Analysis of the Information Transmission between Chinese and International Oil Markets

Qiang Ji, Ying Fan[*]

Center for Energy and Environmental Policy research, the Institute of Policy and Management, Chinese Academy of Sciences, Beijing, 100190, China

Overview

Since China became an oil net importer in 1993, the linkage between domestic and international oil market has strengthened. With the rapid increase of oil imports, oil prices in China are more and more influenced by international oil price shocks. However, the global financial crisis in 2008 changes this situation. OECD countries are experiencing severe economic recession and weak oil demand, and the increasing oil demand in developing countries especially China is playing a major role in supporting the international oil price. The relationship between Chinese and international oil prices should be paid more attention to.

This paper focuses on China's oil markets and chooses Brent crude oil, NYMEX fuel oil and Singapore fuel oil markets as representatives for analysis and comparison of the characteristics for information transmission to and from domestic and international oil markets.

Methods

We analyze the information transmission mechanism among oil markets using an Error Correction Model and variance decomposition based on Directed Acyclic Graph method identifying the contemporaneous causal structure.

A critical step in variance decomposition is to restrict appropriate contemporaneous causal patterns on the basis of the ECM residuals. The DAG technique based on driving data was used to overcome the unrealistic assumption of a recursive structure in the Cholesky decomposition and the shortage of structural factorization.

Expected Results

Some important conclusions for China's oil markets can be drawn. First, development of China's fuel oil futures market has led to a long-term equilibrium relationship between the Chinese oil market and international oil markets. Second, China's fuel oil futures market has contemporaneous effects on Singapore's fuel oil market. In the meantime, China's fuel oil futures market has a direct influence on China's crude oil market which is directly related to its high market liquidity. Finally, China's crude oil market has direct contemporaneous impact on Brent

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[*] Corresponding author, email: yfan@casipm.ac.cn, Tel.: 0086-10-62542627.

crude oil market. China's influence on the international oil market is enhanced.

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References

Awokuse, T.O., Bessler, D.A., 2003. Vector autoregression, policy analysis, and directed graphs: an application to the US economy. Journal of Applied Economics, 6, 1-24.

Bessler, D.A., Yang, J., 2003. The structure of interdependence in international stock markets. Journal of International Money and Finance, 22(2), 261-287.

Chen, K.C., Chen, S.L., Wu, L.F., 2009. Price causal relations between China and the world oil markets. Global Finance Journal, 20(2), 107-118.

Cody, B.J., Mills, L.O., 1991. The role of commodity prices in formulating monetary policy. Review Economics and Statistics, 73, 358-365.

Haigh, M.S., Nomikos, N.K., Bessler, D.A., 2004. Integration and causality in the international freight markets: modeling with error correction and directed acyclic graphs, Southern Economic Journal, 71, 145-162.

Jiao, J.L., Fan, Y., Wei, Y.M., Han, Z.Y., Zhang, J.T., 2007. Analysis of the co-movement between chinese and international crude oil price. International Journal of Global Energy Issues, 27(1), 61-76.

Johansen, S., Juselius, K., 1990. Maximum likelihood estimation and inference on cointegration-with application to the demand for money. Oxford Bulletin of Economics and Statistics, 52, 169-210.

Refola, J.F., 2009. China's impact on price shocks in the world oil markets. The Journal of Energy Markets, 2(1), 89-113.

Sprites, P., Glymour, C., Scheines, R., 2000. Causation, prediction, and search. Cambridge: MIT Press, 1-130.

Swanson, N., Granger, C., 1997. Impulse response functions based on a causal approach to residual Orthogonalization in Vector Autoregression. Journal of the American Statistical Association, 92, 357-367.

Yang, J., Guo, H., Wang, Z.J., 2006. International transmission of inflation among G-7 countries: A data-determined VAR analysis. Journal of Banking & Finance, 30(10), 2681-2700.

Zhang, Y.J., Fan, Y., Wei, Y.M., 2007. Study on the characteristics of Chinese crude oil price volatility based on GED-GARCH models. Application of Statistics and Management, 26(3), 398-406 (In Chinese).