**Abstract**

**Does Oil Price plunge affect alternative energy growth? Evidence from Dynamic Panel Model**

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This Paper used dynamic panel model to analyse the effects of oil price on the growth of biofuels as the alternative energy of choice. Lately, the increased knowledge in matters of climatic change and pollution saw the focus shift to overall greenhouse emissions and the adoption of renewable energy. The world addresses these issues through various internationally binding agreements through the United Nations Framework Convention on Climate Change (UNFCCC). One such agreement is the Paris binding target in 2015 aimed at reducing greenhouse gases emissions. Currently, oil and coal constitute the world's main energy sources. However, both contribute immensely to carbon-dioxide increase in the atmosphere. To achieve the Paris binding target, the world must significantly reduce its dependency on fossil fuels and embrace more the renewable energies such as hydropower, biofuels, solar, the wind, geothermal, and wave or tidal power sources.

The rapid growth in the renewable energy resulted in a record high investments of U.S. $286 billion in the year 2015. This was an 11.28 percent increase from 2011. However, when compared to the 2004 figures, it represented a six-fold increase. This study, however, found that despite this robust growth, there are still considerable limitations in the use of renewable energy in the world and the world's renewable energy's consumption in 2013 was only 2.2 percent averagely .Therefore, oil is still the world's primary energy source and is bound to remain in the number one spot for the coming decades.

As its methodology, this study used dynamic panel model to study the autocorrelation between the oil price changes and the growth of biofuel stocks. To achieve this, it employed two sets of data for the periods of the fourth quarter of 1998 to the end of 2008 and from the first quarter 2009 to the second quarter of 2015. This study established during its literature

review of Hsiao (2003) that the panel data model "*deals with unobserved heterogeneity by applying the within (demeaning) transformation, as in one-way fixed effects models, or by taking first differences if the second dimension of the panel is a proper time series*" (p.2). Number of lags was crucial in this study since the study employed several tests,

As this study aim to investigate extent in which 2014 oil prices plunge affected the renewable energy stocks in the long term, it included a data interval that allowed the energy players to regulate the market for essential changes that include the monthly as well as quarterly data breaks in its statistical analysis since quarterly data is an ideal interval in determining long-term changes in both oil and biofuel stocks.

The expected outcome of this study is that in the year 1998 to 2008, the shock response functions during that period will differ significantly according to the data interval the study chooses to analyse since the test results indicated that the correlation between Brent oil price and the quarterly NEX index are integrated. As dynamic panel model does not consider stationary data in the analysis, shocks are likely to have a long-lasting influence on the determined dependent variable. However, where the model employed the monthly data, it became necessary to use stationary data and, therefore, in the analysis, shocks do not persist and subsequently, their effects die out eventually.

To conclude, the statistical analysis showed that the S&P GSCI Biofuels index and Brent crude oil price are integrated as both of the stocks' analysis directly assesses the performance of these commodities directly. Therefore, a similar behaviour is expected from the two energy stocks.

Additionally, the two energy sources are widely employed in the production of liquid fuels vital in the transport sector. Currently, biofuels constitute a mere 3 percent of the global fuels used by the transport industry. Only Flexi-fuel motor vehicles use pure biofuels and these cars are very few in the world presently. Therefore, most of the biofuels are blended with petrol to form regular gasoline used by the regular cars. Therefore, the price of biofuels determines the proportion of biofuels that go into the blends. Consequently, if prices are relatively higher than regular gasoline, fewer biofuels go into blending resulting in decreased demand and this pushes downward the biofuel prices. However, if the price of Brent crude oil is high, the proportion of biofuels that go into regular gasoline formulation will increase putting more pressure on biofuel prices. Though prices may vary in the short term, they tend to remain integrated in the long-term.

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