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Corporate risk hedging strategies and shareholders' value creation

the Southwest Airlines case

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6/2/2009

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Acknowledgements

Warmest thanks to Mitchell A. Petersen, Glen Vasel Professor of Finance at the Kellogg School of Management for his valuable support as faculty advisor. Thank you to Robert Korajczyk, Harry G. Guthmann Distinguished Professor of Finance and Director of Zell Center for Risk Research at the Kellogg School of Management. Thank you to Sam Zell for his generous contributions to the research of risk at the Kellogg School of Management. I would also like to express my gratitude to Deborah Brauer at the Kellogg School of Management for her continuous support. All errors are mine.

Introduction

During the summer of 2008, oil price peaked at above $140 per barrel to drop at less than half that price level in the spring of 2009. The airline industry, as a user of jet fuel has been heavily impacted by this trend as a result of the fierce competition in the market and continuously declining ticket prices. Hedging jet fuel cost has become increasingly important to ensure the financial viability of a sector that lost $2bn in the first quarter of 2009 (Jennings Moss 2009) in the United States.

According to the ATA the global airline industry hedged 50% on average of its fuel needs in 2008 (Marquez 2009). In the United States, Southwest hedging percentage used to be as high as 95% until 2009 and the Dallas-based carrier has been admired for the success of its hedging program (the percentage is now significantly lower). Despite the widespread use of risk mitigation strategies in the airline industry, the question on whether or not hedging is value creating is once again a topic of interest.

In order to address this question, the paper analyzes Southwest's case based on empirical evidence and academic studies.

In the first section, I illustrate the most popular theories about hedging and try to incorporate the results of studies focused on the airline industry. In the second section, I describe the main features and risks of a fuel hedging program. In the third part, I detail the characteristics of Southwest's fuel hedging program and conduct some statistical analysis to test one of the theories that links hedging with value creation.

I conclude that the value of hedging jet fuel is related to the mitigation of underinvestment risk. In fact, if investment opportunities are uncorrelated with jet fuel and the price of this input reduces cash flows, an airline that hedges its fuel cost tends to gain a strategic advantage vis-à-vis its competitors by being able to sustain its investment projects. In this sense, hedging fuel price creates value for shareholders, particularly when other firms remain exposed.

Southwest's hedging program seems to confirm this theory. The firm has been able to expand almost continuously while others are cutting capacity, during times of high and low oil prices.

However, it remains unclear whether or not the initial goal of the firm was not only the reduction of its exposure to fluctuations of oil prices but also an attempt to time the market. The five-year term of the hedging program is arguably the sign of a risk management strategy rather than a speculative play. However, the current drastic reduction in the percentage hedged by Southwest opens more questions.

Despite the current uncertainty around its future hedging decisions, analyzing Southwest's case is still a great learning opportunity for airlines aspiring to effectively manage their fuel risk going forward.

1. Reasons to Hedge and Optimal Hedging Strategies

Introduction

This section of the paper investigates several theoretical frameworks and empirical studies that directly address the question: does hedging create value? The argument about hedging as a way to reduce underinvestment risk is adopted as the starting point for the analysis of the Southwest's case in the subsequent sections. Although reduction of the probability of distress can be pointed out as another value creating consequence of hedging (particularly for airlines), the investment argument fits very well the case of Southwest. It is also more suitable for a quantitative analysis.

The idea is that hedging a cost factor which is negatively correlated with cash flows but uncorrelated to investment opportunities allows firm to invest in NPV positive projects that could otherwise be missed or delayed. The protection from underinvestment seems to fit very well the sustained capacity growth that has generated consistent profitability for Southwest over the years.

Hedging and Value Creation

In a Modigliani-Miller world hedging is neither value creating nor value destroying. Among the major frictions that make hedging value creating, one of the most deeply analyzed is taxes (Smith and Stulz 1985). A good illustration of the effect of taxes could be provided by the case of a firm facing a range of selling prices of its output that could lead to either a loss or to a

positive profit (McDonald 2006). If we consider the extreme case of completely untaxed losses (losses are not deductible), the after-tax profit of a company are shaped as a concave function of the output price assuming constant cost. As a consequence of the concavity of the profit function, by reducing the uncertainty around the output price (as subsequently the taxable income) we increase the expected after-tax profit of the firm. In other words the total or even partial loss of the present value of NOLs (or deferred taxability of losses) causes profits to behave in accordance to a Jensen's Inequality, whereas f(expected(pre-tax income)) $\geq$ expected(f(pre-tax income)). (Whereas "f" is the after-tax income of the firm.)

Graham, John R. and Rogers, Daniel A. in their empirical study on hedging strategies partially refute Smith and Stulz's tax argument by mentioning the existence of a tax disincentive for firms with existing NOLs and expected future losses (Graham and Rogers, Do Firms Hedge in Response to Tax Incentives? 2001). They test convexity by calculating the tax benefits that would be generated by a decrease in volatility of income for a sample of firms. They do not find a statistically significant relationship between the convexity-based tax incentive and the derivatives holdings (scaled on sales). However, these results seem to be driven by the relative small size and near-zero expected profits of the firms with convexity incentives. This suggests that some of the companies analyzed might not be able to hedge due to liquidity problems sometimes related to financial distress.

Graham and Rogers analyze the other factors that are thought to create an incentive for firms to hedge. According to Graham and Rogers, hedging with derivatives allows firms to increase their debt ratio by 3.03%. The consequence is a higher level of leverage leading to the 1.1% higher firm value from tax shields. It is clear that the most significant advantage of increased debt capacity is derived from increased level of leverage (Leland 1998). However, another hardly

quantifiable benefit comes from the reduced cost of financial distress. Distress costs occur when the loss of one dollar can actually cost the firm more than one dollar due to the costs associated with bankruptcy or the expectation of a bankruptcy procedure.

Another critical factor to be analyzed is the reduction of the risk exposure of investment opportunities (Petersen and Thiagarajan 1997). This argument is based on the idea that external capital is expensive or limited and firms with low operating cash flows might not be able to take advantage of investment opportunities. In the investment context the value of hedging depends on the correlation between firm cash flows and investment opportunities. If investments are not attractive in bad states of the world, hedging does not add value to the firm. Empirical analysis is complex in this field. In fact, desired investments are hardly quantifiable. Petersen and Thiagarajan's analysis of two gold miners American Barrick and Homestake Mining shows also how the optimal hedging strategy depends on the specific investment exposure of various firms and how protection can be implemented in different ways (Petersen and Thiagarajan 1997). American Barrick hedges its gold exposure through the use of derivatives while Homestake does not. American Barrick's ability to protect its investment plans allows the firm to acquire underpriced or distressed assets when gold price is low.

Carter, Rogers and Simkins investigated the impact of hedging on the investment decisions of airlines and evaluated the effect of hedging on firms' value (Carter, Rogers and Simkins 2003). Hedged cash flows can support airlines' capital planning decisions, particularly the purchase of aircrafts that are planned years in advance, when it is hard for the firm to predict its cash holding or access to the capital markets. In addition, hedged cash flows can provide airlines the resources needed to buy assets in downturns. As we discussed earlier, the investment argument need to meet two requirements to support the thesis that hedges create value. The first is low correlation

between investment opportunities and the risk factor. The second is, obviously, the negative relation between the risk factor and cash flows. Carter et al. prove these relationships in the case of jet fuel prices. Data collected between 1979 and 2000 shows a positive relation between high fuel prices and aggregate airline investment. Investment here is defined as capital expenditure and net cash flow from investing. In addition, cash flows and jet fuel prices are significantly negatively correlated between 1987 and 2000.

The environment faced by airlines for most of 2008 seems to be even more consistent with Carter et al.'s analysis with kerosene-type jet fuel at almost $4/gal in July 2008. In the early 90s cash flow declines were associated with relatively high fuel prices. Similarly, the credit upgrades of the late 90s occurred while fuel prices declined significantly.

In conclusion, airlines' investment opportunities can be protected by hedging jet-fuel risk. This results in higher economic value[1] for hedgers in the industry that Carter quantifies in the range of 14.94%-16.08%. The initiation of a measurable hedging program makes hedgers 12.33%-13.68% more valuable with a declining impact on firm's value associated with an increased extent of hedging. In other words, the marginal benefit of hedging is not nearly as significant as the fact that the firm hedges at all. The connection with the investment strategy lies in the fact that all else equal, capital expenditures for hedgers create more value. A possible explanation is the fact that hedging reduces uncertainty on the future level of investments and makes current capital expenditure a better proxy for future capital expenditure.

With respect to the other rationales discussed in this section, Carter et al. (Carter, Rogers and Simkins 2003) refute the tax convexity argument (Graham and Smith, Tax Incentive To Hedge

[1] The value measure is a modified version of the Tobin's Q: (market value of equity + liquidation value of preferred stock + book value of long-term debt and current liabilities – current assets + book value of inventory) / book value of total assets.

1999) when applied to the airline industry. Based on a sample of 13 fuel hedgers, they predict tax savings (as a percentage of taxable income) of only 2.5% for only five firms. This finding is supported Graham and Smith's analysis which proves that firms do not hedge in response to convexity because of the relatively small value of the reduction in the tax liability net of the cost of hedging (Graham and Smith, Tax Incentive To Hedge 1999).

A more compelling argument is the reduction of the cost of financial distress. In fact, if usually costs directly associated with the bankruptcy processes are only fractions of the overall value (Weiss and Wruck 1998), cases in the airline industry (see Eastern Airlines) show that value destruction in Chapter 11 can be enormous. However, I could not find estimates of the increase in firm value related to reduction of cost of financial distress associated with hedging. Moreover, Southwest consistent profitability suggests that if significant value is created by its fuel price risk mitigation strategy, it is most likely related to the firm's ability to invest and expand operations.

Lastly, the rationale of increased debt capacity (Leland 1998) does not apply either to airlines given their already high levels of leverage. Carter et al. (Carter, Rogers and Simkins 2003) report, in fact, a decrease of leverage within hedgers.

In conclusion, analysis focused on the airline industry indicates reduction of the underinvestment risk as the primary source of value creation from hedging. Currently, while legacy carriers reduce their capacity dramatically in response to the downturn, Southwest Airlines continues to grow despite a brief decline in the first months of 2009. Scheduled to start service at LaGuardia in New York in June[2], Southwest boasts a sound financial and operational performance that was

[2] Jennifer Lee, New York Times, April 7, 2009

certainly built upon the cash conservation allowed by its aggressive hedging strategy in recent years. The current downturn might in fact support the hedging rationale based on the idea that cash conservation during times of high fuel prices can turn into a strategic advantage during a recession. In this case hedging could be seen as a way to reduce the probability of distress or to increase investment capability when others are constrained.

2. Hedging in the airline industry

Introduction

After reviewing the theoretical rationales for hedging, it is worth looking into the theory and practice of how to hedge. We will focuse our attention on the specific practices in the airline industry. This will lay the ground for the section on Southwest, allowing the reader to adequately understand basis risk, type of derivative contracts utilized and other features of Southwest's hedging program.

Hedging is not always identifiable by the use of derivative contracts. Petersen and Thiagarajan dealt with this challenge in the context of the gold mining industry (Petersen and Thiagarajan 1997). A gold loan, for example, could be an effective hedging strategy even if not classified as such. Generally, reduction of operational leverage is another example of risk mitigation not associated with the use of derivative contracts. The other point that is worth mentioning is that sometimes it is not clear whether firms' intent is to hedge or to speculate. The case of Metallgesellschaft's oil hedging in the early nineties (Mello and Parsons 1995) provides an example of a strategy that many believe was aimed at using the so-called "stack and roll" method

to speculate in the backwardation trend in the oil futures market. Faulkender finds evidence of market timing with respect to interest rate risk management practices of corporations (Faulkender 2003).

In this paper we will focus on to the use of derivatives contracts by airlines to reduce their fuel exposure. Traditionally the airline industry has not always widely utilized fuel derivatives. For example, in 2004 Rod Eddington, at that time CEO of British Airways, declared that hedging fuel does not save any money long-term for the airline due to its associated costs (Cobbs and Wolf 2004). This position is not uncommon across airline executives and it seems to be related to a herd effect that can be a hurdle for the adoption of more sophisticated financial strategies. In addition, it focuses only on the direct effect of hedging and ignores the value created by the investment opportunities and the reduction in cost of financial distress generated by hedging.

Yet airlines are aware of their exposure to fuel cost and the competitive pressure that make impossible for them to transfer additional costs to customers.

In general, the practice of managing risk exposure is also relatively recent. Airlines started adopting risk management more broadly in the late nineties (Carter, Rogers and Simkins 2004) and since then they have used mostly plain vanilla instruments.

Basis Risk

Hedging risk does not come without inherent risks. Knowing what those risks are is critical to design and implement good programs. A quick review of the concept of basis risk will allow a better understanding of the particular products used by airlines to hedge their jet fuel exposure.

Due to some factors such as limited liquidity in the jet fuel market, crude oil, heating oil and gasoline are frequently used to hedge. The use contracts based on an underlying asset different from the actual item hedged creates basis risk. In fact, while the prices of similar oil distillates have a high correlation, the same does not always apply to the relatives prices of crude and jet fuel.

The chart below illustrates the evolution of the spread (in percentage based on the price of crude) for heating oil and jet fuel. Shocks in refinery capacity (September 2005) or peak oil prices (summer of 2007) are associated with wide fluctuations and consequently basis risk.

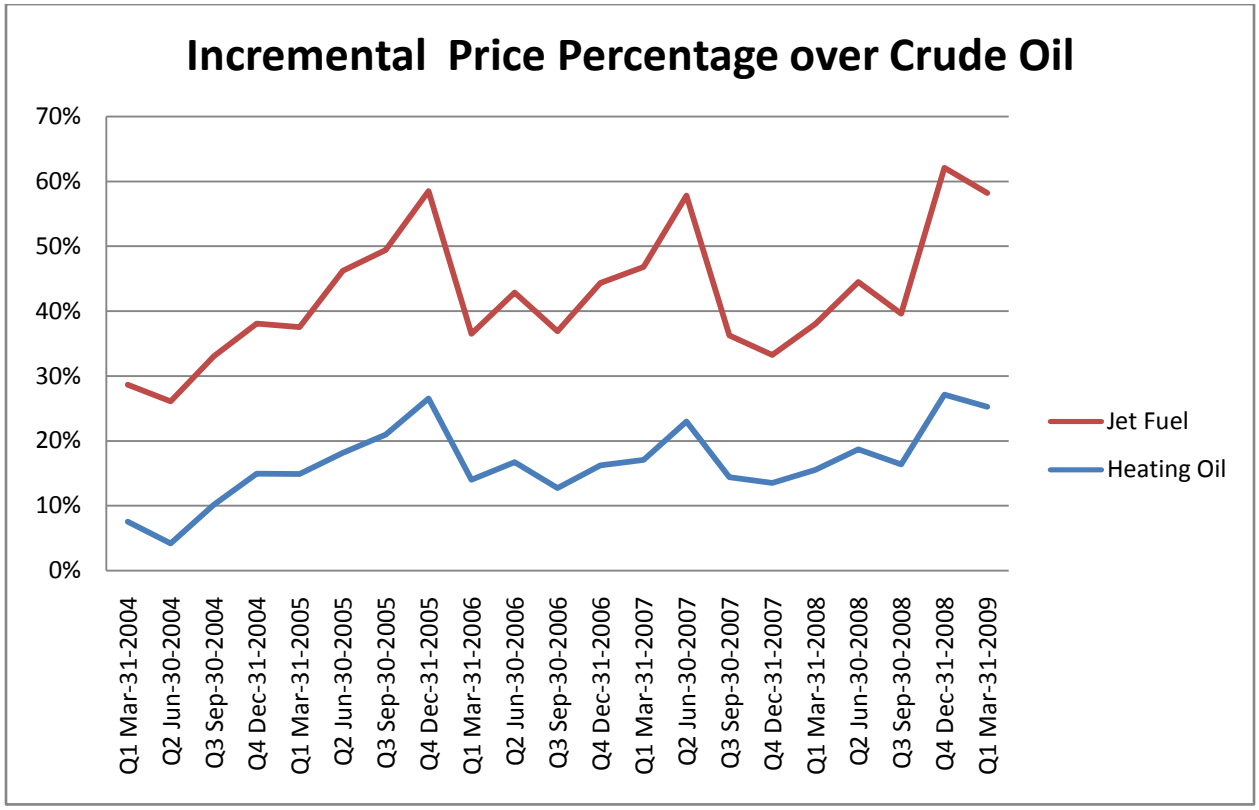


Figure 1.2 - Incremental Price Percentage over Crude for Jet Fuel and Heating Oil since 2004 Source: EIA

The New York Mercantile Exchange (NYMEX) is the main market for crude and heating oil while the International Petroleum Exchange in London (IPE) offers gasoil contracts.

Basis risk can also be "locational" when the pricing mismatch occurs between locations. An example is the spike in the basis between heating oil and jet fuel for the Gulf Coast location at the time of the invasion of Kuwait from the Iraqi army. When the war started the spread jumped by a factor of 8 times the average price differential.

Another form of basis risk is due to the difference between the term of the hedge and the risk exposure. Metallgesellschaft (MG) (Krapels March 26, 2001), the German conglomerate already mentioned above, is an exemplary case to illustrate time basis risk. We already discussed the MG case as an example of the unclear boundary between speculation and risk management. However, MG's example illustrates well the consequences of a mismatch between term of the hedge and underlying exposure.

MG, one of the largest German conglomerates with $10bn in sales in the early nineties and interests spreading from engineering to chemicals, was involved in a series of largely debated derivative transactions. MG hedged long-term (10-year on average) short positions (they were committed to large forward sales) with near-month long future contracts on the NYMEX to the point that their contracts accounted for as much as 16% of the open interest outstanding in the NYMEX's oil contracts. MG's strategy turned out to be dramatically unsuccessful as the firm kept accumulating losses on the short term contracts that were meant to protect them from their initial short position. The reason is the fact the MG's trading volume triggered a contango effect on the short-term forward market leading to a negative arbitrage: buy at higher forward prices than actual prices. Again the term risk here was related to the fact that the sale price of oil was established upfront for a long time horizon while the purchase of products occurred short term.

Contracts

When it comes to the type of contracts utilized for fuel hedging purposes, airlines have traditionally favored plain vanilla contracts. OTC contracts have been widely used by Southwest as they are most customizable than traded contracts (Cobbs and Wolf 2004). Typical contracts entered by airlines are swaps, options and combinations of options such as collars. Asian options (based on the average price of jet-fuel) are very popular as airlines tend to manage their input cost over a defined period of time. Exchange-traded contracts are also common, particularly for commodities highly correlated to jet-fuel and with highly liquid markets.

In the following paragraphs we will cover in further detail several types of contracts and some of their specific features when used for jet fuel hedges.

Swaps

This type of contract consists in an agreement to exchange a floating price for a fixed one over a certain time. Other obligations of these contracts are settlement rules, volumes and any other provision in place to reduce the counterparty risk. Such contracts are commonly settled in cash as they do not require physical delivery of the fuel. Settlements occur usually on a monthly basis but the decision is left to the contractual freedom of the parties.

The plain vanilla swap can be paired with a differential swap that consists of payments based on changes in the basis between, for example, heating oil and jet fuel. In other words, one of the parties will bear the risk of the increase of the differential and vice versa.

If, as we mentioned, OTC contracts have some pros, they are also less liquid, not as efficiently priced as publicly traded contracts and more risky. The presence of a clearing house reduces significantly the counterparty risk in a derivative transaction.

Options and Collars

Options on fuel can be OTC or traded. Usually the OTC options are cash settled and are structured as "asian" options or based on the arithmetic average price of jet fuel over a month. Traded options on the NYMEX are exercised into futures.

Energy options tend to be costly, particularly when high volatility in prices drives option prices up. Airlines use collars to reduce the cost of the hedge. When the premium of the option purchase offsets perfectly the premium of the option sold the collar has zero cost. However, the risk of short positions can be material. In fact the short put side of the collar might have an unlimited downside in case of drops in prices. United Airlines, for example, made extensive use of collars in recent years incurring losses (on the short put positions) even during the drop in oil prices. As a consequence, the firm has been forced to purchase put options to mitigate its losses.

Futures and Forwards

Finally it is worth mentioning futures and forwards as they are also widely used to hedge jet fuel. The main difference between these two types of contracts consists in the fact that futures are standardized and exchange traded, marked to market and cash settled daily, and rarely result in the physical exchange of the commodity.

Forward contracts are not traded in exchanges but have the advantage of being more customizable. The absence of a clearing house and the fact that forwards are usually maturity settled requires particular attention to the management of the counterparty risk.

The section on Southwest's hedging strategy includes further discussion on the factors affecting the choice of a particular type of contract to mitigate the jet fuel risk.

3. Southwest Hedging Program

Introduction

The first two sections of the paper tried to achieve the following goals. The first is defining which theory on hedging and value creation seems to apply to the case of Southwest. The second is laying the ground for a thorough understanding of the execution of the hedging strategy by Southwest. The purpose of this section is analyzing Southwest's hedging program to test the hypothesis of value creation resulting from the reduction of underinvestment risk articulated in the first part of the paper.

The first part is devoted to a detailed description of Southwest's hedging practices and their results in the last five years. This part touches on multiple features of the airline's hedges such as term, equivalent oil prices, and financial results. The second part includes some regressions aimed at verifying that since investment opportunities are weakly correlated with fuel price, hedging allowed Southwest to sustain its capital plans and to signal to the market that its current investment level is a good proxy of its future investment levels.

Scott Topping at Southwest once declared that "if we don't hedge jet fuel price risk, we are speculating. It is our fiduciary duty to try and hedge this risk" (Blanco, Lehman and Shimoda 2005 -June).

In the last decade, Southwest clearly set the bar in defining the features of a successful hedging program. The results achieved by the firm in the last seven years or so are so remarkable that

Morgan Stanley analyst William Greene in July 2008 (Moore 2008) called Southwest "an oil play". Greene stressed the fact that in the middle of the oil price crisis of 2008, Southwest's management announced plans to sustain growth. According to the analyst this is evidence of how hedging is used at Southwest as a durable competitive advantage. This paper's theoretical foundation based on the idea that hedging jet fuel is a way to reduce the risk of under-investment (or to be able to maintain investment levels when others cannot) is, in fact, consistent with Greene's observations.

Features of Southwest Jet Fuel Hedging Program

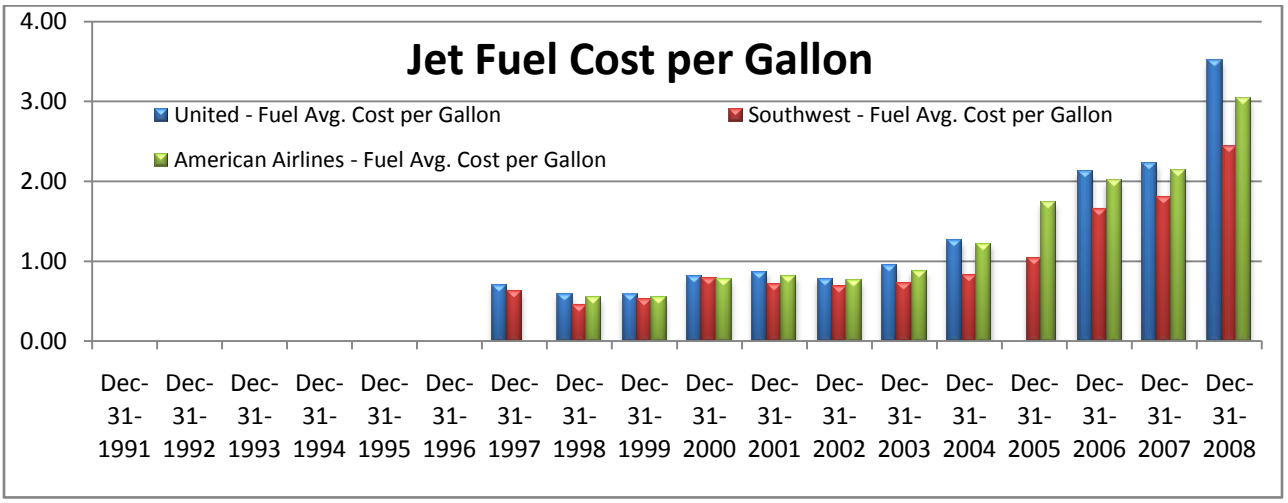


Figure 1.3 - Jet Fuel per Gallon of American Airlines, United Airlines and Southwest (between Dec-91 and Dec-2008)

The figure above shows Southwest's competitive advantage in jet fuel price over the last 11 years comparing the firm with two major legacy carriers. Interestingly, Southwest's hedging implementation is actually in many ways not dissimilar to common market practices. One way to analyze it is to look at the multiple features that are common to every risk management plan in the industry and then try to focus more closely on the distinctive aspects of Southwest's strategy.

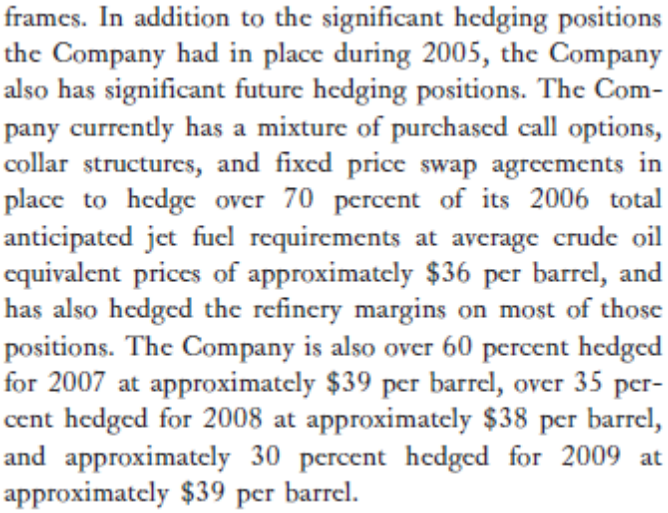
To do so, the first part of this section will address the following topics:

- Type of derivative contracts and rationale for using them
- Underlying commodities used for hedging
- Hedge ratios
- Term of the hedge

Derivatives used

Practitioners and risk managers agrees in identifying two major factors in the choice of the type and combination of derivative contracts used to hedge jet fuel's risk:

1. Minimization of costs
2. Implementation of a flexible hedging strategy based on the oil cycle



frames. In addition to the significant hedging positions the Company had in place during 2005, the Company also has significant future hedging positions. The Company currently has a mixture of purchased call options, collar structures, and fixed price swap agreements in place to hedge over 70 percent of its 2006 total anticipated jet fuel requirements at average crude oil equivalent prices of approximately $36 per barrel, and has also hedged the refinery margins on most of those positions. The Company is also over 60 percent hedged for 2007 at approximately $39 per barrel, over 35 percent hedged for 2008 at approximately $38 per barrel, and approximately 30 percent hedged for 2009 at approximately $39 per barrel.

Figure 2.3 - Footnote on oil hedges - excerpt of Southwest's FY2005 10-K

As described in Figure 2.3, Southwest uses a combination of call options, collars, and fixed price swap agreements to hedge its jet fuel exposure.

As mentioned above, cost is an important driver in selecting a particular set of contracts. Some authors stress the fact that many airlines have to deal with liquidity issues that limit their ability to fully protect themselves from oil price fluctuations (Cobbs and Wolf 2004). Often times they require their counterparties to design hedges that simply fit their budgets. The risk of constraining a risk management program in such way is to expose the firm to higher losses than the immediate savings achieved in the execution. However, it is reasonable to assume that cash strapped companies would rationally try to prioritize the use of their liquidity in order to first service debt and pay compensations. If this is true, it is hard to define the "optimal" hedging strategy based on the empirical observation of airlines risk mitigation practices in the market.

The type of contracts used does not vary significantly across airlines. However, it is interesting to notice how some companies, such as United, tend to use more complex option combinations (such as three-ways and four-ways[3]) while others, such as Southwest, rely mostly on plain vanilla contracts.

Traditionally the firm has favored OTC contracts (Cobbs and Wolf 2004) for the flexibility they offer.

This preference for over-the-counter contracts is related to the second leading factor in the choice of the type of derivatives: the implementation of a dynamic hedging strategy based on the oil cycle.

OTC hedges fit very well the flexible strategy that Southwest (and JetBlue) has adopted in recent years. The idea is that the price of oil behaves as a mean-reverting process. Therefore, different contracts or combination of contracts are used depending on the various stages of the oil price cycle.

At the bottom of the cycle, swap contracts can be used to lock-in a favorable price level while further declines in price are unlikely to occur. In the mid-range of the price cycle, collars allow cheaper protection from price increases while giving up the gains from further decreases in price. Peak prices are

[3] An example of a 3-way option collar includes a long call option (max price), a short put (minimum price), and long put at a price level below which the contract holder is paid. A 4-way contract might include an additional contract in the form of a short call position at a price level above which the protection ends.

more likely to require caps in the form of straight calls to protect from further increases while allowing the firm to benefit from the expected reversion to the mean of oil prices.

The figures below show the different payoff diagrams associated with various common contracts.

Payoff of a Call Spread and a Costless Collar

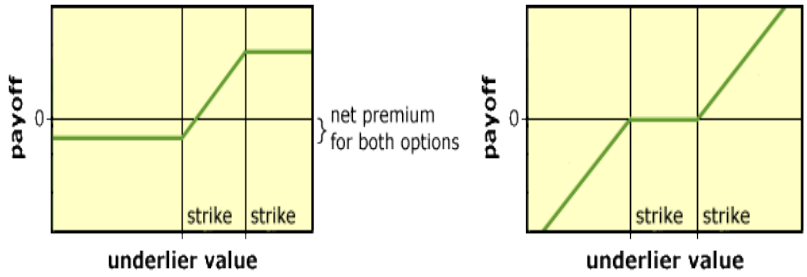


Figure 3.3 – source: http://www.riskglossary.com

Commodities used and basis risk

Southwest hedges jet fuel with several commodities, including crude oil, heating oil and unleaded gasoline. The use of a particular commodity is related to both liquidity and basis risk. Contracts to hedge needs far out in the future are usually based on oil. Oil future market is very liquid but can be manipulated in the short term as a result of speculative bets.

Despite some of the pros that we just described, crude oil hedges expose the airlines to a greater basis risk, or the mismatch between the fluctuations of oil price and the actual jet fuel price as described in the second section of the paper.

Heating oil allows airlines to hedge as far as two years into the future and its price moves more closely with jet fuel. Finally, jet fuel contracts (OTC) are frequently used for shorter term hedges

up to two quarters, due to the absence of publicly traded contracts and limited liquidity in the market.

Managing basis risk can be very complex and requires taking into account various factors related to the changes in supply and demand. For example, hedges implemented at the end of summer, when hurricanes can disrupt refinery capacity and break the normal equilibrium in the crack spread, are most likely to be based on jet fuel and heating oil. At times, Southwest and others have also purchased contracts to reduce basis risk as explained in the footnote to the FY2005 10-K included in Figure 2.3.

The Hedge Ratio

Some of the features of Southwest's hedging strategy as described above, with the exception of the flexible strategy, are not necessarily unique to the firm. Two of the most salient features of Southwest's hedging program are the percentage that the firm hedged over the last seven years and the term of the hedges.

It is hard for an outsider to determine the rationale behind the specific percentages of fuel need that Southwest decides to hedge in every fiscal year.

AIRLINE	PERIOD	PCT HEDGED	PRICE
Continental Airlines	H2 08	63	not disclosed
	H1 09	29	not disclosed
* United Airlines	Q3 08	44	$100-$127/bbl
(UAL Corp.)	Q4 08	47	$99-$134/bbl
	FY 09	14	$102-$152/bbl
American Airlines	Q3 08	35	$95/bbl
(AMR Corp.)	FY 08	34	$82/bbl
Northwest Airlines	Q3 08	63	not disclosed
	Q4 08	56	not disclosed
	Q1 09	21	not disclosed
Southwest Airlines	Q3 08	80	$61/bbl
	Q4 08	80	$58/bbl
	FY 09	70	$66/bbl
	FY 10	40	$81/bbl
Delta Air Lines	Q3 08	48	$2.94/gln of fuel
	Q4 08	46	$3.42/gln of fuel
	FY 09	21	$3.48/gln of fuel
	FY 10	5	$3.05/gln of fuel
* US Airways	Q3 08	58	$97/bbl
	Q4 08	47	$108/bbl

* Data includes fuel consumption for mainline operations only. All others are for consolidated airline operations. (Reporting by Kyle Peterson; Editing by Andre Grenon)

Figure 4.3 - Source: Reuters - Comparison of Percentage of Oil Prices between FY2008-2009

However, two comments can be made. First, figure 4.3 shows how Southwest sticks out in the peer group for its high percentage (80%) of fuel hedged in Q3 and Q4 of 2008 compared to significantly lower averages for the competitors (at approximately 50-55%). Second, by investigating common hedging practices of major airlines, it appears that, traditionally, the percentage of jet fuel hedged is set not to exceed certain levels, which typically are set around 50%. It is not clear whether or not this percentage is based upon a statistical analysis or other quantitative methods. Moreover, as we already mentioned earlier in the paper, airlines except Southwest tend to align their hedged percentages to the rest of the industry.

My hypothesis is that while everybody else is simply trying to conform to the common industry practice in what can be considered a “herd effect”, Southwest is setting its percentages based on different assumptions or methods.

The Term of the Hedge

		2004	2005	2006	2007	2008	2009	2010	2011
% Hedged of total requirements	10-k FY2003	82%							
Equivalent Crude price Hedge (per barrel)		$ 24							
% Hedged of total requirements	10-k FY2004	80-85%	85%	65%	45%	30%	25%		
Equivalent Crude price Hedge (per barrel)		$ 24	$ 26	$ 32	$ 31	$ 33	$ 35		
% Hedged of total requirements	10-k FY2005		85%	70%	60%	35%	30%		
Equivalent Crude price Hedge (per barrel)			$ 26	$ 36	$ 39	$ 38	$ 39		
% Hedged of total requirements	10-k FY2006			70%	95%	65%	50%	25%	15%
Equivalent Crude price Hedge (per barrel)				$ 36	$ 50	$ 49	$ 51	$ 63	$ 64
% Hedged of total requirements	10-k FY2007				100%	70%	55%	30%	15%
Equivalent Crude price Hedge (per barrel)					$ 50.0	51	$ 51.0	$ 63.0	$ 64.0
% Hedged of total requirements	10-k FY2008				90%	78%	10%	10%	10%
Equivalent Crude price Hedge (per barrel)					$ 50	$ 51			

Figure 5.3 - source: Southwest 10-Ks - Percentage Hedged and Equivalent Crude Price of Protection

The figure above is the result of a detailed analysis of the 10Ks filed by Southwest between FY2003 and FY2008. Despite the challenge of filling all the blanks, it is clear that the company tends to structure its program with a five/six year time window. However, they adjust their hedges every year depending of the short-term needs in term of quantity and prices. This is the sign of a very consistent and systematic approach that takes into account a long-term planning and forecasting effort that others do not seem to believe in.

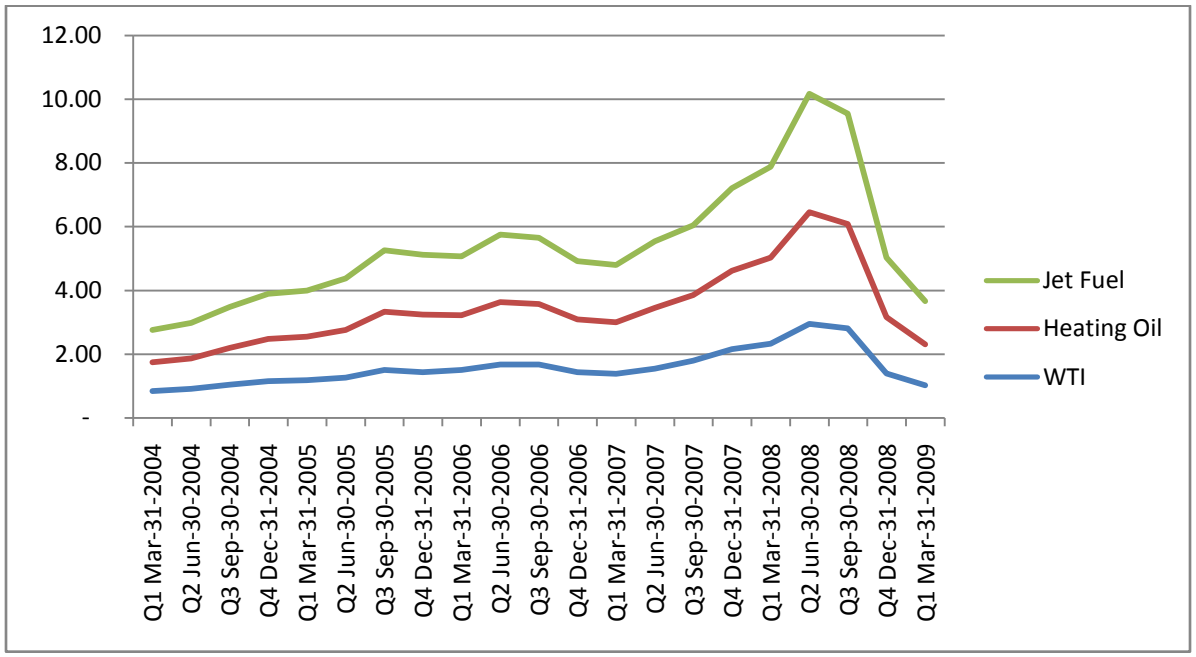
Taking flexible long-term positions prevents Southwest from falling prey of temporary inefficiencies and distortions determined by the activity of speculators in the market. It is interesting to add that traditional carriers rely largely on the forward curve and on the view of their bankers when defining their strategy. Needless to say, there is a clear conflict of interest when the counterparty in the hedging contract is also a major player (i.e. speculator) in the oil market. The uniqueness of Southwest's program seems to indicate that the firm relies on a more independent view of the oil market and its dynamics when designing its hedges.

Another important comment is related to what can be considered to be a match between strategic capital planning and term of the hedge. If expanding into new market and sizing the fleet accordingly requires a medium/long-term year view into the future, the risk exposure of the plan to fluctuations in oil price cannot be shorter. Avoiding stretching the hedge into the future based on the difficulty in predicting the actual future price of oil is a flawed argument. In fact, the goal of the hedge is, first, to ensure the execution of the strategy and, second, to do it at the best price level and lowest cost possible. Obviously, placing a big bet on crude oil contracts 5 years into the future would be irresponsible and risky. However, a staged commitment to a risk mitigation plan reduces considerably the risk of making mistakes. This includes rolling over positions, switching to different contracts and increasing the hedge ratio while the market becomes easier to read.

Clearly, by adopting a flexible hedging strategy, committing to the more aggressive hedged percentage and taking longer term positions made Southwest's jet fuel hedging program successful. The recent losses taken by the airline as a result of the drop in oil prices do not, in my view, undermine the value of the program for the volatility in the commodity market recently reached a level hardly predictable.

Data Analysis of Southwest Hedging Strategy

This paragraph contains a historical analysis of Southwest's hedging program. The goal is to provide the writer with enough background in preparation for the analytical content of the paper which is based on the data described here.



The price series (in $/gallon) of jet fuel, heating oil and WTI show how the increased price levels and the high volatility of oil prices exposed airlines to increasing complexity in their hedging programs.

One of the purposes of this paragraph is to understand how the jet fuel program at Southwest responded and adapted over the years to the trends presented above (Southwest Airlines Co. 2004, 2005, 2006, 2007, 2008). The objective is to show the outcomes of Southwest's hedging strategy over five years (2004-2008) providing a clear picture of context in which the company operated.

FY2004: Cost of fuel becomes the second highest category after labor (according to the company's 10-K for FY 2004). By hedging a percentage of its fuel needs between 80%-85%, Southwest saves $455M.

FY2005: Jet fuel accounts for 19.8% of the total operating expenses of Southwest. While the domino effect of airlines filing for bankruptcy continued and the industry totaled $40bn in losses over the previous five-year period, Southwest reported its 33rd year of consecutive profitability.

FY2006: Savings achieved from fuel hedges through cash settlements of outstanding positions reaches $675M. As of 2006, the hedging program since 2000 saved Southwest $2bn in jet fuel cost. In explaining the acceleration of its hedging program for the year 2007 (95% jet fuel needs hedged as of the end of 2006) and 2008 (65% jet fuel needs hedged as of the end of 2007), Southwest mentions the need to establish protection from possible catastrophic events in the oil market. The firm is able to retain investment grade rating and entered the year 2006 with $1.8bn in cash and a debt to total capital ratio under 35% including aircraft leases (vs. 97% for Continental Airlines excluding leasing as of July 2009).

FY2007: The 95% hedge protection generates $727M in savings for Southwest. The company is able to limit its effective year-over-year increase in jet fuel price to 11.3%.

FY2008: At the end of 2008 what seems to be a cycle of robust hedges buildup comes to an end. Southwest sells mostly swap contracts at a loss as fuel price tumbles. The weeks between the end of 2008 and 2009 mark a reduction in capacity (in ASM) for Southwest in the order of 4%-5%.

The hedge ratios for the firm over the time covered by the analysis are summarized in figure 5.3 and reproduced below:

		2004	2005	2006	2007	2008	2009	2010	2011
% Hedged of total requirements	10-k FY2003	82%							
Equivalent Crude price Hedge (per barrel)		$ 24							
% Hedged of total requirements	10-k FY2004	80-85%	85%	65%	45%	30%	25%		
Equivalent Crude price Hedge (per barrel)		$ 24	$ 26	$ 32	$ 31	$ 33	$ 35		
% Hedged of total requirements	10-k FY2005		85%	70%	60%	35%	30%		
Equivalent Crude price Hedge (per barrel)			$ 26	$ 36	$ 39	$ 38	$ 39		
% Hedged of total requirements	10-k FY2006			70%	95%	65%	50%	25%	15%
Equivalent Crude price Hedge (per barrel)				$ 36	$ 50	$ 49	$ 51	$ 63	$ 64
% Hedged of total requirements	10-k FY2007				100%	70%	55%	30%	15%
Equivalent Crude price Hedge (per barrel)					$ 50.0	51	$ 51.0	$ 63.0	$ 64.0
% Hedged of total requirements	10-k FY2008				90%	78%	10%	10%	10%
Equivalent Crude price Hedge (per barrel)					$ 50	$ 51			

This table reproduces Figure 5.3 for convenience of the reader

It is interesting to notice how the hedge is build upon the longer term positions in increments of the hedged percentages that are generally between 5% and 15%. However, fiscal year 2006 shows a significant ramp up in the hedge percentages (plus 25% for 2007 and 2008 and 30% for 2009). This bold strategy is at the root of the remarkable results achieved when the oil market peaked.

Based on this detailed description of the company's hedge ratios and policies since 2004 (Q1) and up to 2008 (Q4), the paper tries to generate a theoretical quarterly hedged price per gallon for Southwest. It then attempts to match the total fuel cost incurred by Southwest on a quarterly basis as disclosed in the 10-K forms with the total hedged fuel cost generated starting from the theoretical price per gallon as described above. The goal of this first analysis is to understand the level of transparency of the disclosures provided by the company and to assess the economic (vs. accounting) value of the savings achieved by Southwest.

The theoretical quarterly hedged price per gallon calculation is based on the following assumptions: the annual percentage of the jet fuel hedged is constant in each quarter and the

"theoretical" savings per gallon of jet fuel are based on the equivalent crude oil price of the hedge.

The table below (Table 1.3) is an excerpt of the model: the first three lines include the un-hedged cost per gallon for crude oil, heating oil and jet fuel. The second group of three items are the percentage of hedged jet fuel ("hedge level"), the hedged price of a gallon of oil ("Level") and the savings per gallon.

The table, as mentioned, includes the hedged jet fuel price ("hedged fuel ") which is the extrapolated price based on the other information contained in Figure 5.3 and Table 1.3. This is the sum of the un-hedged gallon price of jet fuel minus the expected savings on the price of crude oil per gallon based on the disclosed hedge ratio reported on the 10-Ks of Southwest. "Disclosed" is the hedged price per gallon reported by Southwest in its 10-K.

Table 1.3 – Source: My Elaboration based on data provided by Energy Information Administration Capital IQ and Southwest Airlines 10-K Forms for FY2004 to FY2008.

Industry Specific For the Fiscal Period Ending	Q1 Mar-31-2004	Q2 Jun-30-2004	Q3 Sep-30-2004	Q4 Dec-31-2004	Q1 Mar-31-2005	Q2 Jun-30-2005	Q3 Sep-30-2005	Q4 Dec-31-2005	Q1 Mar-31-2006
Currency	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
WTI	0.84	0.91	1.04	1.15	1.18	1.26	1.50	1.43	1.51
Heating Oil	0.90	0.95	1.15	1.32	1.36	1.49	1.82	1.81	1.72
Jet Fuel	1.02	1.11	1.28	1.42	1.45	1.62	1.93	1.89	1.85
Hedge Level	82%	82%	82%	82%	85%	85%	85%	85%	70%
Level	0.57	0.57	0.57	0.57	0.62	0.62	0.62	0.62	0.86
Saving per gallon	0.27	0.34	0.47	0.58	0.56	0.64	0.89	0.81	0.65
Delta WTI		9%	14%	10%	3%	7%	19%	-5%	5%
Delta Heating Oil		5%	21%	15%	3%	10%	22%	-1%	-5%
Delta Jet Fuel		10%	15%	10%	3%	11%	20%	-2%	-2%
Hedged Fuel	0.80	0.83	0.90	0.94	0.97	1.07	1.18	1.20	1.39
Disclosed	0.80	0.82	0.80	0.80	0.90	1.02	1.01	1.01	1.51
Saved per gallon	(0.22)	(0.29)	(0.48)	(0.61)	(0.55)	(0.60)	(0.92)	(0.88)	(0.34)
Total Consumption per gallon	287	298	306	306	307	322	332	332	329
Total Saved	(63.29)	(87.73)	(147.13)	(187.75)	(168.54)	(192.38)	(306.45)	(290.62)	(110.35)
Total Saved per Year	(485.90)				(957.98)				(606.10)

The “economic” savings achieved by Southwest are based on the difference between the un-hedged and the hedged price of jet fuel per gallon multiplied for the total quarterly consumption and are plotted in the chart below:

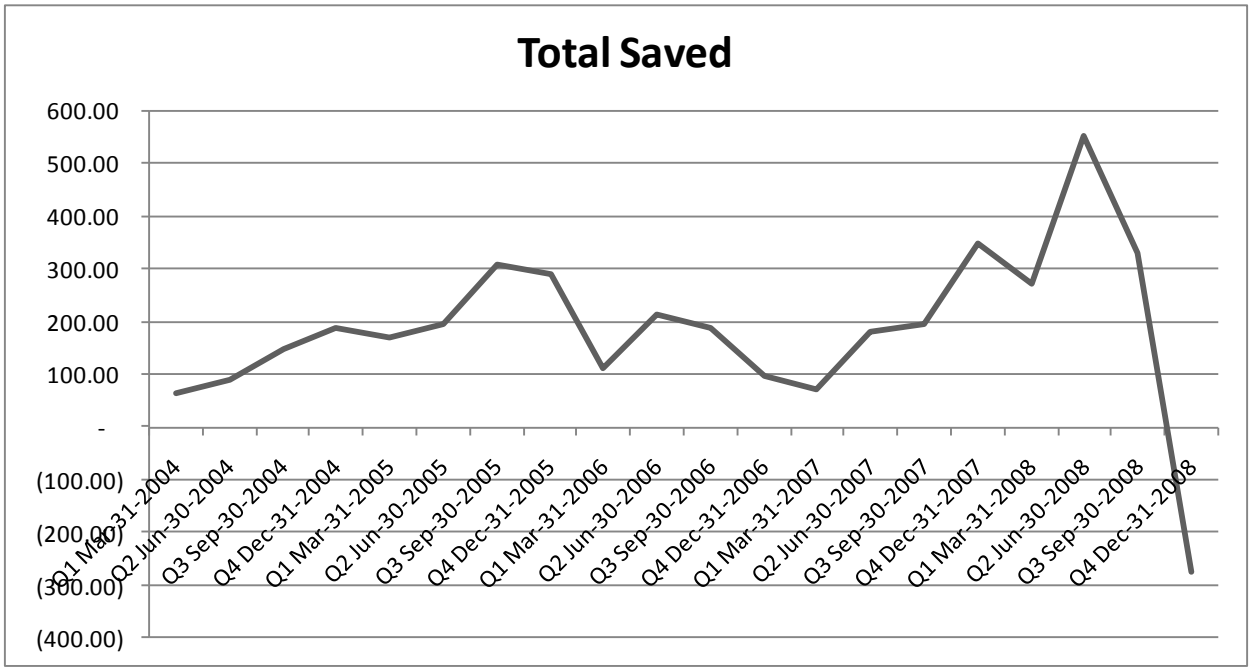
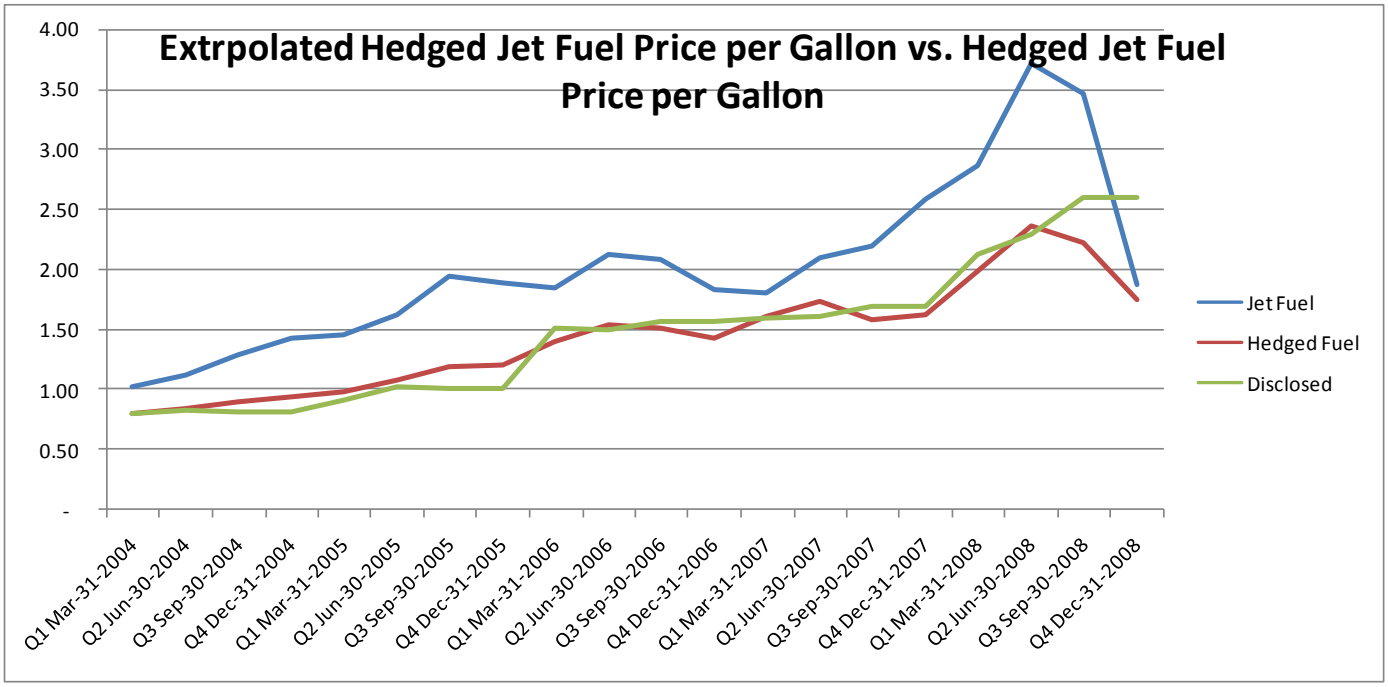


Table 2.3 - Total Savings Generated by Southwest's Hedging Program since Q1 of 2004

The data plotted in Table 2.3 offers a snapshot of the competitive advantage that the firm was able to achieve before the end of last year. The numbers are impressive if we consider that the network carriers lost collectively $867M in the first quarter of 2009 (source: FAA). Lower operating costs enabled Southwest to enter new markets and price their tickets below competitors just enough to win customers without giving up too much profit.

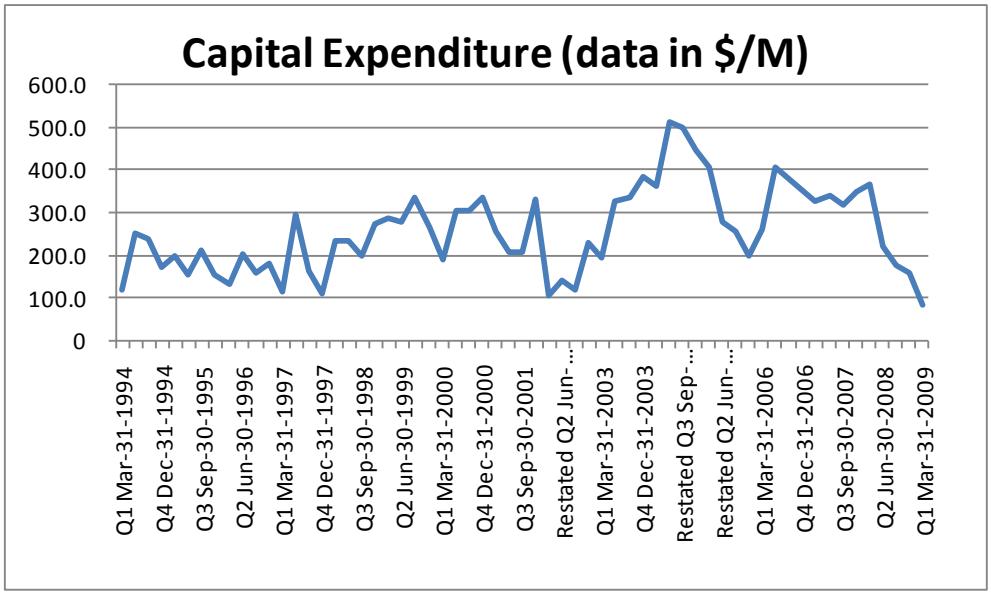
Based on the results of the analysis summarized in Table 1.3, it is possible to plot the quarterly jet fuel price per gallon disclosed versus the extrapolated hedged price of a gallon of jet fuel.

Table 3.3 - Source: Elaboration based on Table 1 data



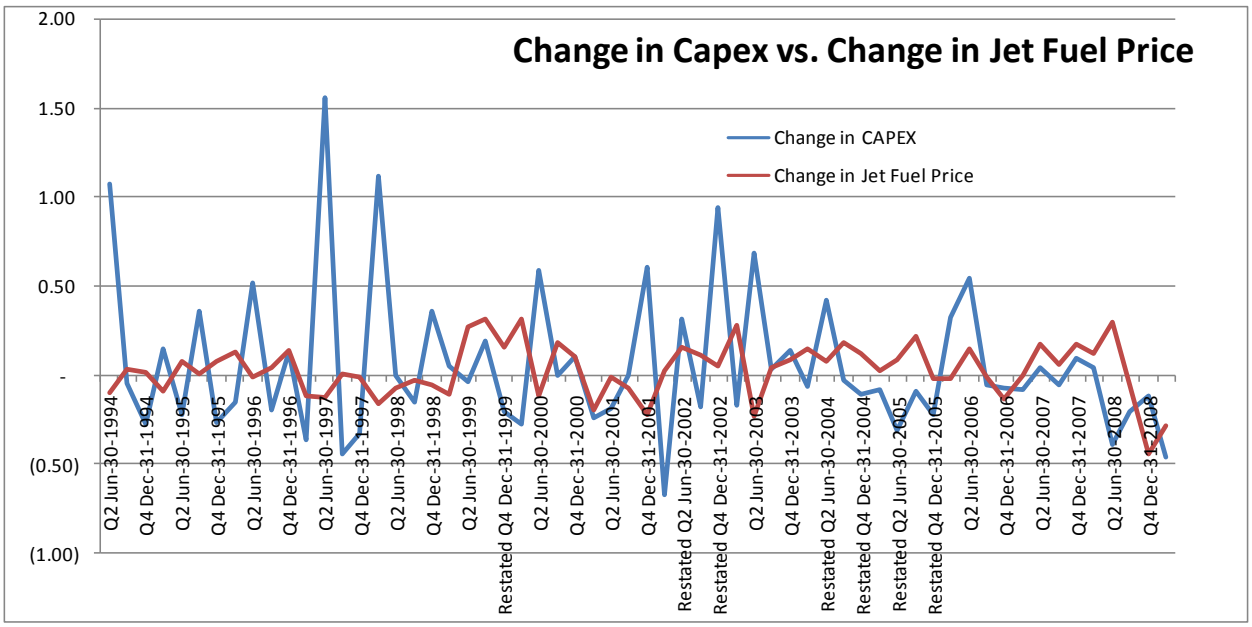
The chart shows that the extrapolated price is a very close approximation of the actual hedged price as reported by the firm. However, in the last three quarters of 2008 actual prices per gallon paid are disconnected from the extrapolated prices. This seems to indicate a substantial change from the initial positions in the percentage of the jet fuel hedged or in the price level of the hedge. Clearly the information provided by financial disclosure does not allow the simulation of the actual price level and percentage hedged at Southwest after the spike in jet fuel price at around $3.71 per gallon in Q2 of 2008. A reduced level of information regarding the price level of the current 10% hedged for the next three years can be interpreted in various ways, including the lack of a new risk mitigation plan with the same breadth it used to have in recent years.

Table 4.3 - Southwest Quarterly Capex since Q1-1994



The second piece of analysis performed in this section is aimed at describing the relationship between fuel prices (un-hedged price) and capital expenditure. We explained that the rationale for hedging based on the risk of underinvestment could be tested precisely if it were possible to measure the desired levels of capital expenditure. Since the only data available is the actual capital expenditure, the first analysis included in this paragraph consists in determining the correlation between the change in jet fuel price and capital expenditure. The same regression is also performed against capex scaled for Available Seat Mile and change in capex per ASM. Seat miles are a good measure of capacity. Scaling for this measure aims at neutralizing any effect that firm size might have on capital expenditure. As we mentioned in the first section (Carter, Rogers and Simkins 2003) we would expect to see low correlation between investments and the jet fuel price (un-hedged) and a negative relationship between jet fuel and cash flows. The second condition is assumed to hold given that jet fuel is a major operational cost item for airlines and that ticket prices have been stable or declining in recent years.

Table 5.3 - Change in Capex vs. Change in Jet Fuel Price (Data in Percentage)



To verify the second condition or low correlation between investments and jet fuel, three sets of analysis have been performed.

At first, according to our data, there is a negative correlation of -.23 between the change in the quarterly capex and the change in the quarterly gallon price of jet fuel starting from Q1 of 1994. The result of the regression for the same variables starting in Q1 2004 reveals a significant negative linear relationship between the two variables:

Regression of Change in Capex as function of change in jet fuel price				
T-statistic	-1.81			
slope	-0.63	0.08	intercept	
+-	0.35	0.05		
R^2	0.05	0.41		

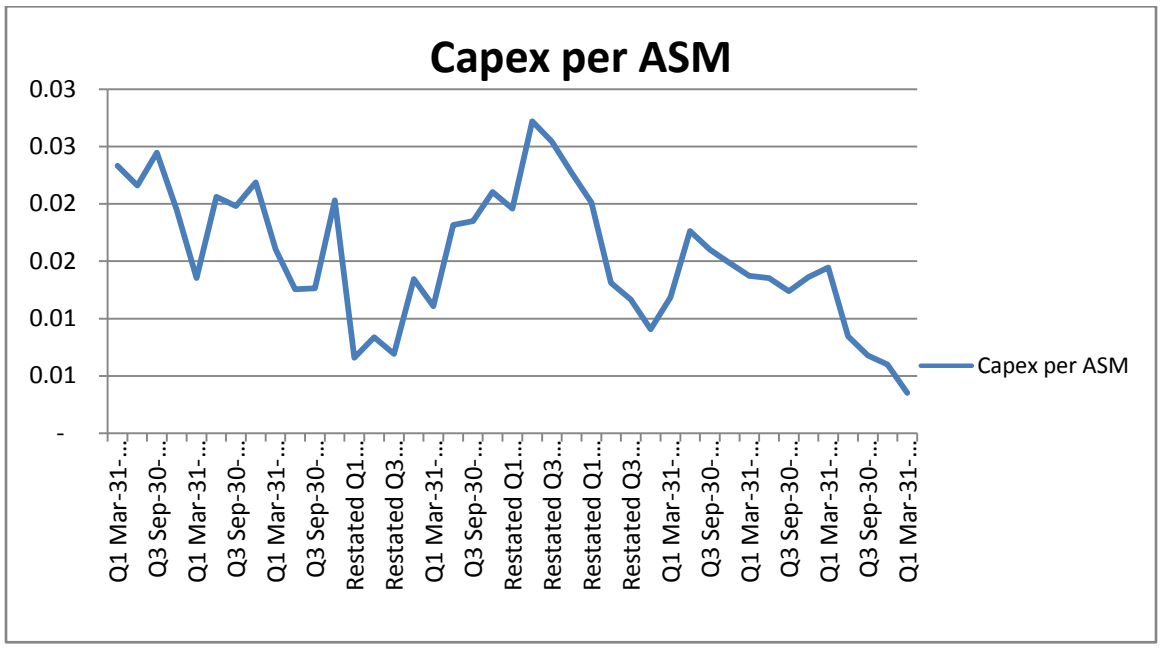
This is not in line with our expectations. The reason can be twofold: first, we are not using the level of desired investments but the actual capex; second, the change in capex is not scaled to the size of the firm.

Table 6.3 – Excerpt of Data for Regression between % Change in Jet Fuel Price and % Change in Capex

Cash Flow			
For the Fiscal Period Ending	Q1 Mar-31-1994	Q2 Jun-30-1994	Q3 Sep-30-1994
Currency	*USD*	*USD*	*USD*
	1	2	3
Net Income	**41.8**	**58.5**	**58.6**
Depreciation & Amort.	32.5	33.8	36.3
Depreciation & Amort., Total	**32.5**	**33.8**	**36.3**
(Gain) Loss From Sale Of Assets	-	-	-
Stock-Based Compensation	-	-	-
Tax Benefit from Stock Options	-	-	-
Other Operating Activities	48.3	37.2	(12.8)
Change in Acc. Receivable	-	-	-
Change in Acc. Payable	-	-	-
Change in Unearned Rev.	-	-	-
Change in Inc. Taxes	-	-	-
Change in Other Net Operating Assets	-	-	-
Cash from Ops.	**122.6**	**129.6**	**82.1**
Capital Expenditure	(121.3)	(252.2)	(240.5)
Abs (Capital Expenditure)	121.3	252.2	240.5
Jet Fuel Price	0.56	0.51	0.52
Change in CAPEX		1.08	(0.05)
Change in Jet Fuel Price		(0.10)	0.03
Correlation	(0.23)		

In order to correct for this potential distortion, I collected the data of the available seat miles for each quarter (Table 7.3). As we explained above, this is an industry specific metric commonly used to measure capacity.

Table 7.3 - Capex per ASM (Q1-1999 to Q4-2008)



The regression result of the quarterly capex per ASM versus the quarterly gallon price of jet fuel between Q1-2004 and Q4-2008 is:

	Regression of Capex per ASM and jet fuel price			
T-statistic	-2.77			
slope	0.00	0.02	intercept	
std error of slope	0.00	0.00		
R^2	0.16	0.01		

The results of this regression are more in line with the conclusions of Carter et al.. The slope is in fact very close to zero and significant. The R^2 is also very low.

I also ran an additional regression based on the percentage change of capex per ASM and the percentage change of jet fuel price for the same time horizon.

	Regression of Change in Capex per ASM and Jet Fuel Price				
T-statistic	0.02				
slope	0.00	-0.07	intercept		
+-	0.17	0.03			
R^2	0.00	0.13			

In this case, the results are not statistically significant but extremely low value of the slope and the R^2 confirm the results of the previous regression.

In other words, the scaled measure of capital expenditure and jet fuel price are weakly correlated. If investment opportunities are not a function of jet fuel prices and assuming that high fuel prices decrease cash flows, hedging is a protection from underinvestment risk.

Despite these encouraging findings, the results of the statistical analysis do conclusively confirm the thesis contained in the study of Carter and al. (Carter, Rogers and Simkins 2003). However, observing the actual strategy of Southwest unfolding offers, perhaps, an additional data point in that direction. The evidence is that hedging enables Southwest to expand its operations (or to reduce them less than the competitors) consistently. The following excerpt from the 10-K of FY2008 reinforces this idea:

"The Company expects its net available seat mile (ASM) capacity in first quarter 2009 to be approximately four to five percent lower than first quarter 2008. However, at this same time, competitors have reduced their seats by approximately 15 percent in certain markets where they compete with the Company. The Company has announced it will start service to Minneapolis- St. Paul, Minnesota, beginning in March 2009, representing the 65th city and 33rd state to which the Company flies. In addition, the Company has received initial approval to acquire 14 take-off and landing slots at New York's LaGuardia airport from the former ATA Airlines, Inc., which filed for bankruptcy protection in April 2008. Pending final approval by the bankruptcy court and

closing of the transaction, which is currently expected to be in March 2009, the Company could begin flying up to seven daily roundtrips to LaGuardia as early as summer 2009."

Conclusion and Additional Comments

After the losses incurred in the fourth quarter of 2008, Southwest has significantly reduced its hedges. Some believe that the company was lucky to take the right positions in the oil market. Recently, with tighter credit markets, Southwest entered two sale leaseback agreements (Bloomberg 2009) for a total of 16 planes since last December. For some, these actions seem to suggest that the firm is adopting an approach more similar to the rest of the competitors: save liquidity by capping its hedging program.

Although it is clear that liquidity risks are currently a priority for every airline carrier, the company has a slightly different explanation for its current strategy. Recently, Chief Financial Officer Laura Wright (Associated Press 2009) declared that Southwest is not hedging due a general uncertainty in the economy, high future prices and the forecast of more stable oil prices in the near future. The analysis conducted in this paper shows that this view is actually consistent with Southwest's approach.

First of all, we know that the firm does not blindly rely on the short-term forward curve to implement its hedges. In early 2009 the forward curve was once again in contango (Reuters 2009) at premiums that Southwest, as many others, deemed to be above a non-arbitrage price. As previously discussed, this is part of what seems to be a systematic approach in analyzing and understanding the dynamics in the oil market. In other words, I do not see the recent changes in Southwest's hedging program conflicting with previous actions. The Dallas based carrier is taking a view of the oil market they are confident about given current information. They are flexible in revising this decision as they did in the past and see a clear opportunity to continue

directing resources toward their expansion plans in new markets this year (Associated Press 2009) including Minneapolis and New York, and Canada and Mexico through alliances.

Southwest's jet fuels plays are functional to ensure that the firm could pursue investment opportunities when others cannot. This strategic view of risk management is also reflected in the reduction of the planned fleet expansion in order to save $700M in capital expenditure between 2008 and 2009 (Associated Press 2009). The company does not see part of its previously planned investments as positive NPV projects in this market environment and is putting in place the necessary actions to take advantage of future investment opportunities when others will be struggling for cash.

The statistical analysis performed provides an additional data point in proving that hedging ensures that, whatever capital plan is in place, the firm is able to pursue it regardless the price of the most important operational cost item in recent years. This conclusion validates the idea that hedging mitigates investment risks and ultimately generates shareholders value by protecting the investment in positive NPV projects.

Southwest is currently cautiously trying to read the market and waiting in order to gain a clearer picture in the future of the economy and the airline industry. Many feel that the market "hit reset" with respect to jet fuel hedging programs after the oil price shocks in the second half of 2008. This radical change will provide some answers to those that think that Southwest is simply trying to time the market or that the firm was simply lucky. These questions remain to some extent still unanswered.

This paper did not investigate the source or the quality and the analysis that has driven Southwest's hedging decision (ratios, term etc.). Again, it focused mostly on the results achieved by Southwest through the implementation of its hedging plan.

In the current economic environment, with uncertainty on the actual value of investment opportunities, it is interesting to observe what direction Southwest's hedging program will take and whether or not the firm will keep setting a standard in its fuel risk management going forward.

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