Oil price shocks and transportation firm asset prices

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The transportation sector is a major user of oil-based energy. Even as oil prices continue to fluctuate greatly, the impact of oil price changes on transportation firms has heretofore not been adequately examined. This paper fills this gap, documenting important new findings based on analysis of over two decades of daily data on large changes in oil prices (oil price shocks). First, while transportation firm returns are influenced negatively by oil price increases, risks are increased more by oil price declines. Second, firm characteristics are important with the market-to-book ratio being the most important firm characteristic, and ROA, firm size, and the prior run up in prices are also important in influencing oil price related returns, betas, variances, and trading volumes. Third, in the S&P transportation sub-sector, industry concentration is negatively related to returns, oil price risk, and trading volume, and asymmetrically related to returns and market betas. These new findings enhance our understanding of the asset price impact of oil price shocks and should be of much interest to scholars, corporate executives, money managers, regulators, and policy makers.

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1. Introduction

A major user of energy, especially oil-based energy, is the transport sector. However, the past decades have seen unprecedented swings in the price of oil and in the resulting demand for oil especially from the transport sector (Larsson and Nossman, 2011). Oil price rises, often dramatic, have also led to many policy developments and innovations in the use of energy for transport (e.g., rising manufacturer fuel economy standards). Further, oil prices are important for national economies and asset markets as they influence both significantly (He et al., 2010; Jones et al., 2004). The costs of oil-based fuels are especially important for the transport sector, and it seems that oil prices change frequently and dramatically. These oil price shocks are important for the economy and especially for energy usage in the transport sector.

Many studies have documented that the impact of oil price shocks on an economy is significant (e.g., Hamilton, 1983, 2003; Kilian, 2008; Mork, 1994). In addition, changes in the price of crude oil have also long been considered an important factor affecting stock prices. Indeed, a large body of literature examines the impact of oil shocks on stock market returns at both the country and industry levels. For example, Driesprong et al. (2008) and Jones and Kaul (1996) find oil prices impact stock returns negatively. In contrast, Chen et al. (1986) conclude that changes in oil price have no incremental explanatory effect on asset pricing, and similarly, Huang et al. (1996) also find no significant relation between stock returns and changes in the price of oil futures.

In addition, it has been noted that the direction of impact of oil shocks on stock returns at the industry level may vary from one industry to the other depending on a number of factors. For example, it depends on whether an industry is a net producer or net consumer of oil.

2 The business and popular press certainly believe that oil prices influence stock prices. For instance, the Financial Times on August 21, 2006 reported that U.S. stock prices declined due to an increase in crude oil prices caused by geopolitical risk in the Middle East (including the Iranian nuclear program and terrorist attacks by Islamic militants). The same newspaper on October 12, 2006 attributed the strong rally in global equity markets to a slide in crude oil prices. Similarly, the Wall Street Journal on May 2, 2007 reported that “A big drop in crude-oil prices also helped stocks, which generally benefit from signs that consumers’ pocket books won’t be sapped by higher pump prices.” In fact, during the years 2005 and 2006, oil prices figured in the headlines of the Wall Street Journal on 204 days and most of these reports suggest that returns on stock markets are sensitive to oil price changes (the search term used are “oil prices”, “oil price”, “oil prices and stocks”, and “oil price and stocks”).

3 Other studies examine the link between the change in oil prices and stock returns at the country level include Ferson and Harvey (1991) and Hamao (1989). Similarly, industry level studies include Faff and Brailsford (1999), Hammoudeh and Li (2005), Kilian and Park (2009), Nandha and Faff (2008) and Sadorsky (2001).
The rest of this paper is organized as follows. In Section 2, we align our work with the relevant literature. Section 3 presents our data sources, research methodology, and hypotheses development. In Section 4, we present our empirical findings. Section 5 concludes the paper.

2. Economic importance of oil price changes

2.1. Oil price changes and stock returns

The impact of oil price changes on equity prices has long been of interest and, as briefly indicated, early studies examined the impact on national stock prices documenting a general negative impact of rising oil prices on stock markets (e.g., Driesprong et al., 2008; Jones and Kaul, 1996; Lee, Ni, and Ratti 1995; Sadorsky, 1999). Using quarterly data for the U.S. (1947–1991), Canada (1960–1991), Japan (1970–1991), and the U.K. (1962–1991), Jones and Kaul (1996) document a uniformly negative effect of oil prices on stock returns in these countries. Sadorsky (1999) estimates a vector auto-regression model to study the relation between oil price changes and stock returns in the U.S. and finds that both oil price changes have a significant negative impact on stock returns. Using country-level data for 48 different countries (both developed and emerging economies), Driesprong et al. (2008) also find that changes in oil prices can have a significant negative impact on stock market returns worldwide.

While the association between changes in oil prices and overall equity prices seems negative, the impact of oil prices on stock prices at the industry level is likely to differ depending on the type of industry. For example, industries may differ with regard to the impact of oil prices on the inputs and on the outputs of various industries. Industries would also differ in their ability to pass on oil price related price increases either because of competitive reasons or because of regulation (e.g., as in the transportation sector). Industries may differ with regard to the impact of oil prices on the demand for their outputs. Oil prices might also influence financial markets directly via shocks to discount rates (i.e., expected return), and through their influence on monetary and other government policies.

In some countries, industry reaction may also differ depending on the nature and level of subsidy provided to fuel prices. Additionally, the postponement of investments and the reallocation costs induced by oil shocks could also result in reduction in expected future cash flows leading to a negative impact on equity returns of such oil-sensitive firms (e.g., Pindyck, 1991). Finally, industries may differ with regard to the structure of product markets within the industry (i.e., industry concentration) which serves as a measure of barriers to entry. Barriers to entry may affect how firms optimally make operating decisions in response to aggregate demand shocks due to change in oil prices (Hou and Robinson, 2006). Therefore, we hypothesize that the degree of industry concentration is likely to have a significant impact on how stock returns of individual firms react to oil prices. Overall, the impact of oil prices on various industries can be expected to vary considerably.

Indeed, Gogineni (2010) examines the impact of daily oil price changes on the stock returns of a wide array of industries. He finds evidence that impact of daily oil price changes on equity returns varies across industries. Using industry-level data, Kilian and Park (2009) analyze the response of industry-specific stock returns to oil shocks. Their study finds that stock returns of oil and gas, and gold and silver mining industries are significantly positive in response to an increase in oil price, while the stock returns of automobile industry and retail sector are significantly negative in response to oil price shocks.

 Huang et al. (1996) suggests that, if oil plays an important role in an economy, one would expect changes in oil price to be correlated with changes in stock prices.
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