Chapter 9

Changing Patterns of Energy Use and Its Linkage With Some Macroeconomic Variables in India and China

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ABSTRACT

Over the last decade there has been a gradual change in the global energy landscape, with fast-growing emerging markets overtaking the traditional centers in terms of energy demand. International Energy Outlook 2017 forecasts that energy consumption in non-OECD countries would increase by 41% between 2015 and 2040 in contrast to a 9% increase in OECD countries. The chapter focuses on two major areas: (1) examining the changing pattern of the composition of energy use in the two selected countries of Asia (India and China) and (2) examining the short-run and long-run relationship among energy use, GDP per capita, energy intensity, use of electricity power, extent of urbanization. Using ARDL bound test for the period 1990 to 2014 for the World Development Indicator data 2017-18, it reveals that the powerhouses of global energy demand growth are led by the developing economies of Asia (i.e., China, India, Indonesia, Morocco, Brazil, Singapore, and Thailand). In the case of India, a long-run association has been found between energy use and GDP per capita, energy intensity, use of electricity power, and extent of urbanization, but no instances are for China.

INTRODUCTION

Of late, there has been a gradual change in the global energy landscape, with fast-growing emerging markets overtaking the traditional centres in terms of energy demand. The composition of energy mix is also undergoing a major change which is being guided by technological innovations or inventions and environmental concerns. One of the fundamental characteristics of the energy transition mapped out by this Energy Outlook Survey 2017 is gradual movement towards de-carbonization of the fuel mix. Sig-

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nificant improvements in the competitiveness of renewable energy have led to the increases in renewable, together with nuclear and hydro energy which expected to provide around half of the increase in global energy till 2035. Natural gas is expected to grow faster than oil or coal, helped by the rapid growth of liquefied natural gas(LNG) increasing the accessibility of gas across the globe. Compared to the growth of vehicles, oil demand continues to increase at a slower pace due to fuel efficiency and technological improvements, such as electric vehicles, battery driven cars etc has been increasingly implemented to keep the environment green. The expansion in the overall demand for energy is expected to continue as increasing prosperity in fast-growing emerging economies lifts billions of people from low incomes. But due to increasing attention in improvements in energy efficiency around the world the extent of this increase is likely to be curbed and making it more sustainable.

Global primary energy consumption grew strongly in 2017, led by natural gas and renewable, with coal's share of the energy mix continuing to decline. Primary energy consumption growth averaged 2.2% in 2017, up from 1.2% in 2016.By fuel, natural gas accounted for the largest increment in energy consumption, followed by renewable and then oil. Energy consumption rose by 3.1% in China. China was the largest growth market for energy for the 17th consecutive year.

Carbon emissions from energy consumption increased by 1.6%, after little or no growth for the three years from 2014 to 2016.Despite the unusually strong growth in the OECD, the vast majority of the increase in global energy consumption came from the developing world, accounting for nearly 80% of the expansion.

LITERATURE REVIEW

Aqeel and Butt (2001) in their paper investigate the causal relationship between energy consumption and economic growth and energy consumption and employment in Pakistan.By applying techniques of co-integration and Hsiao's version of Granger causality, the results infer that economic growth causes total energy consumption. Economic growth also leads to growth in petroleum consumption, while on the other hand, neither economic growth nor gas consumption affect each other. Fatai (2014) in his study reassesses the causal relationships between energy consumption and economic growthin 18 Sub-Saharan Africa countries over the period1980-2011.The results of panel co-integration tests show that energy consumption and economic growth do have a stable long-run equilibrium relationship.Siddique and Majeed (2015) attempted to explore the impact of energy consumption, trade and financial development on growth in five South Asian countries over 1980-2010. The panel co-integration approach is employed to examine the long run association and granger causality analysis for direction.Masuduzzaman (2013) in his paper tries to investigate the relationship between economic growth, electricity consumption and investment for Bangladesh through co-integration and causality analysis over the period 1981 to 2011. The Granger F test results show the existence of unidirectional causality running from electricity consumption to economic growth, electricity consumption to investment and investment to economic growth without feedback in the short run. The source of causation in the long run is also found to be the error correction terms from electricity consumption and economic growth to investment. Khobai, Abel& Roux (2017) investigates the long run relationship and causal relationship between energy consumption and economic growth in the BRICS countries during the period 1990 – 2013. Kabir, Zaku, Tukur & Aikhuele (2013) in their paper tried to examine the causal relationship between energy consumption and National income of Nigeria. The importance of identifying the direction of causality emanates from

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