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"The Impact of International Market Effects and Pure Political Risk on the Major Western Oil and Gas Stock Market Sectors"

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THE IMPACT OF INTERNATIONAL MARKET EFFECTS AND PURE POLITICAL RISK ON THE MAJOR WESTERN OIL AND GAS STOCK MARKET SECTORS

John Simpson

Abstract

A key question in European integration is whether or not the global oil and gas market sector (over the period which includes the oil price hikes of 2001 to late 2007 and the global financial crisis from mid 2008 to early 2009) has been impacted to a greater or lesser extent by major Western country oil and gas stock market sectors (such as, those in the USA, the EMU and the UK) as well as political, social and legal factors (embodied in political risk ratings) for the USA, the UK and the key economies of the EMU (that is, France, Germany and Italy). This short study uses analysis of both unlagged and lagged data in multivariate models to test these relationships and finds a closer relationship politically and financially between the USA and the UK than between the EMU and the UK markets. The EMU and the major EMU countries considered separately in oil and gas market sector movements and political risk ratings movements have very little financial and political influence on the movement of the global oil and gas market sector over the period.

Introduction

According to theory and the Law of One Price as revisited by Asche et al, (2000), in an integrated market, prices on homogenous goods from different producers and suppliers should move together. Price differentials should only indicate differences in transportation costs and quality. These price differentials for energy should flow through to oil and gas stock markets sectors and be reflected in oil and gas share returns. They should also be reflective of the degree of oil and gas stock market integration of the major Western stock markets.

There is a connection between market integration and political risk in energy markets. There is also a relationship between energy prices, political risk and prices in energy stock market sectors. For example, Asche et al (2000) find that cointegration tests showed different border prices for gas to Germany moved proportionally over time. This indicated integration of the German gas market. They also studied whether or not there were large price differences between gas from Norwegian, Dutch and Russian exporters. They find differences in mean prices (Russian gas was cheaper) and the reasons for the price differences were ascribed to differences in volume flexibility and perceived political risk. The question in the case of EMU countries is whether or not energy market integration in the leading EMU countries energy sectors and political risk changes in EMU countries have flowed over to global oil and gas stock market sector integration.

It is logical that oil and gas listed companies need to be combined as a market sector. There is a proven strong connection between oil prices and gas prices and this translates to a need to include energy companies in one sectorial stock price index. Most researchers agree that the price of oil has something to do with the price of gas (For example, Okugu, 2002; Mazighi, 2005 and Eng, 2006). Some also agree that other energy prices, such as coal are related to oil and gas prices (For example, Bachmeier, 2006; Pindyck, 1999). If this is the case in North America as well as in Continental Europe, then an interim global gas pricing model remains possible, with oil and coal prices partial forecasters of gas prices. This direction of energy markets should also be indicated in the degree of integration of American and European oil and gas stock market sectors.

The issues are in respect to the integration of global oil and gas stock market sectors 1. Are the factors driving the major Western oil and gas stock market sectors over the period of study mainly political or economic and financial (that is, stock market related) in nature? 2. Is the EMU oil and gas market a greater political and legal force impacting the main global oil and gas markets over the period of study compared to the UK? 3. Is the UK oil and gas stock market sector more economically and politically integrated with the US and global markets than it is with the EMU? In respect to the last issue it needs to be remembered that whilst the UK is a member of the European Union it has not fully committed to membership of the EMU.

A definition of political risk is required for this study Political risk is the willingness of countries to service their external commitments (For example, Bourke & Shanmugam, 1990; Cantor & Packer, 1996). This is influenced by human, cultural, social and legal factors that provide a subjective quantification of influences such as, the degree of corruption, the history of law and order and the quality of the bureaucracy (ICRG, 2009). It is suggested that political risk ratings in Western economies have become more volatile over the period since "9/11" terrorist attacks, the Iraqi war, the corporate governance issues in the USA related to for example, Worldcom and Enron, and more recently the finance and banking governance issues that led to the global financial crisis in the USA, the UK and the major Western European countries (For an indication of the volatility in political risk ratings over the full period of the study, see Appendix 2).

Political risk ratings are used by financial economists as a management tool for assessing economic, financial and political riskiness in doing business with different countries either at a macro or a microeconomic level (For example they assist banks lending international to ascribe credit risk premia to arrive at a market interest rate). Political risk ratings are part of country or sovereign risk ratings, with the other two components of economic risk and financial risk remaining a measure of a country's ability to meet external obligations.

Country stock market indices, sectorial or otherwise, have proven to be reliable indicators of economic and financial conditions. Major Western stock markets sectors in oil and gas have also be quite volatile over the period from 2001 to 2008 for similar reasons relating to oil prices, US corporate governance issues and the global financial

crisis. Oil and gas market data also reflect global economic and financial conditions and may also be impacted by political risk factors due to the importance of oil and gas as an essential commodity and because the OPEC cartel is comprised of developing countries with high levels of country and political risk.

Data

Global and country oil and gas market monthly indexed data are collected from the DataStream database covering the period June 2001 to December 2008 for the world, the USA the UK and the EMU. Over a similar period monthly political risk ratings are gathered from the ICRG (2009) for the UK, The USA and the major EMU countries in France, Germany and Italy.

The world oil and gas stock market price index values are reported by Datastream who base their series on stock exchange oil and gas price indices that commonly use a representative sample of publicly listed oil and gas related companies in each country, with the stock prices reflected in the index converted into US Dollars at current exchange rates. The companies included in the index generally represent around 85% of the volumes traded in the country oil and gas markets. The index is regularly re-assessed (at least every quarter) to identify changes in the trading volumes of each represented company share. Then a new portfolio is compiled, with new weightings based on the changes in trading activity in each share.

The companies represented in the index commonly represent around 70% of the total oil and gas stock market capitalisation of listed companies in each market. The indices generally reflect information that has been updated daily for the morning following the reference day and may be regarded as an important global economic indicator, reflective in part of global supply and demand conditions.

The Model

Changes in price indices and political risk ratings are studied in a single period (lags excluded) ordinary least squares regression format as follows:

$$\Delta P_{OG_{W_T}} = \alpha_{OG_{W_t}} + \beta1(\Delta P_{OG_{UK_t}}) + \beta2(\Delta P_{OG_{USA_t}}) + \beta3(\Delta P_{OG_{EMU_t}}) + \beta4(\Delta SR_{USA_t}) + \beta5(\Delta SR_{UK_t}) + \beta6(\Delta SR_{FRA_t})$$
$$+ \beta7(\Delta SR_{GERM_t}) + \beta8(\Delta SR_{ITAL_t}) + e_{OG_{W_t}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots1)$$

Where:

$\Delta P_{OG}'s$ Represent the changes in oil and gas price index values for the world (the dependent variable), the UK, the USA and the EMU indices respectively.

$\Delta SR's$ represent the changes in political risk ratings for the USA, the UK, France, Germany and Italy respectively.

$\alpha_{OG_{EMU_t}}$ is the regression intercept for the world oil and gas regression at time t.

β's represent the regression coefficients for each of the above independent variables.

It is also useful, in respect to issue number 3 to provide a basic study on UK political risk relationships with the USA and the key EMU countries. Another single period ordinary least squared multiple linear regression model is tested as follows.

$$\Delta SR_{UK_t} = \alpha_{UK_t} + \beta1(\Delta SR_{FRA_t} + \beta2(\Delta SR_{GERM_t}) + \beta(\Delta SR_{USA_t}) + e_{UK_t} \dots\dots\dots\dots2)$$

Findings

An indication of the volatility in level series oil and gas stock market sectors for the world, the USA, the UK, and the EMU is provided in Appendix 1. The study moves to first differences to remove serial correlation problems in the regression errors. The findings of this study of Equation 1) in first differences (price changes and political risk ratings changes) are reported in Table 1.

Table 1
Regression results for the world oil and gas market index changes

Regression statistics	Value
Adjusted R Square	0.9187
Durbin Watson test statistic	2.2092
t-statistic UK oil and gas market index changes	13.9038
t-statistic US oil and gas market index changes	19.8146
t-statistic political risk changes UK	-2.4572*

Note: Variable are significant at the 1% level except for *, which is significant at the 5% level.

The results show that there is not a problem with serial correlation in this regression as the Durbin Watson (DW) test statistic is significantly greater than 2. The results of

the model may be relied upon. The explanatory power of the model is strong with an adjusted R Square value of 0.9187 (91.87%). The t-statistics show that the EMU oil and gas market does not possess a significant relationship with global oil and gas markets, but the US market and then the UK market are significant parts of the explanatory power of the model (t statistics at 19.8146 and 13.9038, which are significant at the 1% level).

The t-statistics also indicate that political risk changes in the UK are an explanatory variable in this model (where the t-statistic at -2.4572 is significant at the 5% level), but its contribution to the explanatory power is substantially less than the changes in the oil and gas market indices in the UK and the USA. Changes in political risk ratings in Germany, France and Italy are not significant explanatory variables.

Logically there is a positive relationship between the UK and the USA oil and gas price changes and those of the world oil and gas market. As returns increase in one market so they do in the other. There is a negative relationship between changes in political risk in the UK and the changes in the world oil and gas market index. That is, as political risk ratings decrease in the UK (that is, as political risk reduces) the world oil and gas prices and returns increase. This is not in accordance with the risk/return relationships in financial economics theory but it may indicate risk aversion on the part of the UK political environment when oil and gas markets are considered. It may be that when prices in the volatile oil and gas sector increase, the UK risk analysts perceive an improving domestic political environment.

Table 2 shows the results of a system that incorporates the interaction of political risk changes in the UK with political risk changes in the major EMU countries (France, Germany and Italy) and the USA.

Table2
Regression results for UK political risk ratings changes

Statistic	Value
Adjusted R Square	0.0923
Durbin Watson test statistic	1.9684
t-statistic USA political risk changes	3.8126
Standard error of regression	0.7788

Note: All statistics are significant at the 1% level.

These results indicate a model that is clearly not fully specified, but nevertheless has an explanatory power of around 9.23% (adjusted R Square value is 0.0923, which is significant at the 1% level). This number may be relied upon as DW test statistic is significantly greater than 1.5 and serial correlation in the regression errors is not a problem. Around 9% of the variance of the changes in the UK political risk is explained predominantly by the changes in political risk in the USA (the t-statistic for USA political risk changes at 3.8126 is significant at the 1% level). France, Germany and Italy political risk changes are not significant explanatory variables in the system studied at any level of significance. The positive relationship between the changes in USA political risk ratings and those of the UK indicates that as political risk in the USA increases, political risk in the UK also increases.

Equation 1) is respecified into a VAR with all variables in that equation optimally lagged. On a VAR Stability Condition test it the findings are that the VAR satisfies the test with no root lying outside the unit circle. The VAR lag order selection criteria indicates, through the Likelihood Ratio and Schwartz Criteria, that the optimal lag is 1-2 months. The VAR in the specified form with the world oil and gas market treated endogenously has strong explanatory power with an adjusted R Square value of 0.8720 significant at the 1% level. VAR based Granger causality test Chi Square statistic over a 2 month lag verify that there is no significant evidence at the 10% level of one-way causality running from the independent variables to the world oil and gas market.

There is evidence at the 1% level that all variables in the model are influencing the UK oil and gas sector (when the UK is treated endogenously) and at the 10% level all variables are influencing the US oil and gas market (when the US oil and gas market is treated endogenously). When the EMU oil and gas market is treated endogenously there is also Granger causality running from the other variables at the 10% level of significance. When each country political risk variable is treated endogenously all of the other variables in each case are shown to influence that variable at levels of significance ranging from 1% to 10%.

Pair-wise Granger causality tests on two month lags were also run on changes in the oil and gas market indices and changes in the political risk ratings. Significance levels of F statistics up to the 10% level were observed. Granger causality runs from

the world oil and gas market changes to the UK market changes (at 1%), from the US market to the UK market (at 1%). There is dual causality between political risk changes in the UK and changes in the US oil and gas market. The changes in political risk from the UK having slightly greater statistical significance (at 5% compared to 10%). Moreover, changes in the oil and gas markets in the USA Granger cause changes in political risk in Germany (at the 5% level); Changes in political risk in the UK Granger cause changes in the EMU oil and gas market (at the 10% level). Changes in political risk in the UK Granger cause changes in political risk in France (at the 10% level).

There is dual Granger causality at the 10% level between changes in political risk in the UK and changes in political risk in Germany (the relationship is stronger running from Germany to the UK). Changes in the world oil and gas market Granger cause changes in political risk in Germany (at the 5% level). It is however significant at the 10% level that changes in the EMU oil and gas market Granger cause changes in the UK oil and gas market. Overall the results again demonstrate that the relationships between country oil and gas market changes and political risk ratings changes are stronger between the world oil and gas markets and the USA and UK markets and USA and UK political risk ratings and oil and gas markets.

Conclusion

It is concluded from this short analysis that, in unlagged data, the oil markets of the US and the UK, in that order, have a stronger relationship with each other and with the global oil and gas market than with the EMU. To a lesser extent political risk changes in the UK have a small, but significant relationship with the global oil and gas market. The model that includes these variables has strong explanatory power. The political influence of the major EMU countries (That is, France, Germany and Italy) on the global oil and gas market is not statistically significant.

When a VAR is introduced with optimally lagged data the strength of the explanatory power of the model is confirmed. When both pair-wise Granger causality and VAR based causality tests are applied it is confirmed that the stronger relationships are between the world oil and gas market and those in the USA and the UK. The causality tests also indicate stronger causal relationships between the USA and the UK in both

oil and gas markets and in political risk ratings. The major relationships in political risk in unlagged data, when political risk ratings only are considered, are between the US and the UK.

All of this provides evidence that during a period of volatility over the past 7 years in both oil and gas markets and in political environment, the USA and the UK oil and gas markets are closer to the world market than the EMU. In addition the UK has been closer to the USA than it has been to the major EMU economies, and might indicate that, from the view point of energy stock markets sectors, that the UK is understandably not yet fully committed either politically or economically to take the next step in European integration by formally joining the EMU.

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Appendix 1

OGW
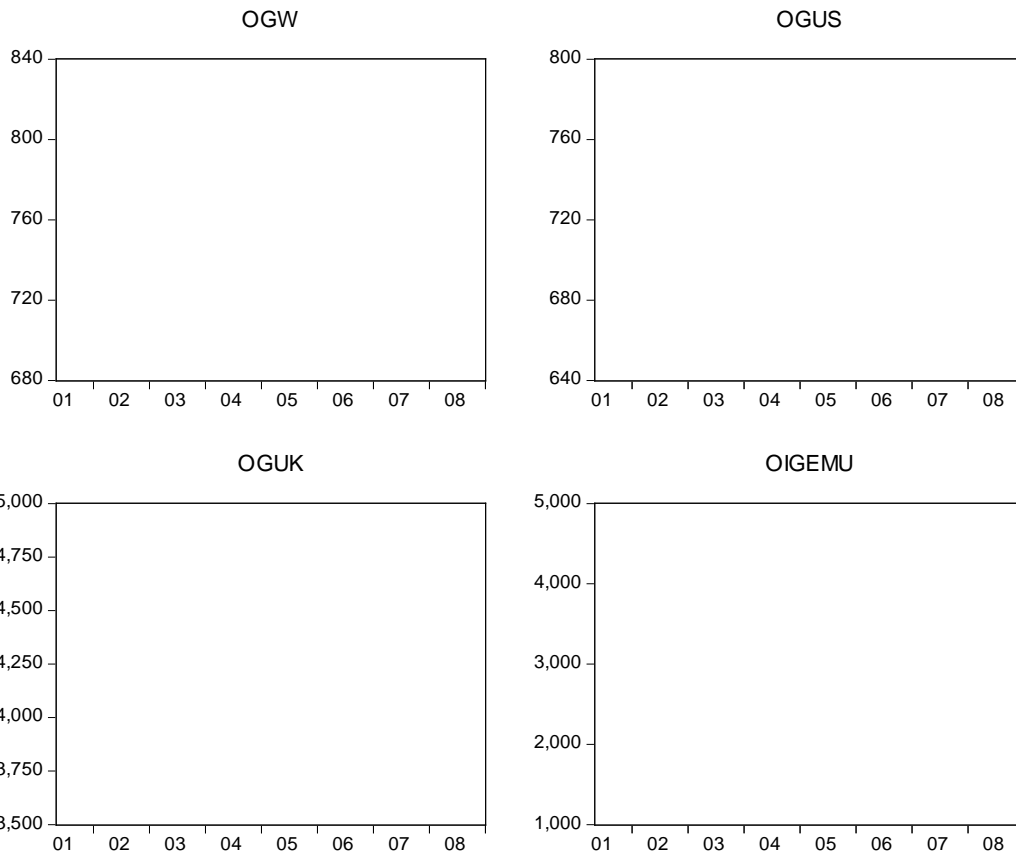
OGUS

OGUK

OIGEMU

Where OGW, OGUS, OGUK, OIGEMU are the price indices for the oil and gas sector of the stock markets for the world, the USA, the UK and the EMU.

Appendix 2

Note: PRUK, PRUSA, PRFRAN, PRGERM, PRITAL are the political risk ratings for the UK, USA, France, Germany and Italy. The variable was not a significant explanatory variable of UK political risk and is omitted from Equation 2).

PRUK

PRUSA

PRFRAN

PRGERM

PRITAL