

THE THRESHOLD EFFECT ANALYSIS OF URBANIZATION AND ENERGY CONSUMPTION: A CASE STUDY OF 29 PROVINCES IN CHINA

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Overview

China has experienced a rapid urbanization process during the past three decades. From 1980 to 2015, The urban population of China expanded by 4 times, the urbanization rate has reached 56.1% in 2015 from 19.4% in 1980. Moreover, the estimation from World Urbanization Prospects shows that the urbanization rate in China will reach 77.3% in 2050. Increased urbanization may have a larger impact on energy consumption, with the consumption of urban residents being about four times that of rural residents. Each 1% increase in When the urbanization will result in an additional energy consumption of approximately 345.8 million tons of oil equivalent (MTOE), including coal, oil, natural gas, and renewable energy. Especially in China, the 35 largest cities include 18% of the population and 40% of energy consumption. Recent studies argue that economic growth has varied impacts on energy consumption at different development stages, such as under different industrialization rates or urbanization rates ,even different per capita income levels will has varied impacts on energy consumption . This study aims to investigate the effects of urbanization and industrialization on energy consumption while considering the different levels of development. we use panel threshold regression models to regroup a balanced panel dataset of 29 provinces in China, and our conclusion shows that there exists at least one threshold point which the impacts of urbanization and industrialization on energy consumption vary across the levels of urbanization and industrialization. Therefore, the research of relationship among urbanization industrialization energy consumption is useful for the Chinese government taking different measures to promote urbanization and industrialization at different stages of development in order to optimizing the energy structure and Improving energy efficiency.

The paper is organized as follows: After the introduction the second section gives a brief reviews related literature and previous studies on the influences of urbanization on energy consumption. The third section describes the econometric method and sample data. In section four we presents the empirical results. In the five section the conclusions and discussions are presented .In the final section gives the policy recommendations based on the conclusions .

Methodology

Panel threshold regression model

Result

First, We use industrialization rate as a threshold variable .The result indicates that one threshold point existing obviously , It shows that the estimated threshold values is 0.34,which means when the industrialization rate

belongs to the $[0, 0.34]$ interval, a 1% increase in the industrialization level would lead to a 2.2% increase in energy consumption, while the industrialization rate is Greater than 0.34, a 1% increase in the industrialization level would lead to a 3.1% increase in total energy consumption.

Second, We use urbanization as threshold variables. The result indicates that two threshold point existing obviously. It shows that the estimated threshold values are 0.68 and 0.78, which means when the urbanization rate belongs to the $[0, 0.68]$ interval, a 1% increase in the urbanization would lead to a 3.3% increase in total energy consumption, while the urbanization belongs to the $[0.68, 0.78]$ interval, a 1% increase in the urbanization level would lead to a 2.1% increase in energy consumption. when the urbanization rate is greater than 0.78, a 1% increase in the urbanization would lead to a 3% increase in energy consumption.

Third, we use the urban per capita income as threshold variables, indicating that two threshold point existing obviously. It shows that the estimated threshold values are RMB7331 and RMB14,764. The interval is divided into three stages, named as low-income, middle-income, and high-income stage. Therefore, at low-income stage, the result shows that urbanization increases by 1%, energy consumption increases by 0.8%. at middle-income. At middle-income, urbanization increases by 1%, energy consumption increases by 1.8%. At high-income, urbanization increases by 1%, energy consumption increases by 2.3%.

Conclusions

There is an inverted U - shaped trend between urbanization and urban energy consumption in China. According to the results above, the relation between urbanization and energy in China are currently in the left of the inverted U-shaped. Institutional reform and technological innovation are the most basic ways to alleviate the contradiction between urbanization and energy consumption.

References

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