How Persistent are Shocks to Energy Prices?

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EXECUTIVE SUMMARY

This paper examines whether the effect of shocks on energy prices are transitory or permanent. An understanding of how persistent the shocks are to energy prices is important for policy makers, as energy commodities can exert a significant impact on a country's economy. For example, for countries that are dependent on energy commodities, policy makers would need to consider the efficacy of counter-cyclical stabilization policies. Besides, permanent energy price shocks can have consequences in terms of creating inflationary pressures which has a direct effect of reducing household income and also an indirect effect on lowering consumer confidence. Not surprisingly, there have been several studies that examine whether energy prices are persistent to shocks. However, the fact that energy prices are likely to exhibit concurrent volatility has been overlooked, and this property can severely affect the methods used in past studies to test for persistence, leading to erroneous conclusions that can have far reaching consequences. This paper identifies the gap and carries out novel and robust tests that can examine persistence of such shocks allowing for changing volatility, paying particular attention to the presence of trends and possible structural breaks. The most common method to test for persistence in energy prices are unit root tests. A battery of novel econometric procedures are implemented taking in to account the characteristics of energy price data. These include a robust test for structural breaks and tests for nonstationary volatility. Accordingly, novel unit root tests are carried out that combine these features of trend breaks and non-stationary volatility that are most appropriate to the data. To this end, two sets of price data measured at monthly and weekly frequencies, which cover the benchmark crude oils, , as well as other energy commodities such as natural gas, coal, heating

oil and gasoline are employed. The empirical results show that shocks to energy prices are not transitory. This result is contrary to some of the recent empirical studies, however, it fits with the narrative based on the reasoning that rapid industrialization over a considerable period of time is characterised by growth shocks which are highly persistent, which in turn leads to persistent changes in oil prices. Further, in a period of rising demand, the OPEC was able to restrict access to additional supplies of oil which may have contributed to the persistence in energy prices. Given the empirical findings on the nature of oil price shocks, the analysis is extended further, by employing an econometric procedure that allows for the decomposition of a benchmark oil price, the decomposition of a demand side variable, (industrial production), and a supply side variable (oil supply) into their permanent and transitory components. The procedure produces cross correlations between these individual components that can lend support to studies in commodity market dynamics with storage. Overall, this study allows one to draw inferences from whether shocks to energy prices are permanent or transitory. For example, after the oil price shock in the early 1970s, the price controls imposed by the U.S. government may have been necessary if the prices were not to revert back to the long term trend. Similarly, the OPEC production quotas of the early 1980s may have not have been redundant if oil prices were anticipated to exhibit a stochastic trend. The findings have strong implications for investment decisions. If shocks to energy prices were indeed to have a permanent effect, then considering the long investment horizon in oil fields, it would imply that we cannot easily ignore the significant deviations from trend. The cumulative evidence of volatility alongside the persistence found in energy prices highlights the additional aspect of 'uncertainty in persistence', which may delay irreversible investment decisions. If shocks to energy prices are permanent, then there are possibilities for energy prices to create instabilities, in particular to emerging countries that are reliant on energy commodities as intermediate inputs.