying long-term call options and selling substantial amount of put options. In 2007, China Eastern's profit due to its fuel hedging strategy is 210 million RMB (30 million US dollars). However, the situation has turned around since late 2008. Due to rapidly falling oil price, its hedging strategy has accumulated financial loss of 6.2 billion RMB (900 million US dollars) for China Eastern, much more than the profit the strategy produced in 2007 [15]. Moreover, because many of the derivative contracts China Eastern has been involved in will not expire until 2010 or 2011, further loss went expected if fuel price continuously maintains its low level.

### **Lessons from Southwest and China Eastern Airlines**

So, what is wrong? How can the two companies, which used to be very successful in fuel hedging, suffer so much from significant financial loss? What can we learn from Southwest and China Eastern Airlines in terms of their information processing decision making practices?

Fuel cost has always been the biggest concern of senior managements in every airline corporation. It is no doubt that for the senior management, any fuel hedging strategy should serve the ultimate goal: keep the fuel cost low and stable as long as possible. As a result, airline companies are much more alert to an increase of fuel price. In other words, for many airline companies their perspective on fuel hedging lies in keeping their fuel cost lower than that might result from current market fuel price. In the first quarter of 2008, Southwest paid roughly \$2 per gallon for fuel, significantly lower than market price in the same period. And of course, once airline companies are confident that their strategy can meet this perspective, they will sustain the strategy as long as possible. For instance, in 2004 Southwest Airline decided to increase its maximum hedge maturities to three years [14]. However, the perspective of seeking fuel cost advantage is actually biased for risk hedging purpose. By emphasizing fuel cost down, companies like Southwest and China Eastern desperately look for a strategy which seems to promise low and stable fuel cost. But, no advantage comes without costs. The hedging strategies from both of their biased perspectives have actually exposed them to substantial financial risks. Those risk factors would harm the two companies to a great extent if market moves in unexpected direction. For Southwest, futures contract is relatively a simple and cheap tool to lock fuel price. However, the downside of those contracts lies in the fact that futures holders are imposed with the obligation to take on any loss caused by unexpected price movement of the underlying asset. Sometimes the loss can accumulate to an extreme level. Moreover, holding long-term futures contract will make the situation even worse.

Compared to Southwest, China Eastern has decided its fuel hedging strategy in a way described as "suspiciously like speculation" by a local newspaper [15]. According to the newspaper, China Eastern

has signed fuel-related derivative contracts with an international investment bank. According to the contracts, if oil market price exceeds \$118 per barrel, the bank is obligated to pay China Eastern the difference between oil market price per barrel and \$118, but no more than \$20 per barrel. On the other hand, if oil market price is below \$82.75 per barrel, China Eastern will have to pay the bank twice the difference between \$82.75 and market price. This is obviously a hedging contract which does not balance rights and obligations at all and put it into a position facing significant downside risk.

The latest financial results of both Southwest and China Eastern Airlines also indicate that the two companies have not yet been able to quickly and effectively adjust their hedging positions on energy market, when facing the substantial increase of price volatility. Technically, the cases of Southwest and China Eastern give us a warning call showing flexibility is one of the most important factors for any successful hedging strategy on energy market. More importantly, in a strategic sense, any biased perspective toward risk management can cause harmful results. It is essentially because the biased perspective can easily make senior management bypass much valuable information and have inefficient information processing and management, then making potentially harmful decision. For example, the energy market has been experiencing rapid changing situation and striking price fluctuation since 2004 (see Figure 1). In the time period of 2000-2004, the estimated monthly average crude oil price is \$26.19 per barrel with estimated standard deviation equal to \$5.41 per barrel. In contrast, those values are \$67.45 and \$23 respectively in the period from early 2005 to September 2008 which is right before the oil prices crashed. Simply assuming crude oil price is normally distributed, a simplified projection will present that there is roughly 16% chance for crude oil price to drop below \$45 per barrel in future. Unfortunately, it is exactly what has occurred since October 2008. Apparently, both Southwest and China Eastern did not pay enough attention to the important information.

Human beings are limited in making decisions [16]. Southwest and China Eastern Airlines' management have also been constrained by these factors in the decisions they made in the past. The fact that Southwest and China Eastern Airlines signed hedging contract despite signs that oil price might be on the decline displays management decision making biases due to bounded rationality. Escalation of commitment [17] happens when management stick to an original decision regardless of signs that the earlier decision could be wrong. The fact that Southwest and China Eastern Airlines' hedging strategy had worked in the past emphasized to the management that this was a successful strategy. The management was slow in reacting to and taking sufficient consideration of the changing environment. Thus, what had been a successful strategy became a competence trap if the management failed to consider the rapid changes in the environment. Over confidence [18] and illusion of control are two other biases that prevent management from making the best decision. One study [19] on security analysts found that accuracy in earnings forecast was slightly worse for more visible industries than less visible industries because analysts tended to be over confident when it came to more visible industries and more conservative about less visible industries. Tversky and Kahneman [18] suggest that people's confidence in their decision depends on the storage of reasons they find in their memory to be confident about their decision. In this case, Southwest and China Eastern Airlines both had good reasons to be confident about signing hedging contracts according to their memory of the success of this strategy. This organizational memory may lead the management to be over confident about using the same strategy. The management may display a special type of over confidence—illusion of control [20] in which the management assess the chance of success of their decision over favorably.

## CONCLUSION

Although fuel hedging programs provide Southwest and China Eastern Airlines substantial price protection on transportation costs, they are also the triggers for those companies' losses, which bring concerns about risks of hedge and efficiency of risk management. In an era of the higher volatility on

fuel prices and the economic uncertainty, risk managers in the any industry should emphasize flexibility of their planning which are more suitable for the liquidity and pricing fluctuations. More importantly, successful business strategies are based on correct perspectives; biased ones may result in inefficient information processing and management, eventually business decision contrary to essential company interest. For example, regarding fuel hedging strategy, airline companies should not only stress cutting fuel cost, but also focus on reducing impact of fuel price fluctuations on company operations. Planning is a way to help minimize the negative effects of decision making biases of the management. The management can plan several alternative scenarios regarding the possible variance of oil prices, and make action plans for the company accordingly to minimize the loss to the company and maximize profit under different scenarios. While loss is inevitable, the management can adopt the “real option reasoning” [21] in decision making and planning, where caution is taken in making decisions and a less amount of commitment is invested into a decision under great uncertainty. If Southwest and China Eastern Airlines were able to use the real option reasoning at a time when oil price had reached an unreasonable high, the risk of contracting largely for a higher-than-market price could have been reduced and the company’s loss could have been cut considerably.

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