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Stock market efficiency and international shipping-market information

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ABSTRACT

Changes in international shipping freight rates can predict US and international stock market returns. In today's global world where economies are linked, shipping freight rates carry information about economic activity and stock returns. Using US size and sector indices we find that shipping market movements can explain returns and volatility of stock indices. The results are economically significant and cannot be explained by time-varying risk premia thus constituting a challenge to the EMH. Consistent with the gradual information-diffusion hypothesis, investors are slow in responding to the information from changes in shipping freight rates across industries and around the world.

1. Introduction

In this paper, we investigate whether international shipping freight rates are able to predict movements in the US stock market. In today's global world, shipping services are important because economies are linked through international trade, and shipping freight rates carry information about economic activity worldwide. We show that while shipping freight rates predict the stock market, the time-varying risk premia do not explain this predictability. We make two main contributions. First, we explain the predictive power of shipping freight rates in relation to market efficiency. Since our results constitute a challenge to the efficient market hypothesis (EMH), we conduct a number of direct tests and show that predictability is not due to time-varying risk premia but is in line with the gradual information-diffusion hypothesis. Second, we show that predictability is statistically significant and the results hold for sector and worldwide stock indices.

We begin our analysis with the US stock market and find that monthly returns across size and sector indexes can be predicted using international shipping freight market information. In addition, we examine the ability of international shipping freight rates to predict the market in comparison to oil prices, a well know predictor for the stock market, and show that shipping freight rates remain both statistically and economically significant. Moreover, we study the impact of shipping market information on volatility of the US size and sector index returns. Second, our investigation builds on the work of Hong and Stein (1999) in the sense that we show that predictability is not due to time-varying risk premia, but is consistent with

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the gradual diffusion of information from the shipping sector to the investors in other sectors. Third, we extend our analysis to the stock markets outside of the US and show that, similar to the US, shipping freight rates shipping rates predict stock markets in 24 out of 28 countries around the world.

The literature on the predictability of the stock market is vast.[1] There are many competing variables for stock-return predictability. For example, Subrahmanyam (2010) in his review of the literature indicates that there are in excess of fifty such variables to varying degrees. One could argue that, with such a vast array, one more variable (e.g., shipping freight index) might not mean much. However, the role of shipping freight rates as an index of global economic activity has not been fully recognized. The only papers we are aware of are Kilian (2009) and Bakshi et al. (2011). Kilian (2009) and Kilian and Park (2009) develop an index of dry-cargo, single-voyage, and ocean-shipping rates to capture shifts in demand for industrial commodities in global business markets and as such provide a measure for economic activity. They use this index to decompose oil prices into demand- and supply-driven components and investigate the dynamics of aggregate response of stock market to oil price shocks. Our paper is different from Kilian (2009) and Kilian and Park (2009) as we investigate the direct relationship between freight rates and stock-market activity. We use the Baltic Exchange dry bulk freight index (BDI) that is readily available on a daily basis to analysts, traders and investors without any cost and in real time.

Similar to Bakshi et al. (2011), we investigate whether shipping-market information can predict the stock market. However, we extend their analysis in several directions. First we conduct several tests for market efficiency to examine if such predictability is a challenge to the EMH. In particular, we test for time-varying risk premia and show that although shipping market information can predict the stock market it is not related to known risk factors. We then examine whether predicted excess returns can be negative, and if the predictability is short lived or not. The works cited on the predictability in general (Subrahmanyam, 2010) and on shipping rates in particular (Bakshi et al., 2011) is not concerned with its direct implications for market efficiency. Second, we examine US size and sector indexes and investigate the impact of changes in the shipping freight rate across different industries. We find supporting evidence from the size and sector returns that information diffusion is gradual. Finally, we investigate whether shipping freight market movement has any effect on volatility of the US size and sectors indices.

Klovland (2004) and Stopford (2009) argue that world economic activity is the most important single influence on ship demand and that shipping freight rates are demand driven. Hence, an upswing or downturn in global business cycles is immediately reflected in freight rates. Although we show that shipping freight rates are not correlated with standard variables that measure time varying risk premia, we find that changes in shipping freight rates can be used as a predictor of changes in stock-market prices in the sense that stock returns tend to be higher after shipping-rate increases and lower after shipping-rate decreases. This predictability is not only statistically but also economically significant. For instance, an increase in shipping rates of one standard deviation (16.8%) predictably increases S&P500 index returns by 1.1% a month (or 12.7% per year).[2]

The most common macroeconomic factor used to predict stock returns is oil prices, as it is generally believed that the impact of oil-price changes on the world economy is extensive (Hamilton 1983; Huang et al., 1996; Adelman, 1993; Kilian, 2009; Nandha and Faff, 2008, amongst others). Oil has been significant to the international economy for a long time and therefore has been widely used for predicting economic growth. Numerous studies focus on the relation between oil prices and stock markets to investigate whether oil-price risk is priced into the stock markets (Chen et al., 1986; Ferson and Campbell, 1993; Jones and Kaul, 1996). Or they show that oil prices predict stock returns (Driesprong et al., 2008; Sorensen, 2009).

One major problem with oil price as a predictor of stock market activity is the fact that it is driven by supply as well as demand shocks (Kilian, 2009; Kilian and Park, 2009). These shocks can have different impacts on the economy and it is very difficult to disentangle the effect of supply and demand shocks on economic activity and stock returns.[3] Adelman (1993) notes that the main caveat in predicting economic growth is that it is based under the assumption of "provided that there is no oil shock" that indicates supply-side pressure in the oil market. The second problem with oil prices as a stock return predictor is the change in the composition of the world economy and production. World production, at least in the larger economies, has moved from manufacturing to services and technology over the last decade, and the importance of oil in

[1] See Subrahmanyam (2010); for a detailed review of literature on cross-sectional predictors of stock returns.

[2] We have also implemented a long–short trading strategy based on shipping-rate changes on the same index (S&P500) over an out-of-sample test period January 2000–December 2010, yields 7.8% compared to a buy-and-hold strategy that yields 0.95%, whereas a similar trading strategy based on oil-price changes yields −5.4%. Results are not reported here but are available from authors upon request.

[3] Kilian (2009) distinguishes between different types of supply and demand shocks to real oil prices: namely, "oil supply shocks" due to the production and physical availability of oil; "aggregate demand shocks" due to the current demand for crude oil driven by fluctuations in the global business cycle; and "precautionary demand shocks" due to the shifts in precautionary demand for crude oil. However, in the shipping market supply cannot change significantly in the short run as it takes time to order and build ships to increase the fleet size.