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Equity prices and financial globalization

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ABSTRACT

This paper examines the association between equity returns, economic shocks, and economic integration. The empirical findings show that oil prices and U.S. Federal Reserve funds rates are associated with negative responses of international equity returns, of which a simple asset-pricing model is capable of explaining the international differences. Using vector autoregressions, we find that the effects of global economic shocks operate through the current excess returns of equity prices. Empirically, trade integration increases the responses of international equity returns to oil prices, while finance integration increases the responses of equity returns to Federal Reserve funds rates across countries.

1. Introduction

The objective of this paper is to study the empirical response, together with its determinants, of international equity returns to global economic shocks. Using international data of equity prices, our analysis proceeds in two stages. First, we estimate the responses of equity prices to oil prices and U.S. Federal Reserve funds rates. Second, the estimated response of equity prices is further examined into its components and then its association with economic integration is studied. The sample covers years 1989–2006, a period of relative macroeconomic and financial stability, chosen in order to understand discernible patterns in the data across major economies.

This study cuts across several strands of finance and economic literature. In an international finance context, news about the global economy, i.e. energy markets and Federal Reserve policy, may generate global shocks on the equity investment. Empirical regularities suggest (i) that a tightening of the Federal Reserve policy is negatively associated with equity returns (Bernanke and Kuttner (2005), Chen (2007), Patelis (1997), Rigobon and Sack (2003, 2004), Thorbecke (1997), Ehrmann and Fratzscher (2004, 2006), and Conover, Jensen, and Johnson (1999)); (ii) that national equity markets are positively correlated in responding to macroeconomic and global factors (Albuquerque and Vega (2007), Andersen, Bollerslev, Diebold, and Vega (2007), Ammer and Wongswan (2007), and Craine and Martin (2008)); and (iii) that an observed innovation in current excess equity return can be decomposed into the discounted sum of return revisions in future dividends, real interest rates, expected future excess equity returns and real exchange rates (Ammer & Mei, 1996). We contribute to this stand of the literature by studying the empirical components of equity prices and their informativeness, in order to understand the role of economic shocks and economic integration on the international equity markets.

In a macroeconomics context, the response of asset prices to exogenous shocks has considerable implications on the economic fluctuations (Bernanke, Gertler, and Watson (1997, 2004), Carlstrom and Fuerst (2006), Hamilton and Herrera (2004), and Leduc and Sill (2004)). On the oil prices, Jones and Kaul (1996) find that the responses of cash flows and dividends account for the response of the U.S. and Canadian equity prices to oil shocks; Kilian and Park (2009) find that the U.S. equity market respond negatively to oil-market specific demand shocks (e.g. precautionary demand), but positively to aggregate demand shocks at the global level. On the Federal Reserve funds rates, Bernanke and Kuttner (2005) find that expected returns account for the majority of the response of U.S. equity markets to Federal Reserve funds rates; Wongswan (2009) find that fifteen foreign equity indices respond to U.S. monetary policy surprises. We contribute to this strand of the literature by studying the effects of both oil prices and Federal Reserve funds rates on the fluctuations of asset prices internationally.[1]

[1] In addition, note that movements in equity prices may capture expectation about future economic growth at home and abroad; there is some evidence that the innovation in equity prices is contemporaneously orthogonal to total factor productivity, but highly correlated with the shock explaining long-run movements in the productivity (Beaudry & Portier, 2006).

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Table 1
Correlations of crude oil prices, Federal funds rates, and international equity returns. Monthly data spanning May 1989–December 2006. The prices of crude oil are in dollars per barrel (source: Energy Information Administration). The Federal funds target rates are in percentage points (source: Datastream). Equity returns are value-weighted in U.S. dollars, based on MSCI portfolios. EAFE is an abbreviation for Europe, Australia, and the Far East. Europe includes Austria, Belgium, Switzerland, Germany, Denmark, Spain, France, United Kingdom, Ireland, Italy, and the Netherlands. Scandinavia includes Finland, Norway, and Sweden. Asia and Pacific includes Australia, Hong Kong, Japan, Malaysia, New Zealand, and Singapore. Market capitalization (percent of world) is based on world development indicators. Average holding by U.S. investors (percent of country's capitalization) is based on U.S. TIC System data.

Regional markets	EAFE	Europe	Scandinavia	Asia & Pacific
Capitalization/world (%)	41.130	23.290	1.850	15.990
(Holding by U.S. investors % of capitalization)	(12.191)	(13.469)	(14.250)	(8.817)
Correlation of excess equity returns with global economic shocks:				
Oil prices	−0.112	−0.138	−0.078	−0.042
Funds rates	−0.053	−0.085	−0.044	−0.037

In the context of international economics, the empirical responses of international equity returns to global shocks help understanding the risk sharing across markets. By and large, previous studies suggest that the larger the volume of trade and financial integration between countries, the higher the correlation of equity returns (Coeurdacier, Kollmann, and Martin (2007), Aviat and Coeurdacier (2007), Portes and Rey (2005), Forbes and Chinn (2004), and Imbs (2004)). We contribute to this strand of the literature by accounting for the effects of trade and finance integration on the risk diversification and international portfolio investment, focusing on the responses of global equity returns to exogenous movements of oil prices and Federal Reserve funds rates across countries.

The rest of this paper is organized as follows. The next section discusses the data and preliminary analysis of international equity returns, oil prices, and Federal Reserve funds rates, and studies the association between equity returns and global economic shocks in an international asset-pricing framework. To gain further insights, Section 3 reports the decomposition of equity returns into the detailed responses to oil prices and Federal Reserve funds rates, and examines their relationship with trade and finance integration. The conclusion is in Section 4.

2. Data and preliminary analysis

The data on international equity returns are derived from MSCI value-weighted country returns in US dollars, based on Kenneth French's database. We use the monthly data, spanning May 1989 to December 2006 and covering more than 80% of the global market capitalization. While some previous studies use higher frequency data, we focus here on the monthly frequency as we are interested in the average response of equity returns and its association with economic integration. Using instead the daily or weekly data has the benefits of capturing the real-time movement of equity returns, but this involves more noises and price changes that might be reversed quickly over a course of the month due to a garden variety of factors. We consider two economic shocks, the oil prices and the Federal Reserve funds rates. For the oil prices, we use the prices of crude oil in dollar per barrel, based on the Energy Information Administration. For the Federal Reserve funds target rates, the series are taken from Datastream.

Table 1 provides descriptive statistics of excess equity returns (over the Treasury bill rates), studying their correlation with the changes in the oil prices and the Federal Reserve funds rates across geographic regions of equity investment. As shown in the table, both the increase of oil prices and the increase of Federal Reserve funds rates are associated with negative excess equity returns. To proceed, we will next disaggregate the changes of oil prices and Federal funds rates into their expected and unexpected components, and examine their association with international equity returns in a simple asset-pricing model. The responses of excess equity returns to the global shocks will then be decomposed into news (revisions in expectation) about dividend, interest rate, future excess returns, and real exchange rates. In the final step, we will estimate how the empirical responses of equity returns are attributable to integration via trade and finance across countries.

2.1. Global Economic shocks: oil prices and Federal Reserve funds rates

Since the financial markets are forward looking, only the unexpected component of the changes in oil prices and Federal Reserve funds rates may influence the innovation in excess equity returns. To measure the unexpected, or surprise, component of these two global economic shocks, we follow the methodology of Kuttner (2001) and Bernanke and Kuttner (2005) in constructing the expected and unexpected components, first on the Federal funds rates, then on the oil prices. Using the futures data, the unexpected component of Federal funds rates (i, in percentage points) and oil prices (o, in dollars per barrel) is constructed as

$$\overline{\Delta}s_t^u = \frac{1}{D}\sum_{d=1}^{D} s_{t,d} - f^1_{t-1,D}, \tag{1}$$

where $s = \{o,i\}$; $s_{t,d}$ is the rate on day d of month t, and $f^1_{t-1,D}$ is the rate of the 1-month futures contract on the last (Dth) day of month $t-1$. The notation $\overline{\Delta}$ is used to distinguish this from the first-difference operator. The expected component is constructed as

$$\overline{\Delta}s_t^e = f^1_{t-1,D} - s_{t-1,D}. \tag{2}$$

$\overline{\Delta}s_t^e + \overline{\Delta}s_t^u = \overline{\Delta}s_t$ is the average in month-t minus the value on the last day of month $t-1$.[2] Based on this configuration, from May 1989 to December 2006 the standard deviation of oil prices is about 1.8 dollars per barrel, with the unexpected components making up most of the changes in oil prices. For the funds rates, the standard deviation is .22 and we find that the expected component is slightly more important than the unexpected component.[3]

Note that on possible feedbacks between funds rates and oil prices, if endogeneity is the issue, then the effects of oil prices on the equity returns would be larger by endogenous monetary responses. However, much of the concern in the literature on the oil-monetary policy endogeneity revolved around the earlier episodes (early 80s and before) that are outside the sample period in this paper (1989–2006). More importantly, as shown recently by Kilian and Park (2009), the VAR model of federal funds rates and oil prices has provided no supportive evidence that the Federal Reserve changes interest rates in response to oil prices.[4]

The measurements of economic shocks being used here are admittedly not perfect, but objective and repeatable at a monthly frequency with readily available futures data on crude oil prices and Federal funds rates. Three measurement issues are in order. First, we make no distinction between target surprises and path surprises of oil prices

[2] Following Bernanke and Kuttner (2005) we exclude the September 17, 2001 observation for the Federal funds rate as it was the rate cut on the first trading day after the September 11 event.

[3] Before 1994, the Federal Reserve made no public announcement of its target for the Federal funds rate following the FOMC meetings at which the target was determined; as a result, financial markets had to infer the target rate from the subsequent open market operations. From February 1994 onwards, the Federal Reserve announces all the changes in its target rate, the action which eliminates uncertainty about the date of rate changes and influences the path of financial variables [Davig and Gerlach (2006), Woodford (2005)]. For this reason, existing studies on the response of financial markets to Federal Reserve policy use the year 1994 as a cutoff.

[4] Although the central banks may generally not want to respond to movements in asset prices (Bernanke & Gertler, 2001), it is also possible that central banks' response to movements in equity prices driven by relative productivity shocks may yield some price stability benefits (e.g.Di Giorgio & Nistico, 2007).