

Thesis Abstract

No. 1

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Title of Thesis: Economic Analysis of Global Fossil Energy Markets			
Summary of Thesis: <p>This thesis is an investigation of the relationships between three primary energy markets, crude oil, coal and natural gas. We study both the short-run and long-run relationships between these fossil fuels markets. Our main purpose is to study the effects of each market on the other markets in both the short-run and the long-run.</p> <p>The oil market is a global market, and we can find data on the world oil production, oil consumption and oil prices in many periods. However, the coal market to some extent is comprised of some segmented markets, and the natural gas market is nearly regionally markets. However, with technical progress and the establishment of a new cartel for natural gas market, the coal and natural gas markets are gradually moving to become global markets. As the coal and natural gas markets still are not global, we cannot find data on world production of coal and natural gas, thus in the short-run this dictates us to investigate the relationships between crude oil and natural gas, and crude oil and coal, separately. For this purpose, we use the decomposition of the real price of crude oil recently proposed by Kilian (2009): crude oil supply shocks, global demand shocks, and crude oil precautionary demand shocks to distinguish between the effects of oil market shocks and global aggregate demand shocks.</p> <p>In chapter one, we provide a general introduction of fossil fuels. In chapter two, we study the relationship between crude oil and natural gas using a four-variable structural vector autoregressive model (SVAR) for oil production, real activity, oil prices and natural gas prices. In the chapter three, we investigate the relationships between crude oil and coal prices. For this purpose, we developed a four-variable SVAR. The results of chapters two and three provide some evidence that oil supply shocks have no significant effect on the real price of crude oil and natural gas, while they have significant effect on coal prices.</p> <p>Regarding the demand shocks effect, a positive aggregate demand shock has a positive significant effect on the prices of oil, coal and natural gas, as an increase in the demand for goods and services leads to increase in the demand for energy sources, which are mainly fossil fuels.</p> <p>Meanwhile, a positive aggregate demand shock has a positive and significant effect on the oil production. Our result is consistent with the view of some researchers that the natural gas market has no effect on oil prices, while the coal market can affect oil prices.</p> <p>The precautionary demand for oil that Kilian (2009) introduced as an oil specific demand shock shows a fear of future lack of crude oil. Precautionary demand shock gradually transfer to coal and natural gas markets and has significant effects on coal and natural gas prices as they are the main</p>			

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substitutes for crude oil.

In the chapter four, we concentrate on the effect of an aggregate demand shock on oil production. While Kilian (2009) shows that an aggregate demand shock has no significant effect on oil production, this chapter shows that his data during the second oil shock and the subsequent decade exhibit a puzzle, namely, a positive aggregate demand shock has a negative and significant effect on oil production. As our results on the relationships between coal and natural gas prices with crude oil price show that an aggregate demand shock has a significant positive effect on the oil production, we investigate more about this relationship. We solve the puzzle by adding the prices of coal and natural gas. We interpret our results as suggesting that ignoring the strong interactions between fossil fuel markets may lead to misleading results.

In the chapter five, we investigate the long-run relationship between the prices of crude oil, coal and natural gas. We apply two cointegration tests, first the Johansen maximum likelihood test, and second Park's Canonical Cointegration Regression (CCR) test. The results provide some evidence that there are at least two cointegration relationships between fossil fuels prices.

We conclude that there are high interactions between the crude oil, coal and natural gas markets in both the short-run, and the long-run. The oil market has significant effects on the coal and natural gas markets in the short-run, while the effect of the natural gas market on the oil market is not significant, and the coal market affects the crude oil market prices for some months. Meanwhile, in the long-run the cointegration relationships between crude oil, coal and natural gas prices show they affect other fossil fuels markets.

