ANALYSIS ON THE RELATIONSHIP BETWEEN SECTORAL ELECTRICITY CONSUMPTION, ECONOMIC PERFORMANCE AND ELECTRICITY PRICE IN MALAYSIA

By

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ABSTRACT

Electricity is one of the important sources of energy and is vital for the process of the country’s economic growth. The issues of growing electricity consumption and heavy electricity subsidies have raised the attention of the government. However, the majority of the previous studies that specialize on the demand side of electricity were focused on total electricity consumption. Thus, this paper aims to provide the background analysis of electricity consumption trends with the focus on the four main economic sectors in Malaysia such as the industrial, commercial, mining and agricultural. The purposes were to examine the relationship between electricity consumption, Gross Domestic Product (GDP) and price of electricity based on panel data for the period 2002 to 2012. The sectoral electricity consumption model was tested using econometric techniques such as Panel Cointegration, Panel Fully Modified Ordinary Least Square (FMOLS) and Panel Granger Causality tests. The Panel Cointegration Test confirmed an existence of a stable long run relationship among the variables. The results from the panel FMOLS estimation revealed that the electricity consumption in industrial, commercial and mining sectors was positively responsive to GDP changes. In the agricultural sector, GDP had a negative effect on electricity consumption. Moreover, the higher electricity price tended to increase and decrease electricity consumption in the industrial sector and commercial sector respectively. Nonetheless, the results of the electricity price were not significant in the mining and agricultural sectors. For all the sectors, an increase in GDP had a positive effect on electricity consumption. Finally, the Panel Granger Causality Test detected a relationship running from economic growth to electricity consumption. The results obtained indicated that policy maker must be careful in the formulation of energy policy, thus suggesting that the policy should be focused on the electricity consumption in each sector.
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Mohd Hafiz Aswad bin Nadzri

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<tr>
<td>ADF</td>
<td>Augmented Dickey-Fuller</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of South-East Asian Nations</td>
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<tr>
<td>Sen/kWh</td>
<td>Sen per kilowatts hour</td>
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<tr>
<td>CI</td>
<td>Capital Investment</td>
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<td>CONS</td>
<td>Number of Consumers</td>
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<td>CPI</td>
<td>Consumer Price Index</td>
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<td>EC</td>
<td>Electricity Consumption</td>
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<td>ECM</td>
<td>Error Correction Model</td>
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<td>ECT</td>
<td>Error Correction Term</td>
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<td>EMP</td>
<td>Employment</td>
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<td>FMOLS</td>
<td>Fully Modified Ordinary Least Square</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GW</td>
<td>Gigawatts</td>
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<td>GWh</td>
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<td>IEA</td>
<td>International Energy Agency</td>
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<td>IPP</td>
<td>Independent Power Producer</td>
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<td>kWh</td>
<td>Kilowatts per hour</td>
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<tr>
<td>LLC</td>
<td>Levin, Lin and Chu</td>
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<td>MIEEIP</td>
<td>Malaysian Industrial Energy Efficiency Improvement Project</td>
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<td>MW</td>
<td>Megawatts</td>
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<td>OLS</td>
<td>Ordinary Least Square</td>
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<td>PE</td>
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<td>RE</td>
<td>Renewable Energy</td>
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<td>SEB</td>
<td>Sarawak Energy Berhad</td>
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<td>SESB</td>
<td>Sabah Electricity Sdn Bhd</td>
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<td>SUR</td>
<td>Seemingly Unrelated Regression</td>
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<td>TNB</td>
<td>Tenaga Nasional Berhad</td>
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<td>TWh</td>
<td>Terawatts per hour</td>
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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

Electricity is a man-made source of energy. As it is non-durable, electricity compliments durable goods like electrical appliances or electrical machinery (Rebensteiner, 2013). It helps directly by running consumer durables in terms of services and running machines which help directly or indirectly to produce consumer goods. Electricity is an exceptional energy because the consumption of electricity has to be simultaneous once it is been generated, thus electricity cannot be economically stored. Furthermore, electricity has a unique position among other different types of energy because electricity is clean energy, is easy to transfer and can be transformed into other kinds of energy. The demand of electricity varies hourly, daily, weekly and across the seasons (Ranci & Cervigni, 2013). It cannot be fully controlled and it is practically impossible to prevent market participants from consuming more or less electricity.

Electricity plays an important role in the process of economic growth and is required for both commercial and non-commercial usage. Commercial usage of electricity refers to the use of electric power in the industrial, commercial, mining and agricultural sectors. For non-commercial, the principal use of electricity energy is for public lighting and by residential consumer. Winkler, Simoes, Rovere, Rahman & Mwakasonda (2011) stated that electricity is a vital input together with machinery,
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