



Impact of fuel price fluctuations on airline stock returns



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HIGHLIGHTS

- Is the first study to analyze 56 stock prices IATA and the fuel price influence.
- There is a puzzle about the effects of the oil to the airline stock price.
- The results show a strong positive influence of fuel price on a daily basis.
- The results support the market inertia and the oil as signal of economic growth.

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ABSTRACT

This paper analyzes the impact of changes in fuel price on the equity returns of airlines associated with International Air Transport Association (IATA), as listed on the stock market. While it is simple to comprehend that airline price stock returns are related to fuel price variations, it is not as simple to establish whether this relationship is direct or indirect. It could be assumed to be indirect given the high influence of fuel price on airline costs. However, when taking into account the market inertia theory and the paradigm that increases in oil price are indicators of economic growth, these relations could also be assumed to be direct.

In order to solve this puzzle, 56 airlines were studied, relating their price returns to the price variations of West Texas Intermediate crude oil and Jet Fuel by using GARCH models. The main results show a strong positive influence of fuel price fluctuation on a daily basis. These results support the market inertia theory, confirming the paradigm that increases in oil price are signals of improving economic growth.

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1. Introduction

The world has witnessed exceptional stages of economic growth and contraction over the last 10 years. Periods of extraordinary economic increase, followed by deep crisis, have set the tone. These cycles of high volatility affect each market in a different manner, especially the fuel market and the financial market. Fuels have reached peaks in production and prices without precedent, which have varied repercussions in different markets and industries. The financial market has undergone many attacks as a result of world events, and at the same time, has been a key player in this maelstrom. Technological evolution also aids the speed and volume of transactions, favoring speculation and capital investment across industries. For these reasons, the oil market as well as oil price and stock have captured the attention of academia, policy makers, and investors, Zhang and Zhang [1] and Zhang [2]. In fact,

a rise in oil prices can lead to a depression in some economies, which may result in an economic recession. Given the importance of oil for sustainable economic development and financial markets, various studies have analyzed the oil market, Chang [3] and Sévi [4].

Being able to make clear and understand new relationships and effects of oil on economic aspects is relevant to making better decisions. Multiple studies analyze the impact of fuel prices on various markets and industries, as well as on economies at the global level and by country, for example, Aggarwal et al. [5], Jin and Jorion [6], Mohanty and Nandha [7], Basher et al. [8], and Apergis and Miller [9]. Its effects on the economies of various exporting and importing countries (Berument et al. [10], He et al. [11], Behmiri and Manso [12]), on economic activity (Lardic and Mignon [13]), as well as on financial markets (Sadorsky [14], Filis et al. [15], Basher and Sadorsky [16], Huang et al. [17]) make it one of the most relevant markets due to its influences and effects on different areas. Furthermore, some studies have appeared concerning the impact of the oil market on private sectors of the economy (Nandha and Faff [18], Elyasiani et al. [19], Nandha and Brooks [20], Aggarwal et al.

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[5], Mohanty et al. [21], Arouri and Nguyen [22]). An interesting point made by Narayan and Sharma [23] is that the transportation industry is positively affected by oil price, but it is unclear if this finding is applicable to all of the sectors of transportation, ground transport, sea transport, and air transport. This is the space in which this article comes to fill the gap in knowledge on the impact of the oil market on one of the key sectors in human transportation, the airline industry. In this sense, being able to model and predict the impacts that it will have on airline value as well as changes in oil and oil shocks is the fundamental objective and value of this study.

The airline industry has been in a state of constant change since the Twin Towers attack in 2001. This has caused bankruptcies, mergers, and acquisitions within the industry in search of improving operational and financial efficiency in order to be able to continue developing businesses. In fact, from 2001 to 2016 in the United States, the number of major airlines passed from 10 (American, TWA, American West, U.S. Airways, Delta, Northwest, United, Continental, Southwest, AirTrain) to 4 (American, Delta, United-Continental and Southwest). Some mergers and acquisitions are AirFrance KLM, LATAM (Lan – Tam), and British Airways-Iberia. Other characteristics of the industry are that there are three large alliances among airlines: One World, Star Alliance, and Sky Team.

There is a logical effect of oil price on airline stock, meaning that if oil price increases, then an airline's stock price should decrease. This analysis is based on the percentage that oil price represents within airline costs. Jet fuel accounts for a large portion of passenger airlines' operating costs [24], composing 35% of costs for Southwest Airlines according to Form 10-K (2013–2014), for example. Therefore, the price and the price volatility of jet fuel or oil is constantly affecting this cost structure and also notably affects financial results. This especially occurs when sudden variations exist, although forward contracts, insurance, etc. also exist, which seek to ensure a good buying price. However, some studies show that for some stock markets and industries, the effect is actually positive. Arouri and Nguyen [22] studied the main European stock markets and found evidence of the positive effect of oil price in some industries, supporting these results with a hypothesis based on the fact that increases in oil price are signals of economic growth. Narayan and Sharma [23] analyze the effect of oil price on the stock market, grouping the stocks by industries. They find a negative effect for 12 industries, but a positive effect for two industries: energy and transportation. Thus, it is logical to assume that for the airline industry, which is highly similar to the transportation industry, the effect would be positive. For this reason, there is a dilemma about the relationship between the oil market and airline stock prices, since there are already grounds for this relationship to be positive or negative.

With this objective, we studied the impact of fuel price variation on stock return in airlines associated with the International Air Transport Association (IATA), all publically traded on the stock market. Four different models were applied. The period analyzed is between January 2008 and October 2013 for 56 airlines, characterizing fuel with WTI crude oil barrels and Jet Fuel (JT) for airplanes. This is the first paper to examine the impact of oil on the airline industry. Furthermore, it is also the first to conduct a worldwide analysis of this industry by collecting prices from different stock markets, showing a robustness in the results across stock prices.

The first result obtained shows that the effect of fuel is positive on airline stock prices in the daily frequency analysis. A second result obtained is that by lagging oil price variation, this continues to have a positive effect on airline stock. The third result found is that the oil effect decreases over time, having a higher effect in daily analyses and a lower effect in monthly analyses. Another result is that there are not many cases of asymmetry or extreme shock regarding the effect of oil on airline stock prices.

The results and a greater knowledge of airline stock behavior and its relationship with oil are of interest to investors, fund administrators, economic policy makers, and government administrators. From the point of view of airline administrators, it would be interesting to possess the results of this behavior in order to explain stock return and to be able to separate the contribution of management from the value of the business.

This article is composed of five sections, beginning with this introduction. In the second section, a literature review is carried out on previous works studying the relationship between fuel and stock prices. The applied methodology and variable description are detailed in section three. In the fourth section, the results obtained are analyzed, and finally, conclusions are presented in the last section.

2. Literature review

Various studies have determined how fuel prices and their changes and shocks (sometimes sudden and violent) affect economies, both globally and in certain countries. Hamilton [25] discovered that increases in oil prices were at least partially responsible for all recessions in the U.S. post-World War II, except for the recession of 1960. Later, attention was centered on the role of the asymmetric effects that oil price shocks have on the economy [26,27].

The effect on the stock markets was analyzed by Campbell [28], finding that the reaction of stock prices in the U.S. and Canada to shocks in oil price can be explained by the impact of these perturbations on real cash flows. Nevertheless, results in the cases of Japan and the United Kingdom are not as strong. Subsequently, Jones and Kaul [29] verified that the reaction of the international stock market to oil price shocks can be justified by current and future changes in real cash flows and/or by changes in expected returns. Huang et al. [30] found that returns of oil futures lead over U.S. stock yields of certain individual oil companies, but do not have a relevant impact on market indexes, such as the S&P 500. Meanwhile, Sadorsky [14] concluded that oil prices and their volatility play an important role in the yield of US stocks, showing that changes in oil prices impact economic activity; however, changes in economic activity have little impact on oil prices. Kilian and Park [31] showed that the reaction of real stock returns in the U.S. to oil price shocks varies ostensibly depending on if the oil price change is induced by demand or supply. According to this study, supply and demand shocks that affect the global oil market represent 22% of the long-term variation in U.S. real stock returns.

Strong evidence that oil price volatility affects stock returns in emerging markets was found by Basher and Sadorsky [16] and Basher et al. [8], establishing that positive price shocks in oil prices tend to decrease emerging stock market prices and types of exchange in USD in the short term. Furthermore, it was also found that a positive oil production shock reduces oil price, while a positive shock in real economic activity increases the price of oil. Ji and Fan [32] identified that the crude oil market has significant volatility spillover effects on non-energy commodity markets. Narayan and Narayan [33] found that stock prices, oil prices, and nominal exchange rates are cointegrated in the Vietnam stock market and that oil prices have a positive effect on stock prices. Ghosh [34] revealed that an increase in the oil price return leads to the depreciation of Indian currency vis-à-vis US dollar. Apergis and Miller [9] investigated how explicit structural shocks characterized the endogenous character of oil price changes, affecting stock market returns in eight countries (Australia, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States), identifying that international stock returns do not respond greatly to oil market perturbations. Finally, Wang et al. [35] grouping the stock

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