



Energy prices, volatility, and the stock market: Evidence from the Eurozone

Ulrich Oberndorfer*

Federal Ministry of Economics and Technology, Scharnhorststr. 34-37, 10115 Berlin, Germany

ARTICLE INFO

Article history:

Received 17 December 2008

Accepted 19 August 2009

Available online 15 September 2009

JEL classification:

Q40

Q43

C13

G12

Keywords:

Stock market

Energy market

Energy price volatility

ABSTRACT

This paper constitutes a first analysis on stock returns of energy corporations from the Eurozone. It focuses on the relationship between energy market developments and the pricing of European energy stocks. According to our results, oil price hikes negatively impact on stock returns of European utilities. However, they lead to an appreciation of oil and gas stocks. Interestingly, forecastable oil market volatility negatively affects European oil and gas stocks, implying profit opportunities for strategic investors. In contrast, the gas market does not play a role for the pricing of Eurozone energy stocks. Coal price developments affect the stock returns of European utilities. However, this effect is small compared to oil price impacts, although oil is barely used for electricity generation in Europe. This suggests that for the European stock market, the oil price is the main indicator for energy price developments as a whole.

© 2009 Elsevier Ltd. All rights reserved.

1. Introduction

The recent years have been marked by massive price movements at the energy markets. From 2002 to 2007, prices at the respective international exchanges have been rising strongly, and record high prices for oil and natural gas have been accompanied by non-negligible volatility. Energy price, but also price volatility hikes have been shown to be economically detrimental (e.g., Ferderer, 1996 and Sadorsky, 1999). Overall stock market developments are no exception to this rule. Against this background, the recent public attention not only to energy prices, but also to the volatility at the energy markets is not surprising, with oil price volatility being relatively high also compared to volatility of other commodities (Regnier, 2007).

This paper constitutes a first analysis on the determinants of stock returns of Eurozone energy corporations. It focuses on the effect of the energy market developments on the stock market. From previous literature it is apparent that the stock market effects of energy price developments may depend on the sectoral affiliation of the respective corporation analyzed. Particularly energy corporations are often said gaining from energy price increase. The role of energy price volatility has not yet been explored in this context. Generally, stock market developments of corporations from the energy branch are very interesting case. This is due to the fact that the sector itself is marked by several

peculiarities. Many of the inputs this sector uses and of the outputs it produces are both homogenous and traded at international exchanges. The prices of some of these goods – resources such as oil and gas – are extremely volatile, and the US Dollar is the predominant currency for their trading. Moreover, capital intensity of the industry, compared to other sectors, is high (Sadorsky, 2001).

In the light of such possible interactions of different financial markets, it is surprising that there is relatively little literature on the determinants of energy corporations' stock pricing. Moreover, to our knowledge, for European markets as a whole only studies of Manning (1991) assessing UK oil industry stock portfolios is available. Evidence from continental Europe is completely missing. According to the main result from Manning's research – using a market model plus oil price change for weekly data – a positive effect of oil price changes on oil corporations' stock returns exists. This effect is largest for corporations purely engaged in oil exploration and production. Faff and Brailsford (1999) analyze the Australian stock market analogously using a model including an "oil factor" besides the well-established market (beta) factor. With respect to the oil and gas sector that is in the focus of our research question, the authors find a positive impact of oil price changes on stock returns on a monthly basis.

Most recent and comprehensive research as far as returns of energy stocks are concerned has been conducted for Canada. Sadorsky (2001) develops an extensive model including the market excess return, an interest variable based on the term premium, the change of the Canadian Dollar to US Dollar exchange rate, as well as oil price changes. His estimations show

* Corresponding author. Tel.: +49 1888 615 7407; fax: +49 1888 615 5414.
E-mail address: ulrich.oberndorfer@bmwi.bund.de

that each of these variables plays a statistically significant role in explaining returns from a stock portfolio of Canadian oil and gas corporations. While the market excess return and the oil price change positively impact on portfolio returns, results of Sadorsky (2001) indicate that increases in both the exchange rate and the term premium lower Canadian oil and gas stock returns. Their results with respect to an estimated beta coefficient smaller than one furthermore suggests that the Canadian oil and gas industry is on average less risky than the market. Similarly focussing on Canadian oil and gas corporations, Boyer and Filion (2007) contribute to these findings in adding gas price changes as a factor of stock returns as well as in incorporating firm-specific financial and operational characteristics (“fundamental factors”) such as cash flows and production volume. As the most surprising result from their analysis based on monthly data, Boyer and Filion find that firm production negatively affects stock returns.

As far as the determinants of energy stock returns are concerned, the previous literature is largely restricted to the impact of (amongst others) energy prices. Given the background of negative macroeconomic effects of energy price volatility, and Sadorsky, 2003 finding that even technology stocks seem to be driven by oil price volatility, it is very surprising that the relationship between energy market volatility and energy stocks has, to our knowledge, been ignored so far. In contrast, energy stock returns as well as their volatility may also be influenced by energy market volatility.

In this respect, the contribution of this paper is twofold: we conduct a first analysis on the determinants of stock returns of energy corporations from the Eurozone, focussing on the role of the energy market for the stock market. For this purpose, we examine two different portfolios of energy stocks: one portfolio consisting of oil and gas corporations' and one portfolio comprising utilities' stocks. Particularly, within our empirical approach, we tackle the issue of relationships between energy market volatility and energy corporations' stocks. The remainder of this paper is structured as follows: Section 2 presents the background including the main hypotheses for our empirical investigation. Section 3 gives the empirical analysis; Section 4 concludes.

2. Background

Using a simple illustration, Chen et al. (1986) argue that macroeconomic variables systematically affect stock returns. It is based on the representation of stock prices of corporation i (p_i) as expected future cash flows of the corporation ($E(cf_i)$) that are discounted by the discount rate δ

$$p_i = \frac{E(cf_i)}{\delta}, \quad (1)$$

implying stock returns of corporation i of

$$\frac{dp_i}{p_i} = \frac{d[E(cf_i)]}{E(cf_i)} - \frac{d\delta}{\delta}. \quad (2)$$

In this respect, following Chen et al. (1986), the systematic forces of the stock returns of corporation i should be both changes in the discount rate δ and in the expected future cash flows $E(cf_i)$.

Given rising oil and gas prices, the resource stocks of companies related to oil and gas business or their products and services should be upvalued. Consequently, their expected future cash flows should rise. Energy price collapses, in contrast, should be economically harmful for them (Hampton, 1995). European utilities use oil and – to a much larger extent – gas and coal as an input for electricity generation (EIA, 2007) or sell them directly to their clients. Although at least some of the utilities are supposed to exhibit non-negligible market power and electricity consump-

tion is considered to be relatively inelastic, it is unclear whether costs stemming from energy price increases can fully and immediately be passed on to the consumers. Rising (falling) energy prices should therefore reduce (increase) utilities' expected future cash flows.

Following the existing literature, energy price variables – besides the market return – are the most important determinants of energy stock returns. However, not only appreciations and depreciations in levels of resources may matter for the market developments of energy stocks. Sauter and Awerbuch (2003) argue that since “the 1980s, oil price volatility is more significant in its effects on economic activity than the oil price level”. Despite the existence of energy options, the energy industry is strongly exposed to energy price risks (Hampton, 1995). Therefore, energy market volatility may equally impact on the discounted expected future cash flows of energy corporations. Energy market volatility may cause augmented expenditures for affected corporations, and may, e.g., induce hedging costs for oil and gas corporations as well as for utilities. Moreover, following Pindyck (2004), an increase in price volatility may decrease the production of the respective commodity. Energy price volatility should therefore negatively affect expected future cash flows particularly of oil and gas corporations, but also of utilities.

3. Empirical analysis

3.1. Estimation approach

Our goal is to test the predictions lined out in the preceding section for Eurozone energy stock returns using two portfolios based on stock returns of utilities on the one hand, and of oil and gas corporations on the other hand. In line with the existing literature from outside of the Eurozone, this is done in a following framework:

$$r_{i,t} = \beta'_i X_{i,t} + \varepsilon_{i,t}. \quad (3)$$

Here, $r_{i,t}$ is the excess returns for portfolio i ($i = 1,2$) and at the end of period t (i.e., between $t-1$ and t) over the one month T-bill rate. β_i is the parameter vector of the model, and $X_{i,t}$ a vector containing the explanatory variables of the model. $\varepsilon_{i,t}$ is the disturbance term with $E(\varepsilon_{i,t}) = 0$ and $\text{var}(\varepsilon_{i,t}) = \sigma_i^2$. The parameter vector β_i besides σ_i^2 have to be estimated by OLS. The important choice for this model relates to the explanatory variables to be considered. First of all, $X_{i,t}$ includes the market excess return $r_{m,t}$. This is based on (and compatible to) the capital asset pricing model (CAPM, Sharpe, 1964 and Lintner, 1965), that assumes that the market excess return is sufficient to explain the excess returns of the portfolios, i.e., that the market excess return is the only relevant risk factor.

We extend this model by those variables that have shown to influence Canadian energy stock returns: We add the price changes of the term premium $r_{r,t}$, of the Euro to US Dollar exchange rate $r_{x,t}$ ¹ (Sadorsky, 2001), as well as of energy prices: for both the utilities and the oil and gas portfolio, we add price changes of oil $r_{o,t}$, and of gas $r_{g,t}$ (Boyer and Filion, 2007) to $X_{i,t}$. As particularly coal is an important input for electricity generation in Europe, in case of the utilities analysis also the change to the coal price $r_{c,t}$ is added. Additionally to the models established in the existing literature, we enrich $X_{i,t}$ by adding the volatilities of the changes in the oil price $v_{o,t}$ (or $w_{o,t}$ and $z_{o,t}$, see below) and in the gas price (and, for the analysis of the utilities portfolio, volatilities of the changes in the coal price).

¹ Analogously to the Canadian Dollar to US Dollar exchange rate in Sadorsky's (2001) analysis for Canadian energy corporations.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات