

[REGIONAL DISPARITY AND CHINESE FOSSIL ENERGY SUBSIDIES REFORM]

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Overview

Considering that the fossil energy subsidies harm the environment and in large amount in China, it is urgent for China to conduct the reform policy. However, one big issue in China is the regional disparity, in terms of economic development, industrial structure and geographical features. The disparity adds uncertainty to the effectiveness and efficiency of the reform policy. Therefore, this study invested the regional disparity of fossil energy reform in China 31 provinces/mega cities, so as to support the policy making optimization. We firstly analysed the fossil energy subsidies in China from 2005 to 2010. It was noted that the electricity subsidies and oil subsidies took a large percentage. Further we made an in-depth analysis and evaluation on two issues: the economic impacts (EI) and environmental effects (EE) of fossil energy reform on the 31 regions in China. For the former, we calculated the ratio of energy expense increase and the GDP per capita; for the later, we calculated the energy saving and CO₂ reduction effects. Results highlighted that from the perspective of economic impacts, three megacities named Beijing, Shanghai and Tianjin showed the lowest EI, while the lagged areas, like the middle and western areas had a higher EI. From the perspective of environmental effects, mega cities showed lower EE, while the industry centered areas and energy/power supply regions own the higher EE. For an improved reform policy, a trade off between the economic impacts and the environmental effects should be considered. Based on the analytical results, we proposed and discussed the appropriate reform policy mix that could effectively deal with the regional disparity in China.

Methodology

In this study, we mainly studied the following issues with several approaches.

First of all, based on multi sources, we analysed the fossil energy subsidies in China from 2005 to 2010.

Furthermore, we made an in-depth analysis on the regional disparity of fossil energy subsidies in China's 31 provinces/mega cities. We designed two assessment indicators, named economic impacts (EI) and environmental effects (EE). They were defined as:

$$EI = \frac{EEI}{GDPP} \quad (1) \quad EE = EE_{es} + EE_{cr} \quad (2)$$

Where, the EEI is energy expense increase (USD/capita); $GDPP$ is the GDP per capita (USD/capita). EE_{es} is the energy saving per capita (tce/capita); EE_{cr} is the pollutants reduction per capita (kg/capita), here we selected CO₂.

As to investigate the energy products price and consumption change due to the subsidies reform, as subsidies lower the end-use prices, we use the constant-elasticity inverse demand function to calculate the impacts of removing the subsidies on energy consumption.

$$q = P^\varepsilon \quad (3) \quad \Delta q = Q_0 - Q_1 \quad (4)$$

Where q is the energy consumption and ε is the long-term demand elasticity. Δq stands for the change in consumption after removing the subsidies. Q_0 and Q_1 are the quantity before and after removing the price-gap respectively. With the data of price-gap and the price elasticity, it can be obtained that how the energy price and consumption amount would change after removing the subsidies. The pollutants reduction could be gain from the multification of energy saving and the according pollutants emissions co-efficients.

Results

Based on the data of Chinese 31 provinces/mega-cities and above methodologies, we analyse the regional disparity of fossil energy subsidies reform in China. Shown as **Figure 1**, the analysis of fossil energy subsidies showed that in current China, the electricity and oil subsidies took a large percentage.

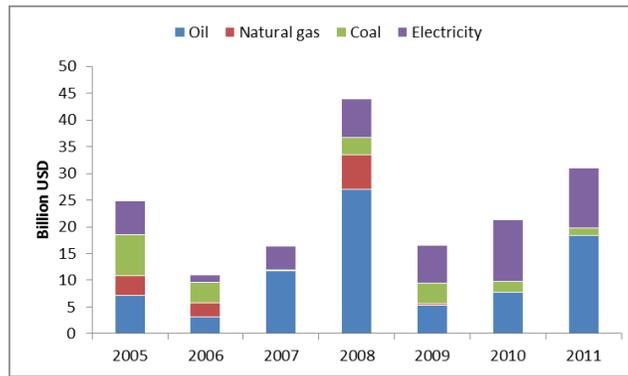


Figure 1 Fossil Energy Subsidies in China from 2005 to 2011

Source: The data of 2005 and 2006 come from WEO, 2007; the data of 2007 to 2010 come from OECD; the data of 2011 come from IEA.

The analysis of economic impacts showed that developed areas, such as the mega-cities are burden with lower EI, while lagged and poor areas would suffer more lost from the fossil energy subsidies reform.

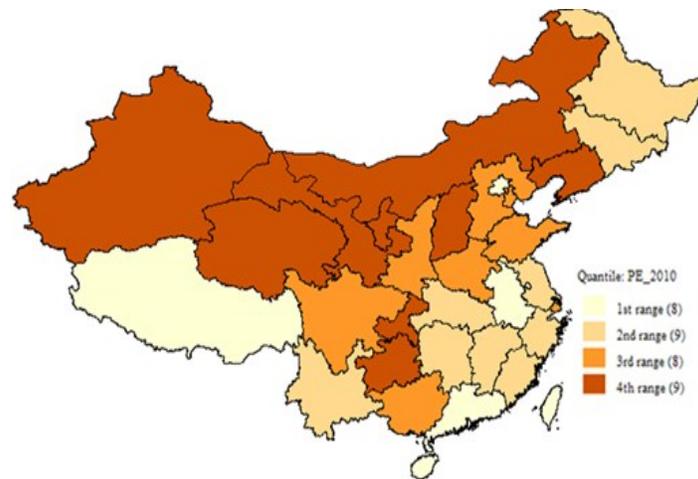


Figure 2 Environmental effects for Chinese 31 provinces/cities through fossil energy subsidies reform
Note: The darker color means larger reduction effects. We classified the regions into 4 groups according to the degree of reduction effects.

From the perspective of environmental effects, shown as [Figure 2](#), mega cities showed lower EE, while the industry centered areas and energy/power supply regions own the higher EE.

Conclusions

Our study investigated the regional disparity of fossil energy subsidies reform in China's 31 provinces. The results presented great disparity in terms of economic impacts and environmental effects, which inlighting that a trade off between the economic and environmental aspects was needed for policy making.

Regional disparity is a specific feature for emerging China. Different economic development stage and industrial structure have great effects on the policy implementation effectness and efficiency. For future subsidies reform policy making, a mix of policy measures best suited for each regions's challenges and customs, including the subsidies transformation and cascade subsidies removal, will be needed to effectively reform the subsidies policy.

References

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