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Summary

Energy resource price shocks and their impact on the economic activity of the European Union economies

Doctoral thesis concerns the analysis of the asymmetric reaction of economic activity in selected EU economies on changes in oil prices. The main motivation for the dissertation was the relatively small number of studies on the impact of oil prices shock on the economic activity of the EU economies in the context of an upward and downward economic activity regime (threshold ECM models) and in the context of the rising and falling regime of oil prices (asymmetric VAR models). This research extend the current approach to the aspect of asymmetric analysis of reaction in production and inflation in the regimes of economic activity and regimes of oil market conditions.

The purpose of this study is to analyze the impact of energy price shocks on the economic activity of selected European Union economies (Germany, France, Denmark, Netherlands Poland, Czech Republic and European Union). In this work three hypothesis were set:

Hypothesis 1: The adjustment of the economic activity to changes in energy resource prices is non-linear,

Hypothesis 2: The relationship between the short-term components of energy resource prices and the economic activity is unidirectional causal relationship (oil prices are transmitted on to economic activity)

Hypothesis 3: The reaction of economic activity in European Union economies on the energy resource price shocks is asymmetric.

The PhD thesis consists of four chapters, introduction, conclusions and methodological appendix. The plan of this research is as follows. Section 1 presents the characteristics of energy resource market. The characteristics of oil, gas and coal markets were conducted. Chapter two presents the asymmetric relationship between oil prices and macroeconomic activity (i.e. economic growth, industrial production, inflation, monetary policy and stock markets). Section 3 shows the results of analysis in the short- and long-term dynamics between oil prices, production and inflation in selected EU countries in the presence of the structural break due to the financial crisis. Chapter four presents the results of asymmetric relationship analysis between oil prices, production and inflation with multivariate approach (VAR).

The data consist of seasonally adjusted monthly industrial production index at constant prices of 201 (P_t), consumer price index for the EU economies (corresponding month of previous year = 100) (In_t) and Brent crude oil prices (in USD/bbl) (B_t) from January 1995 to April 2014.

Methodology applied in this work include, the threshold cointegration analysis (Enders and Siklos approach) which is extended to the case of structural break due to the financial crisis. Then the Granger causality among oil prices, production and inflation is examined based on the threshold and linear ECM models. Then the asymmetric relationship between oil prices, production and inflation is analyzed with VAR models and impulse response function.

First, the threshold cointegration analysis (structural break occur in September 2008 when the financial crisis peaked) allows to identify the long-run relationship between production, inflation and oil prices for Germany, France, the EU and Poland. For Germany, France and the EU belonging to the developed countries the threshold cointegration has been found in low growth state of the economy. It means, that the Germany, France and EU economies reverts much faster toward its long-run equilibrium when the deviations are below the threshold value and tends to persist when the deviations are above the threshold value. However, Polish economy reverts much faster toward its long-run equilibrium when the deviations are above the threshold value and tends to persist when the deviations are below the threshold.

Second, the error correction models are capable to detect the significant relationship between oil prices, production and inflation in Germany, France, European Union and Poland. The threshold models (T-ECM) outperform the linear ECM models because the former can reveal the asymmetric connections among analyzed variables in terms of short-run and long-run relations, while the latter cannot. When the economy is in the high growth phase of business cycle (deviations form long-run equation are above the threshold – regime 1) the Granger causality test finds evidence of short-run relationship running from oil prices to inflation (for Germany, France and EU). When the economy is in the low growth phase of business cycle (deviations form long-run equation are below the threshold – regime 2) the Granger causality test finds evidence of short-run relationship running from oil prices to production (for Germany, France and EU). In the case Poland, when the economy is in the high growth phase of business cycle (deviations form long-run equation are above the threshold value – regime 1) the short-run causality from oil prices to inflation and production is identified.

The analysis of asymmetric reaction of production and inflation on the oil price shocks, conducted on basis of impulse response function (IRF) from VAR models, shows that the oil price shocks are transmitted to the economic activity by the high inflation channel and the low economic growth channel. The high inflation channel is more active, when the oil prices rise than the oil prices drops. But the low economic growth channel is more active when the oil prices drops, than the oil prices rise.

The presented study is a wider spectrum of economic problems related to the analysis of relationship between economic activity and fluctuations of energy resource prices. Further studies should be conducted in several directions, like:

- build asymmetric models with more variables (such as exchange rates and bilateral trade between economies),
- use other multivariate, nonlinear models (such as threshold VAR/VECM or Markov-switching VAR models).