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Fuel hedging and airline operating costs

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A B S T R A C T

Fuel hedging is a common risk management tool used in the airline industry. But past studies have not addressed the question of whether fuel hedging creates any benefit to airline operations. This study is the first work that empirically examines the role of fuel hedging in reducing airlines' operating costs. Using US airlines data from 2000 through 2012, we find that, after accounting for the presence of cost inefficiency, fuel-hedging airlines had about 9–12% lower operating costs, but this effect is statistically insignificant. Irrespective of the hedging status, US airlines could reduce operating costs by an average of 12–14% per year without reducing output.

1. Introduction

Airlines use financial instruments and contracts as part of their risk management strategies to mitigate the impact of rising fuel prices. The primary purpose of fuel hedging is to reduce a company's exposure to unexpected changes in the price of fuel. Thus, it is essential to understand the implications of fuel hedging on airlines for the following reasons. First, the industry is highly energy intensive and jet fuel is a major component of airlines' operating costs. Second, because of the competitive market structure, airlines are unable to pass on the high fuel costs to passengers by charging higher airfares. Third, persistently thin or negative profits among airlines may be driven by managerial issues apart from high fuel expenses and market competition.

As part of a corporate risk management strategy, hedging generates both benefits and risks to firms (Smith and Stulz, 1985; Froot et al., 1993; Stulz, 1996, 2004). Past studies have examined hedging behavior of U.S. airlines, but the impact of fuel hedging on airlines is empirically an unsettled issue. Carter et al. (2006) and Sturm (2009) found that hedging is positively correlated with the airlines' firm value, and Rampini et al. (2014) found a strong positive correlation between hedging and operating income scaled by lagged assets. An earlier study by Rao (1999) suggested that the quarterly pre-tax income of an average U.S. airline company in the late 1980s and 1990s would be less unpredictable with hedging.[1]

On the other hand, Morrell and Swan (2006) expressed their reservation about fuel hedging in the airline industry. They questioned the perceived "benefits" of fuel hedging, noting that there is no clear benefit of fuel hedging other than to signal managerial competency. Based on their empirical findings from a study on US oil and gas producers, Jin and Jorion (2004) concluded that hedging does not necessarily influence the market value of a company. At any rate, the association between firm value and derivatives should be "treated with caution" (Stulz, 2004, p. 182).

In fact, airlines' profits have been consistently anemic in the past years. Fig. 1 shows that the industry's nominal average operating profits hovered around $0 per available seat mile (ASM). However, if fuel was excluded from being a cost driver, nominal operating profits per ASM, if not rising, would have been positive. This pattern is mirrored in nominal operating costs. Average nominal operating costs per ASM peaked in 2005 and 2008. Excluding fuel, nominal operating costs per ASM have been rather stagnant.

If there is any reason to enter into fuel hedging contracts, airlines hedge to mitigate rising fuel prices and to protect themselves against unexpected fuel price changes. The effects of jet fuel availability and increased fuel costs have been persistently salient to airlines operations, leading Delta Airlines to vertically integrate into the oil refining business by acquiring an oil refinery in Pennsylvania in 2012 (Delta Airlines, 2013). This is a bold and unprecedented move whose outcomes are yet to be examined.

Jet fuel accounts for a sizeable portion of airline operating cost, and a sudden disruption to oil supply or a wild swing of oil prices could affect airline operations. While fuel hedging is a common practice in the industry, we feel that past studies have not addressed the broader question of whether fuel hedging leads to any practical and operational benefits for airlines when it comes to

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[1] The use of an 'average' firm in Rao (1999) masked firm's heterogeneity in the analysis. See Morrell and Swan (2006) for additional discussion.

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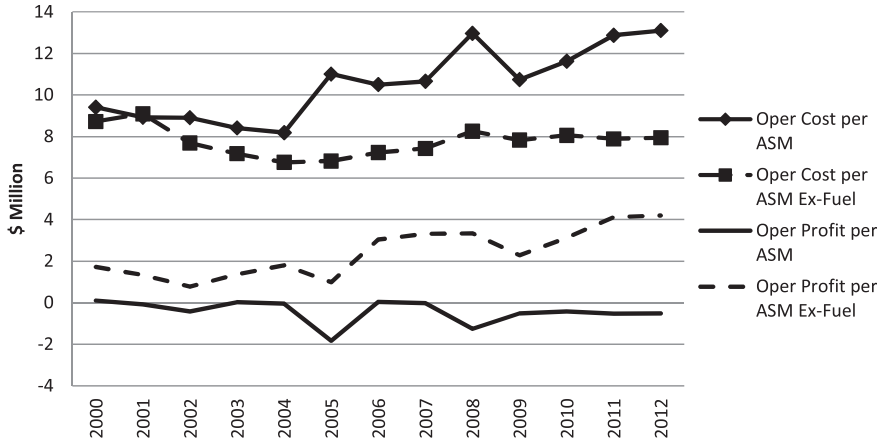

Fig. 1. Per ASM operating cost and profit, 2000–2012 (source: Bloomberg).

"cost". The purpose of this paper is to examine the relationship between airlines' hedging strategy and their operating costs in the US airline industry. The study employs the cost frontier approach using panel data for the period of 2000–2012. Specifically, we study the implication of hedging on operating costs to determine if fuel hedging helps reducing costs. To the best of our knowledge, this study is the first work that empirically examines the role of hedging in reducing airlines' operating costs.

The rest of this paper is organized as follows. Section 2 presents US airlines' hedging behavior. In Section 3, we explain our model, and Section 4 describes the variables and data. In Section 5, the main empirical findings are discussed. Finally, Section 6 provides concluding remarks.

2. Fuel price, fuel hedging and airline costs

Since the Airline Deregulation Act of 1978, the US airline industry has experienced revolutionary changes. Although deregulation contributed to better performance of airlines by increasing productivity, a series of mergers, acquisitions and bankruptcies have occurred due mainly to increasing market competition and operating costs. The threat of market entry and the growth of low cost carriers have initiated price wars on many routes. As a result, levels of market concentration and real airfares have fallen in the US airline industry (Evans and Kessides, 1993). Given the intense market competition, besides seeking to increase resource utilization, airlines use customer loyalty programs and develop price discrimination strategies to increase revenues and profits. However, volatile and increasing fuel costs have been a major obstacle to achieving this goal.

Airlines, like other nonfinancial firms, use derivatives as a risk mitigation tool. The main benefit of derivatives is that they enable firms to pursue riskier and more profitable projects while shifting risks to those who can better handle the risks. Additionally, derivatives markets generate useful information that is otherwise unavailable, and the markets produce price information that is otherwise too prohibitively costly to trade on. In other words, derivatives make the underlying markets more efficient (Stulz, 2004).

Fuel hedging offers a means for airlines to mitigate commodity price risks. The extent of hedging tends to depend upon the firms' views of future price movement, and the main focus of hedging is on near-term transactions (Stulz, 1996). Airlines' fuel contracts are typically short-term, no longer than one year (Morrell and Swan 2006). If the company expects jet fuel price (and therefore operating cost) to rise, part of the cost may be shifted toward the airfare. However since the U.S. airline industry can be very competitive in certain locations, raising airfares may not be possible. Moreover, since air tickets are purchased at varying times in advance of the actual fuel cost increases, the time lag of airfares and input prices effectively reduces the firms' ability to shift the cost increase entirely to passengers when the air travel service is delivered and jet fuel is consumed. Passing fuel costs to passengers is even more difficult when fuel prices peak quickly (Delta Airlines, 2013). The industry may be able to pass increased fuel costs to its cargo business, but if passenger airlines could do this so easily, then there would not be any clear incentive to hedge (Morrell and Swan, 2006).

Southwest Airlines (Southwest) is considered to be a relatively "successful" hedger in the airline industry. However, despite its impressive net gains of $1.3 billion from fuel derivative contracts' settlements in 2008 (while other airlines experienced losses), owing to higher and volatile fuel costs, Southwest paid out $245 million to counterparties in 2009 (Southwest Airlines, 2010). In 2011, the company also experienced nearly a 30 percent decline in both its net income and operating income, primarily due to higher fuel costs (Southwest Airlines, 2012, p. 46). Among the less successful hedgers in the industry, Delta, in 2009, incurred $1.4 billion fuel hedge losses from contracts purchased in 2008, when fuel prices unexpectedly dropped after a record high (Delta Airlines, 2010, p. 32). But in 2011, the Delta fuel cost rose considerably due to "*unhedged fuel prices, partially offset by an improvement in net fuel hedge results*" (Delta Airlines, 2012, p. 32). US Airways, another unsuccessful hedger, has ceased to enter into fuel hedging contracts since late 2008. Between 2007 and 2009, US Airways recorded a total net loss of $608 million in fuel hedging (US Airways, 2010).

Hedging might not be at all times necessary. Allegiant Airlines, whose revenues are heavily dependent on leisure travelers, does not participate in fuel hedging. Given that leisure travelers tend to purchase air tickets well in advance, and the average age of its fleet is 23 years (as of 2012), Allegiant is more susceptible to a sudden fuel price hike, but the company's operating profit per available seat mile (ASM) rose from $0.50 in 2004 to $1.77 in 2012, compared to Southwest's $0.40 in 2004 and −$0.29 in 2012. Within a wider context for the same years, the industry's average operating profit per ASM was −$0.04 and −$0.51, respectively.

In summary, by not hedging, airlines expose themselves to the risk of fuel spot price increases, and by hedging, airlines face the prospect of falling fuel prices in the near term and incurring financial losses in fuel hedging contracts. Earning stability is paramount to firms and investors. Since jet fuel is scarcely traded in organized exchange markets, it is common for airlines to enter into forward contracts, hedge other petroleum products in futures markets, or use other financial derivatives like options, collars and swaps, or a combination of some of these instruments (Morrell and