Market Segmentation and Energy Efficiency: Evidence from China's Regional Economies

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With widespread local air pollution throughout China and an urgent need to address global climate change, increasing energy consumption and CO_2 emissions have made China's energy efficiency the topic of a growing number of studies. In recent years, as China's economy has progressed toward high-quality growth, the literature on how to improve energy efficiency has shifted its focus from demand-side to supply-side factors, and there is now a general consensus that suboptimal resource allocation in factor markets is the key to limiting China's energy efficiency. However, suboptimal resource allocation is merely a phenomenon created by delayed reforms in China's energy markets, and few studies have investigated the origin of this phenomenon and its impact on energy efficiency under China's current administrative structure. To fill the gap of literature, this paper investigates the impact of market segmentation driven by competition among local governments on energy efficiency.

Theoretically, we clarify how market segmentation impacts energy efficiency directly, and the indirect transmission mechanisms that exist between them. Empirically, the epsilon-based measure model, which combines the merits of radial and non-radial data envelopment analysis, is used to measure energy efficiency in China, and the price index method, which has been widely employed to measure market segmentation in recent studies, is further improved in this paper. After collecting data from 18 provincial-level administrative entities in mainland China, we use fractional regression models to study the influence of market segmentation on energy efficiency.

Our analysis provides evidence that market segmentation has a significant negative effect on China's energy efficiency. This remains robust even if the independent and dependent variables are measured with new indicators, extreme observations are replaced, and samples prior to the 2008 financial crisis are removed. Additionally, the inhibitory effect varies depending on the region and market segmentation distribution. The impact mechanism test reveals that energy price distortion, enterprise technology innovation and industrial agglomeration are three mediating mechanisms through which market segmentation affects energy efficiency.

Based on the above findings, the Chinese central government should work to eliminate local protections and accelerate market integration to the greatest extent possible. It is critical to remove the intermediary mechanisms through which market segmentation inhibits energy efficiency. Furthermore, the advancement of a local official should be evaluated in terms of economic, social, energy, and environmental performance across the entire jurisdiction, rather than focusing simply on economic growth.

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