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Does hedging make economic sense for American Airlines?

O hedge faz sentido econômico para a American Airlines?

La cobertura tiene sentido económico para American Airlines?

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Abstract

This study evaluates the impact of hedging in company value by analyzing how American Airline consolidated group's market value is impacted by changes in the level of next year's fuel needs hedged and total value of its outstanding agreements from 1989 to 2010. A descriptive and qualitative research methodology was used. Secondary data was collected for a case study.The results indicate that it makes economic sense to hedge fuel costs. However, investors have negatively valued increases in hedge positions.

Keywords: Hedging. Jet fuel costs. American Airlines.

Resumo:

Este estudo avalia o impacto do *hedge* no valor da empresa através da análise de como o valor de mercado do grupo consolidado da American Airlines é afetado por mudanças no nível de necessidade de *hedge* de combustível do próximo ano e valor total de seus contratos em aberto de 1989 a 2010. A pesquisa caracteriza-se como de natureza quantitativa e descritiva; o método de coleta de dados utilizado foi um estudo de caso. Os resultados indicam que faz sentido econômico cobrir os custos de combustível. No entanto, os investidores têm valorizado negativamente o aumento nas posições de *hedge*.

Palavras-chave: *Hedging.* Custos de combustível de aviação. American Airlines.

Resumen

Este estudio evalúa el impacto de la cobertura en el valor de la compañía al analizar cómo el valor de mercado del grupo consolidado American Airlines es impactado por cambios en el nivel de las necesidades cubiertas de combustible del próximo año y el valor total de sus acuerdos pendientes de 1989 a 2010. Fue utilizada una metodología de investigación descriptiva y cualitativa. Fueron recopilados datos secundarios para un estudio de caso. Los resultados indican que cubrir los costos del combustible tiene un sentido económico. Sin embargo, los inversores han evaluado negativamente los aumentos en las posiciones de cobertura.

Palabras clave: Cobertura. Costos de combustible de aviación. American Airlines.

1 Introduction

Does hedging make economic sense for American Airlines (AA)? Hedging strategies are widely used in the airline industry to reduce the costs of unfavorable jet fuel prices. However, hedging is not costless. A company should not adopt hedging strategies to bring all risks to zero; instead, it should find an optimal point where the marginal costs of hedging equals its marginal benefits as everything else in finance.

The reason for the focus on American Airlines (American Airlines (AA) is a subsidiary of AMR Corp. Since AA is not publicly traded, all the data comes from AMR Corp. consolidated financial statements, which also includes the regional affiliate American Eagle.) in this study is twofold. First, its earnings are substantially affected by jet fuel prices. While quarterly aircraft fuel cost have accounted, on average, for 17.1% from 1989 to 2010, the portion of fuel on the company operating cost has already achieved 41% in recent years and was reported to be 29.3% as of the third quarter of 2010. Fuel represents the second most important cost for the company after the cost with wages, salaries, and benefits. Second, oil prices have been more volatile than exchange and interest rates and usually smaller companies might not find useful to hedge (CARTER; ROGERS; SIMKINS, 2002).

Thus, this study seeks to analyze the economic effects of fuel hedging on airline cash flows and market value. It weights costs and benefits of hedging by American Airlines to manage its fuel costs – one of the most relevant costs in the airline industry. This study aims to add to the academic community understanding of hedging impact for airline companies. However, it is important to note that the sample size was limited due to data availability as American Airlines did not start disclosing hedging activities until 1994. Furthermore, a second limitation of the current research is that its results might not repeat themselves in the future as the sample includes data for the 2007-2009 Great Depression.

This paper is based on the Carter, Rogers and Simkins (2002) and Allayannis and Weston (2001) framework to examine the effect of hedging activities on relative market value, represented by Tobin's Q. The hypothesis is that hedging is positively related with relative market value. Carter, Rogers and Simkins (2002) have shown that hedging adds value to companies in the airline industry and American Airlines is an example of company that has systematically hedged fuel risk since the 1990s. The question is "does hedging make economic sense for American Airlines?" If so, its relative market value will increase with hedging.

The approach in this study is similar to the one taken by Carter, Rogers and Simkins (2002) who found that hedging with derivatives provides significant improvements in company value. On the other hand, other strategies such as passing fuel costs to costumers and entering fuel pass-through contracts were not significant. For that reason, the use of financial derivatives, such as fuel swap, collars, and option contracts, is the only strategy considered, although AA also trades and ships fuel and maintains fuel storage to support its operations as part of its hedging strategy.

The paper proceeds as follows. Section 2 contains a literature review. Section 3 describes the research methods. The analysis of AA's economic exposure to price fluctuations is presented in Section 4. Finally, Section 5 concludes this paper with its main findings.

2 Theoretical Review

Knowledge of the impact of hedging on corporations has a great importance for both practitioners and academics alike. According to the International Swaps and Derivatives Association (ISDA, 2009), over 94% of the world's 500 largest companies use derivatives to help manage their business and financial risks, including American Airlines (AMR). Meanwhile, many recent studies have analyzed the effects of hedging on financial results. Though several studies have focused on airlines, the implications of hedging are relevant to a wide range of companies.

The airline industry provides a unique opportunity to observe the value of hedging as jet fuel is a commodity that represents a major cost for all companies in the sector and it is hard to pass fuel increases to costumers due to competitive pressures. Treanor et al. (2014) examined evidence for both operating and financial hedging in this industry and concluded that both strategies are effective in reducing jet fuel exposure. They suggest that financial hedging might be less costly in the short term than operating hedges, such as flying fewer passengers. Combined, these strategies seem to succeed well as oil prices alone have not influenced airline stock prices globally as one would expect, except when this volatility is combined with unforeseen events such as the 9/11 terrorist attacks (NANDHA; BROOKS; FAFF, 2013).

Many researchers have debated the impact of hedging on company value and found a positive relationship between fuel hedging and company value (FROOT et al., 1993; ALLAYANNIS; WESTON, 2001; CARTER; ROGERS; SIMKINS, 2002; CARTER; ROGERS; SIMKINS, 2006; STURM, 2009). This valuation premium for hedging companies comes from the fact that hedging companies have lower operating costs and an improved financial position. Recent increases in oil price volatility have led to studies on the use of hedging with market-timing considerations – also known as “selective hedging”. These studies (SEBEHELA; MADIMABE, 2009; STURM, 2009) have found that active companies tend to perform better financially than their passive counterparties in special in volatile periods.

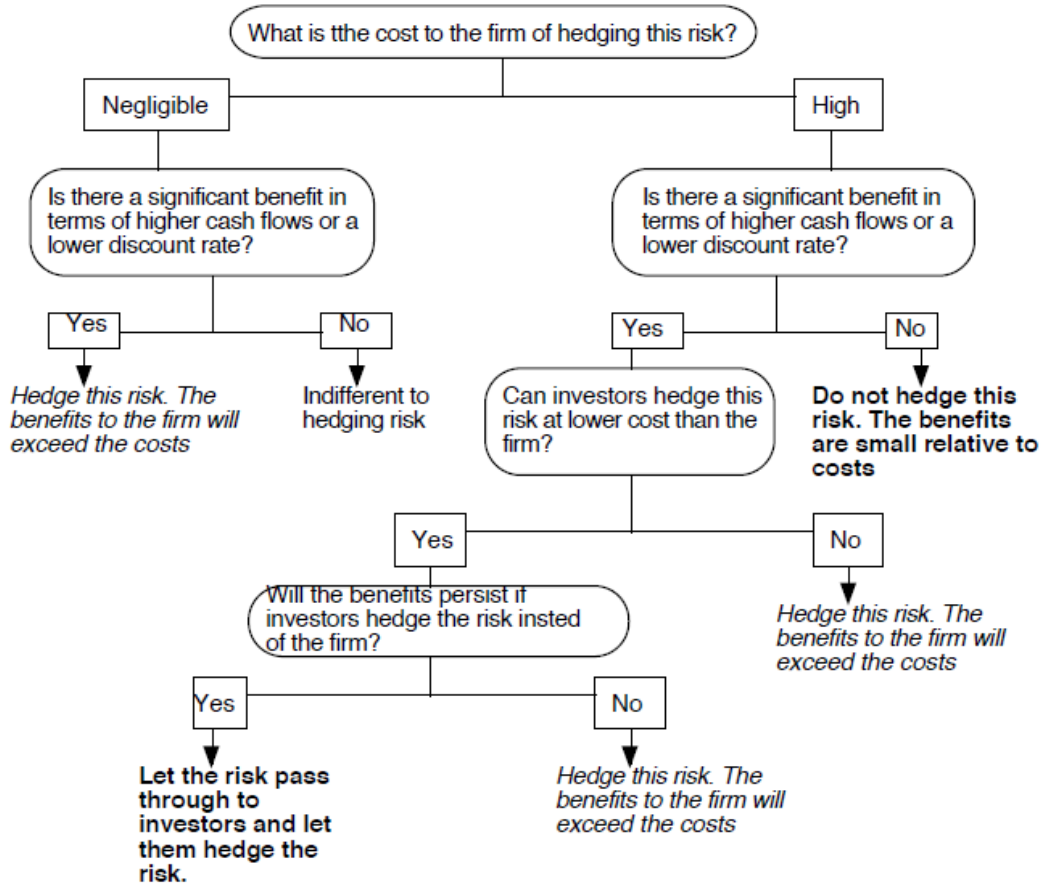
Airlines are naturally short on oil as they benefit from cheaper inputs when prices go down. Their hedging positions are intended to offset their exposure by generating gains when oil prices go up. However, Morrell and Swan (2006) have shown a potential increase in cash flow explosiveness due to hedging. As oil prices increase during periods of economic expansion, company profits increase due to higher sales and effects of hedging. This scenario might lead to a misalignment of incentives between managers and investors resulting in sub-optimal decisions by the company when deciding hedging policies. Previous studies have suggested the existence of agency costs as managers might want to take advantage of hedges to move profits from one period to the other, making results smoother during downturns, with the goal of being perceived as superior managers (TUFANO, 1998; MORRELL; SWAN, 2006). In more extreme cases, executives might speculate excessively and contribute to the creation of market bubbles. Tokic (2012) has illustrated how hedging strategies have failed during the 2007-2008 for Southwest Airlines due to significant increases in prices.

In a perfectly efficient market, hedging should not add value for companies because investors would be able to do it at the same cost. In reality, however, market imperfections such as information asymmetry, taxes, and transaction costs (JIN; JORION, 2006) prevent an

efficient market and create an opportunity for companies to increase their value through hedging. Thus, an airline company is in a better position to hedge its business risks as it is unlikely that any investor would be able to understand a company's oil needs as good as the company itself. As a result, one should expect that an airline oil hedging may be rewarded by investors through an increase in its value depending on the balance between costs and benefits of hedging.

According to Damodaran (2010), the decision on whether or not to hedge should take into account potential cash flows increases, discount rates decreases, investors' ability to hedge that risk, and the persistence of hedging benefits, as seen below on Figure 1.

Figure 1- To hedge or not to hedge?



Source: Damodaran (2010).

The main focus in the hedging-related literature has been on the benefits that motivate companies to avoid risks and use options, swaps, futures and forwards to manage business risks. The main reasons to hedge are to avoid the underinvestment problem, avoid financial distress costs, tax benefits, and managerial interests.

The underinvestment problem is presented when opportunities are negatively related to cash flows (FROOT; SCHARFSTEIN; STEIN, 1993; JIN; JORION, 2006). For airlines, this is true because when oil prices go up industry-wide cash flows go down and there is an increase in opportunities to acquire airplanes and other assets from competitors at a discount.

Damodaran (2010) highlights that during industry downturns profitable projects are often rejected by managers due to their risk aversion or lack of access to capital markets. As Carter, Rogers and Simkins (2002) indicate, the airline industry model of investment requires available cash flows to honor installments for years ahead since the purchase of fixed assets and airplanes in this industry is usually done in several installments. Fuel hedging then would assista company to reduce the number of positive net present value being rejected and allow it to invest during high oil price periods.

Reducing the expected cost of distress is the most cited reason to hedge in the literature along with avoiding the underinvestment problem. Jin and Jorion (2006) found the most relevant distress costs to be higher borrowing costs, the need to sell assets at a discount to raise money, and potential bankruptcy. The combination of these factors goes against the principle that managers should maximize the company value, as companies in distress tend to have a lower valuation price. Damodaran (2010) indicates that hedging companies tend to borrow more and cheaper and Carter, Rogers and Simkins (2002) describe that financial distress also impacts normal operations as suppliers might offer stricter terms and consumers might become reluctant to buy from troubled companies.

The tax benefits is another important reason to hedge according to the financial literature (CARTER; ROGERS; SIMKINS, 2002; JIN; JORION, 2006; DAMODARAN, 2010). A company with smoother profits might enjoy lower tax brackets than a company with earnings spikes. Accordingly, there is a tax incentive for companies to keep lower and steady earnings as high profits lead to higher taxes. A second tax benefit of hedging arises if insurance and other hedging costs are tax deductible. However, this effect is often less significant than the hedging profit-smoothing potential.

Managerial interest play a special role on a company decision to hedge as it can reduce external noises to its earnings. Financial managers want to keep their job protected and it makes them risk averse. According to Petersen and Thiagarajan (1997) and Damodaran (2010), compensation systems tied to earnings often provide incentives to reduce earnings fluctuations and management often wants to avoid the external scrutiny that comes with financial distress. Therefore, they often seek to hedge risks to keep their benefits away from shareholders, auditors, the public, and all other stakeholders.

On top of explicit costs such as setup and transaction expenses, a company has additional reasons to consider either a partial or no hedge strategy. First, there are opportunity costssuch as the one when a company taking a long position in an oil fuel future contract also has to give up savings if prices move below the settlement price. Second, a company's expected return tends to decrease as higher hedging levels lead to decreasing business and financial risk. The risk-return dilemma is a central topic in the finance field, as lower expected return will lead to lower company valuations. Finally, Jin and Jorion (2006) suggest that there is no need for American Airlines to diversify its operations into different sectors as a way to hedge its over-exposition to the transportation sector. Shareholders able to do the same at a small cost and would not reward American Airlines to do so.

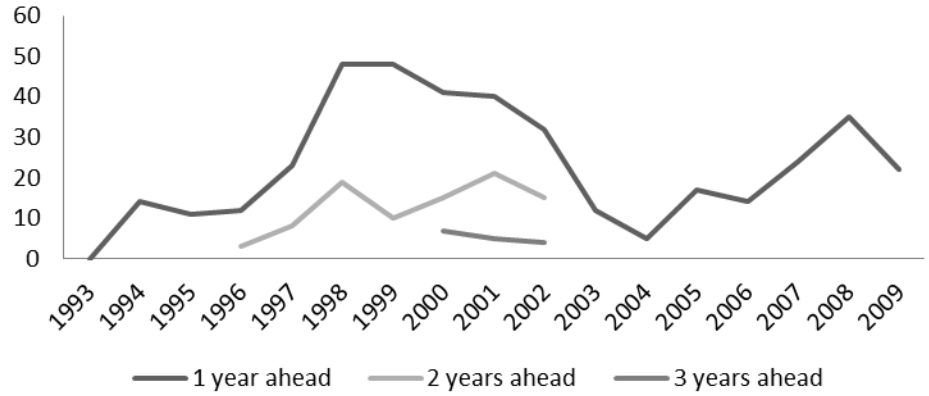
In sum, previous studies support that investors should value a company higher if its hedging strategy yields benefits that offset both implicit and explicit costs. In addition to the four main hedging benefits previously mentioned, there is also a potential informational advantage as an airline company can also use hedging to show investors that its strength lies not on forecasting oil fuel prices, but on its operating expertise in choosing the best commercial routes and marketing its services (CARTER; ROGERS; SIMKINS, 2002).

3 Methodology

The research was quantitative, descriptive, through a case study based on secondary sources. American Airlines' quarterly financial reports were collected from Reuters Knowledge Database from 1989:2 to 2010:3. The quarterly average for jet fuel, which underlies AA's hedging operations, was calculated from daily spot price for Kerosene-Type Jet Fuel data from the US Energy Information Administration. Finally, AMR Corp. share prices were collected from Yahoo! Finance.

There were no disclosures about hedging activities as of 1993. In the following year, the company started disclosing the use of fuel swap contracts with "immaterial" fair value or insignificant values that the company would receive or pay to terminate its agreements. In 1997, it started using collars and options. Since 2001, American Airlines started disclosing the gains of its hedging positions, net of expenses. In the first quarter of 2003, it revised its whole strategy and terminated substantially all of its contracts with maturities beyond 2004 – as seen in Graph 1.By the fourth quarter of that year, it began entering into new hedging contracts. However, a deteriorated credit rating has limited its ability to enter into certain types of fuel hedge contracts. It stopped using swaps in 2003. American Airlines has recently managed its price risk of fuel costs primarily by using jet fuel and heating oil hedging contracts. Crude oil contracts are not part of the strategy anymore. In the same fashion, it has only hedged fuel needs one year ahead.

Graph 1 -Next year's fuel needs hedged



Sources: SEC (2010).

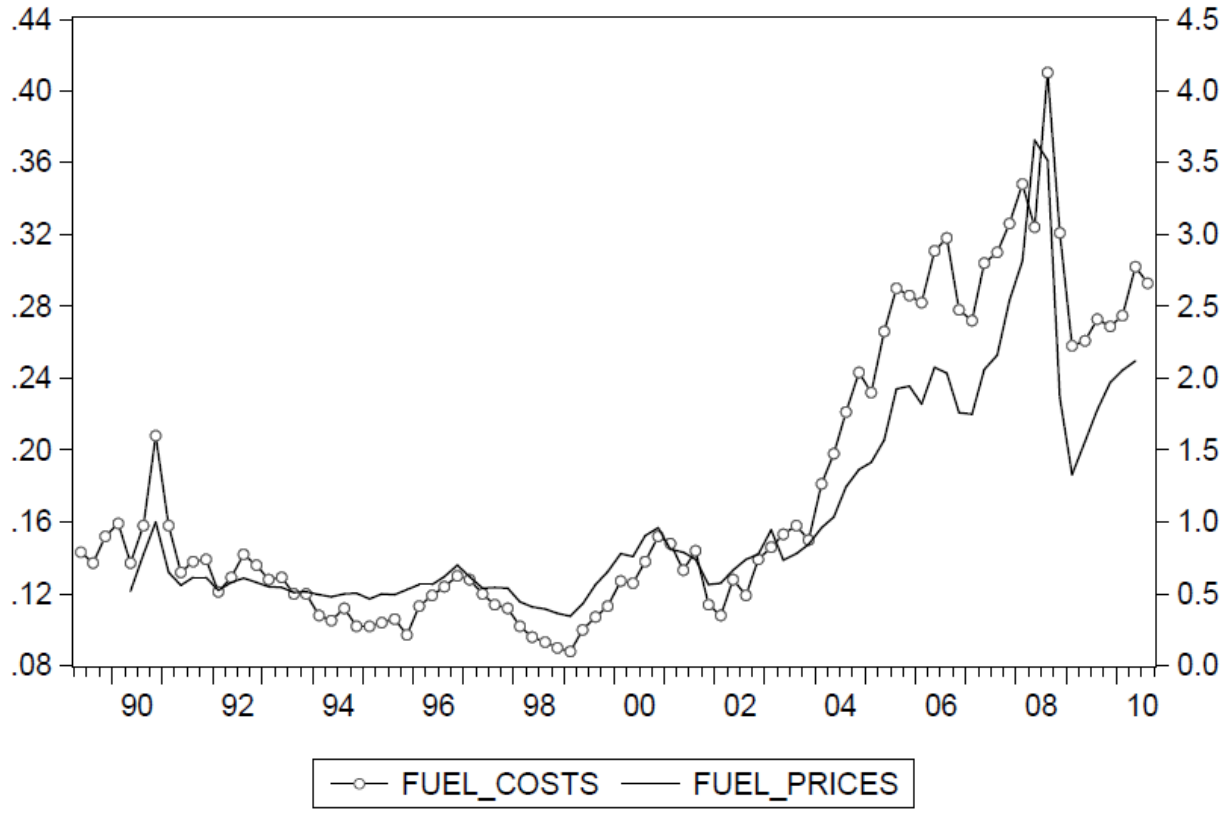
Accordingly, the annually reported market risk, since 1997, has significantly increased over the years. That is an estimation of a hypothetical 10 percent increase in cost per gallon of fuel impact in next year's aircraft fuel expense. The main reasons appointed were rising fuel prices and decreasing hedges. The estimated market risk soared almost 800 percent between 1998 and 2007, going from 73 to 649 million. In fact, the percentage of next year's fuel needs hedged have recently decreased.

Fuel price volatility and fuel costs proportion in operating costs provide extra reasons for American Airlines to hedge fuel risk. First, oil and fuel price have been more volatile than

other market risks, such as foreign exchange and interest rates, assert Carter, Rogers, and Simkins (2002).

Second, aircraft fuel costs accounts for a high portion of American Airlines operating costs and impacts significantly on its results. The graph below shows in the right axis that quarterly fuel costs ranged from 8.8% to 41.0% of AA's operating costs from 1989 to 2010. As the spot price for Kerosene-Type Jet Fuel increased (left axis) in the late 2000s, American Airlines' aircraft fuel costs has drastically increased.

Graph 2 - Fuel costs and prices



Sources: Reuters (2010) and EIA (2010).

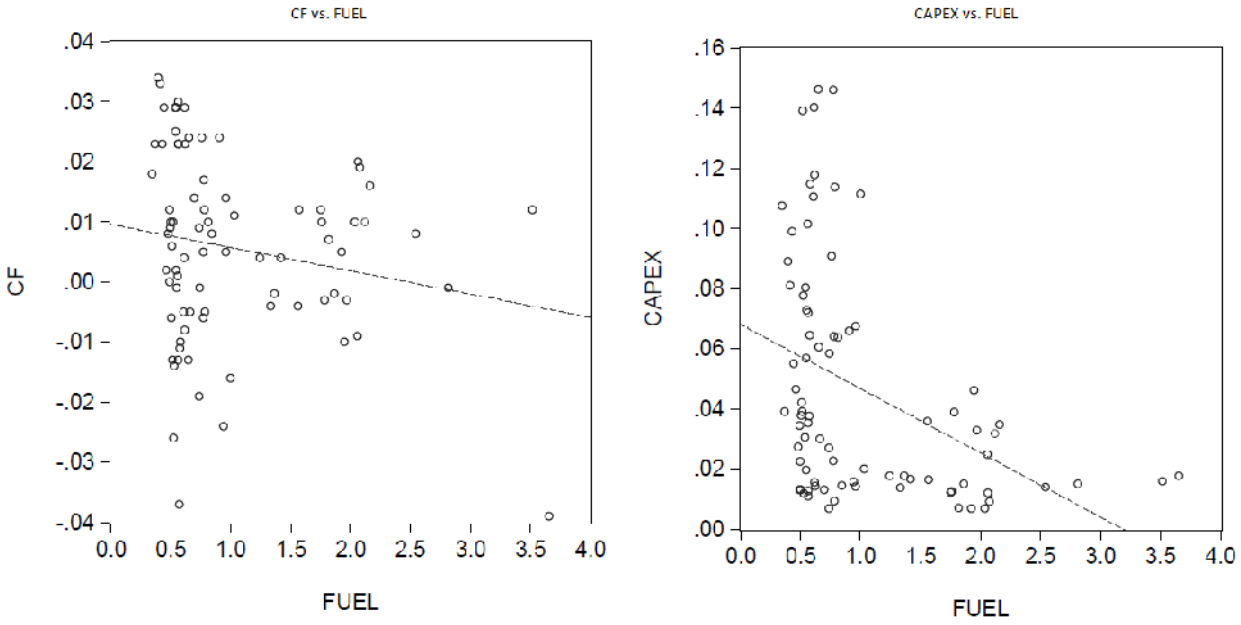
Surprisingly, when plotted together the proportion of jet fuel in operating costs have recently increased more than spot fuel prices. It is not clear, however, whether the company has become more efficient in managing other operating costs or less efficient in managing fuel costs.

Based on the Froot, Scharfstein and Stein (1993) framework, Carter, Rogers and Simkins (2002) show that a) airline cash flows are negatively related with fuel costs; and b) opportunities are negatively related to airline industry cash flows. The authors use the fact that airlines do not offset higher fuel costs by reducing capital expenditures to conclude that non-hedging airlines companies might face underinvestment problems.

In the case of American Airlines, a negative relation between fuel prices and cash flows is seen by regressing AA net income plus depreciation (CF) against jet fuel prices (Fuel). It shows that high jet fuel costs coincide with lower cash generation. Conversely, the

relationship between investment in fixed assets (Capex) and jet fuel prices are not consistent with the results for the industry seen in Carter, Rogers, and Simkins (2002).

Graph 3 - Cash flows and Capital expenditures



Sources: Reuters (2010) and EIA (2010).

Assuming the existence of underinvestment problem in the industry described by the authors, additional cash from hedging in bad times would help buying distressed companies, protecting against the need of selling assets at discount prices, and keeping the company's ability to meet long term obligations. Although Carter, Rogers, and Simkins (2002) show that industry investments are negatively related to fuel costs, that is not the case for American Airlines. There is a negative relation when regressing capital expenditures (Capex) against Fuel spot prices as seen in Graph 3.

4 Does Hedging Make Economic Sense?

The classic assumptions were tested for all the regression models. The models were corrected for serial correlation when necessary and all the models are presented with White Heteroskedasticity-Consistent Standard Errors & Covariance. The models include quarterly data unless specified in contrary.

4.1 Price sensitiveness

Before deciding whether or not to hedge a certain risk, it is essential to determine how much exposure a company has. Petersen and Thiagarajan (1997) suggest using regression coefficients as a measure of risk sensitiveness. Based on this framework, a first issue that can

be addressed is “does fuel price impact stock prices?” In short, the answer is yes, the higher the jet fuel prices, the lower the stock value.

The following time-series regression was performed:

$$AMR_t = \alpha + \beta_{SP500t} + \beta_{FUELt} + \rho\varepsilon_{t-1} + \rho\varepsilon_{t-5} + \varepsilon_t \quad (1)$$

$$\varepsilon_t = v_t + \theta v_{t-1} \quad (2)$$

Where: $AMR_t$is the monthly return on the stock from 1990:6 to 2010:10, $SP500_t$ is the monthly market return for the same period, and $FUEL_t$ is the monthly change in jet fuel spot prices. Market return is included in the model to keep this variable constant in the fuel analysis. The complete ARMA model regression is show in formula (3)

$$AMR_t = 0{,}007938 + 0{,}115690_{SP500t} + -0{,}273692_{FUELt} + 0{,}301183\varepsilon_{t-1} + 0{,}213891\varepsilon_{t-5} + 0{,}0052v_{t-1} \quad (3)$$

There is sufficient evidence to conclude that higher jet fuel prices are associated with lower stock returns at the 5 percent significance level (only variable “FUEL” was significant – p value = 0,0219). As a result, a one standard deviation change in jet fuel prices of 9.39 percent would lead to a 2.57 percent decrease in stock returns in a single month.

A second issue to bead dressed is “does fuel price impact cash flows?” Surprisingly, the answer is no and it seems to be a sign that the strategy has performed well for American Airlines. The following time-series regression was run:

$$CF_t = \alpha + \beta_{FUELt} + \varepsilon_t \quad (4)$$

Where: CF_t is the quarterly change in net income plus depreciation (cash flows) and β_{FUELt} is the quarterly change in jet fuel spot prices. None variable was significant at the 5 percent level.

The result is that there is not enough information to conclude that the impact of fuel prices in the company cash flows is significantly different from zero. Thus, it seems that American Airlines’ hedging strategy has been successful in neutralizing the effects of quarterly fluctuations in fuel prices.

4.2 The value added

According to the results so far, the importance of fuel for American Airlines operating results has increased, stock returns have a high exposition to this commodity price fluctuations, and the company has been successful in minimizing the impacts on its cash flows. Finally, the question is “does hedging make economic sense for American Airlines?” That is, do investors perceive the benefits exceeding costs of American Airlines hedging strategy?

In order to test this question, the following model was run:

$$Q_t = \alpha + \beta_{ONE\_Yt} + \beta_{FAIR\_VALUEt} + \varepsilon_t \quad (5)$$

Where: $Q_i$is the annual American Airline Tobin's Q, β_{ONE_Yt} is the percent level of next year's fuel needs hedged, and β_{FAIR_VALUEt} is the value that AA would receive (pay) to terminate its outstanding agreements.

The measure of Tobin's Q is an approximation for firm value and is based on Chung and Pruitt (1994) and Damodaran (2010) models, so that it is given by enterprise value divided by book value. In other terms:

$$\frac{(Market\ value\ of\ equity + Book\ value\ of\ debt + Minority\ interest - Cash)}{Bookvalue} \quad (6)$$

Where Market value of equity is average quarterly stock price multiplied by the average number of shares outstanding, Book value of debt is used for the reason that market value is often unavailable and it is a common practice to use the book value as a proxy, Minority interest is added back since debt and cash values come from consolidated financial statements, Cash is netted because it is a non-operating asset that can help acquiring a company, Book value is American Airlines total book value of assets.

Both the percent level of next year's fuel needs hedged and the value that AA would receive (pay) to terminate its outstanding agreements show the changes in the company hedging strategy overtime. In the current model, they show the relationship of these changes to American Airlines market value relative to its book value.

The model is show in formula 7, with all the variables significant at 5 percent level (p-values constant = 0,00, *ONE_Yt*= 0,00 e FAIR_VALUEt = 0,014)

$$Q_t = 1{,}054597 + -0{,}003948_{ONE\_Yt} + -0{,}000228_{FAIR\_VALUEt} \quad (7)$$

The model 7 shows that changes in hedging strategy do impact in the company value. Surprisingly, investors have valued increases in the hedges positions negatively. American Airlines value has increased as the level of next year's fuel needs hedged and the value of the outstanding agreements decrease. In other words, investors seem to believe that the costs of hedging fuel price are exceeding the benefits.

5 Conclusions

This paper sought to answer whether American Airlines hedging make economic sense. There is empirical evidence in the literature supporting that managing fuel price risk adds value to airline companies, oil prices have been highly volatile, and represent an important cost for airlines – up 40% of American Airlines' operating expenses. There are also relevant implicit and explicit costs when determining an airline's hedging policy.

Our results contradict previous researches that have shown a market premium for hedging companies in the airline industry including Froot et al. (1993), Allayannis and Weston (2001) and Carter, Rogers and Simkins, (2002). The company has hedged for most of the time on which financial reports are available through both the SEC and Reuters databases. There were no sufficient data for a non-hedging period, except for 1993, that could be compared to its current practice of using financial derivatives to hedge. It is important to highlight that our period of analysis precedes AMR Corp's filing for Chapter 11 bankruptcy in November 2011. This was the last of the leading US airlines to file for bankruptcy on what

seems to be an attempt to reorganize its cost and debt structure to the rest of the industry. This might explain the reason why our results have differed from previous industry-wide studies.

Our results sustain the hypothesis that it makes economic sense for American Airlines to have some hedge for fuel price risk. Although fuel prices are still negatively correlated with our measure of cash flow (net income plus depreciation), the impact of higher fuel prices for the period analyzed is statistically insignificant. On the other hand, this paper's findings suggest that the company has not been able to optimize the level of its hedging strategy. American Airlines' strategy has considerably changed overtime, with a drastic reduction in the size of its hedges in 2003 due to credit restrictions. Investors have given a premium to the company when it reduces the level of hedges. Nonetheless, it indicates that the recent levels of hedging do not make economic sense given as investors do not see the benefits offsetting its costs.

A plausible explanation for this situation relies on the fact that, although those hedges have been successful in preventing major impacts in cash flows, the company has not used it to increase capital expenditures during fuel crisis. Conversely, its investments have decreased as fuel prices increase. Therefore, investors might have penalized the company for its excess of hedging without efficient use or insignificant benefits in terms of higher cash flows or lower discount rates.

In sum, we conclude that while hedging makes sense for American Airlines, investors have questioned the use of these funds by decreasing AMR Corp's valuation for each increase in hedging levels. We corroborate with the results of Tufano (1998) that indicate the possibility that managers might actually destroy value when over hedging. Managerial interests – such as job protection, better reputation due to stable earnings, and the desire to avoid external scrutiny – along with distorted compensation systems might have played an important role in this situation. Alternatively, the pool of available distressed assets might have not significantly increased during industry downturns given the recent wave of consolidation in the US airline sector. Future studies should also analyze a company's hedging position, cash flows, and investments relatively to its peers.

References

ALLAYANNIS, G.; WESTON, J. P.The Use of Foreign Currency Derivatives and Firm Market Value. **The Review of Financial Studies**, v. 14, n. 1, p. 243-276, 2001.

CARTER, D. A.; ROGERS, D. A.; SIMKINS, B. J. Does Fuel Hedging Make Economic Sense? The Case of the US Airline Industry. Social Science Research Network, 2002. From: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=325402>. Retrieved: 03 dec. 2010.

CARTER, D. A.; ROGERS, D. A.; SIMKINS, B. J. Hedging and Value in the U.S. Airline Industry. **Journal of Applied Corporate Finance**, v. 18, n.4, p. 21-33, 2006.

CHUNG, K. H.; PRUITT, S. W. A Simple Approximation of Tobin's Q. **Financial Management**, v. 23, n. 3,p. 70-74, 1994.

DAMODARAN, A. Equity Risk Premiums (ERP): Determinants, Estimation and

Implications. Social Science Research Network, 2010. From: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1556382>. Retrieved: 03 dec. 2010.

DAMODARAN, A. Financial Ratios and Measures.Retrieved. From: <http://pages.stern.nyu.edu/~adamodar/New_Home_Page/definitions.html.>. Retrived: 13 dec. 2010.

EIA.*Petroleum Navigator. U.S. Energy Information Administration*, from <http://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm>. Retrieved: 01 dec. 2010.

FROOT, K.A.; SCHARFSTEIN, D. S.; STEIN, J. C. Risk Management: Coordinating Corporate Investment and Financing Policies. **The Journal of Finance**, v. 48, n. 5, p.1629-1658, 1993.

ISDA. International Swaps and Derivatives Association. From: <http://www.isda.org/press/press042309der.pdf>. Retrieved: 15 dec. 2010.

JIN, Y.; JORION, P. Firm Value and Hedging: Evidence from U.S. Oil and Gas Producers. **The Journal of Finance**, v. 61, n. 2, p. 893-919, 2006.

MORRELL, P.; SWAN, W. Airline Jet Fuel Hedging: Theory and Practice. **Transport Reviews**, v. 26, n. 6, p. 713-730, 2006.

NANDHA, M.; BROOKS, R.; FAFF, R. Oil, Oil Volatility and Airline Stocks: A Global Analysis. **Accounting and Management Information Systems**, v. 12, n. 2, p. 302-318, 2013.

PETERSEN, M. A.; THIAGARAJAN, S. R. *Risk Measurement and Hedging*. Social Science Research Network, 1997. From: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=39783>. Retrieved: 10 dec. 2010.

REUTERS, T.*Thomson Reuters Knowledge 2.18*. From:<http://www.knowledge.reuters.com/Views/Home/Home.aspx>. Retrieved: 01 dec 2010.