CLUB CONVERGENCE IN THE ENERGY INTENSITY OF CHINA

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Overview

This paper studies the regional energy intensity of China by adopting a methodology proposed by Phillips and Sul (2007). While the existing literature has paid more attention to the dynamics of China's energy intensity at the aggregate or sectoral level to try to find the driving forces of fluctuations in China's energy intensity, we approach this problem from a regional perspective. By identifying clubs of convergent regions, we conclude that energy intensity may converge to different equilibria depending on regionally specific characteristics.

Methods

Phillips and Sul (2007, hereinafter PS) proposed an empirical algorithm explicitly dealing with this problem based on tests of convergence. The algorithm allows for possible convergence clusters or clubs that move towards separate points of equilibria. Instead of relying on some pre-specified criteria, identifying convergence clubs offers us the opportunity to study the characteristics and patterns within the clubs and therefore provides useful information for understanding the underlying mechanisms.

The algorithm is based on repeated logt regressions and PS provide detailed instructions for clustering. First assume there is a 'core' convergence Club G_k with k members. then use the logt test on adding an additional member k + 1 to G_k. The test statistic will be insignificant if the new member belongs to this group. The algorithm can be illustrated briefly in the following four steps: ordering, forming the core group, sieving the membership and stop searching.

Results

The convergence of the full panel energy intensity in China for 28 provinces will be examined first using the logt test. Its estimated value of b is -1.183 and the t statistic is −18.889, suggesting a divergence of the full panel. Following Phillips and Sul (2007), we are able to sort the provinces into three convergence clubs. The results provide information which can promote the understanding of current regional differences in the energy intensity transitions across China. There are four members in the first club, namely, Neimeng, Qinghai, Guizhou, and Ningxia. It is interesting to discuss the combination of the 12 club members in group 2. It is a mixture of provinces located in all parts of China, including Hebei, Hubei, Shanxi, Shanxi-Xian, and Hunan in the center; Liaoning, Shandong, and Jilin in the east; and Sichuan, Xinjiang, Gansu, and Yunnan in the west. The members of Club 3 are mainly located in the east, with a clearly more advanced economic development.

Conclusions

Energy intensity is an important issue not only for a country but also for the re gions within it. Though there has been a clear declining trend of energy intensity in China, there are significant regional disparities. This paper has investigated the issue of convergence among 28 provinces in China. The underlying question, which may have strong policy implications, is whether the disparity is temporary and whether regional energy intensity converges in the long run. If there is no country level convergence, will there be convergence clubs?

Normally, people believe that the provinces in China can be divided into the coastal region, the midlands, and the western region. However, in this paper, using a recently developed method, we demonstrated that three convergence clubs exist, but the club members do not exactly follow this stereotyped belief. Our empirical results provide important information to classify provinces into convergence clubs, and furthermore, looking into the patterns within each club enables us to discuss what is necessary to improve its energy intensity while trying to maintain regional

balance. Through descriptive statistics and some simple regressions, we showed that economic advances, investment, and economic structure are important factors when considering policy design. Additionally, using forecast data over the next ten years, assuming no interventions or external shocks, we found there is no possibility of a countrywide convergence. The authorities may need to use regionally specific, or more precisely, club specific policies in order to successfully achieve a balanced energy intensity path all over the country.

References

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