

Structural Breaks Dependence Analysis of Oil, Natural Gas, and Heating Oil: A Vine-copula Approach

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Abstract. In this study, we investigate the relationship between crude oil, heating oil and natural gas by applying a vine copula based GARCH model. Also, we consider the structural change in crude oil as it is found to be a root node in vine copula structure. Then, we separate the data into sub-periods and investigate the dependence structure in each sub-period using the break point approach. The result shows that there are four breaks at the following dates: 12/02/2009, 8/04/2011, 9/04/2014 and 11/02/2016. Overall, the degree of dependence varies over sub-periods where the dependence between crude oil, natural gas and heating oil is positive for almost all pairs. Interestingly, the dependence between crude oil and heating oil is positively strongest while the dependence between crude oil and natural gas is negative during the financial crisis sub-period.