WHAT ARE THE FORCES THAT DRIVE THE CHANGE IN ENERGY POVERTY? THE JAPANESE CASE

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Overview

Energy poverty can be described, conceptually, as the condition of lacking the resources necessary to meet basic energy needs, following the definition of food poverty given by Greer and Thorbecke (1986). The lack of access to modern types of energy (e.g., electricity) is generally the focal point in the context of developing countries, whereas the broader issues that prevent people from satisfying their basic energy needs are the focus of the energy poverty problem in developed countries, as in Japan.

Concerning energy poverty, Japan faces an unparalleled situation. Following the Fukushima nuclear plant disaster, nuclear power plants have hardly been operating for four years. Moreover, the government encourages renewable energy production using measures such as a feed-in tariff scheme. These increase the energy costs. In addition to this kind of "denuclearization" movement, the government introduced the new tax on fossil fuels to tackle climate change, and raised the consumption tax to sustain the social security systems. All of these factors have already increased the energy costs in recent years, which sooner or later will be passed on to the households in the form of higher energy prices.

Apart from the energy price hikes, there is another problem: the share of low-income household is increasing, reflecting Japan's aging and sluggish economy. Vulnerable households such as lone-parent-with-dependent-child(ren) and elderly and/or single-person households are highly sensitive to rising energy costs. From these points of view, the energy poverty problem could be a thorny issue worrying Japan on a middle- or long-term basis.

Given the above-mentioned background, this research analyzes the past and present situation of energy poverty in Japan, especially around the year of the Great East Japan Earthquake, and specifies the factors in the change of energy poverty in Japan. There have been few studies about the issue in Japan, although my empirical result shows that there are sure signs of energy poverty in Japan, particularly in lower income and vulnerable households. This study also performs a decomposition analysis to identify the driving factors to the change in energy poverty in Japan.

Methods

This research tackles the energy poverty problem using the detailed microdata on household income and expenditure, with a sample of about 50,000 households covering the whole of Japan. The data is provided for this research purpose and makes us possible to perform a full-fledged analysis of the impacts on low-income and vulnerable households. The study examines the situation of energy poverty in Japan after the 2000s by poverty measures and then performs a decomposition analysis to evaluate the forces that drive the change in energy poverty.

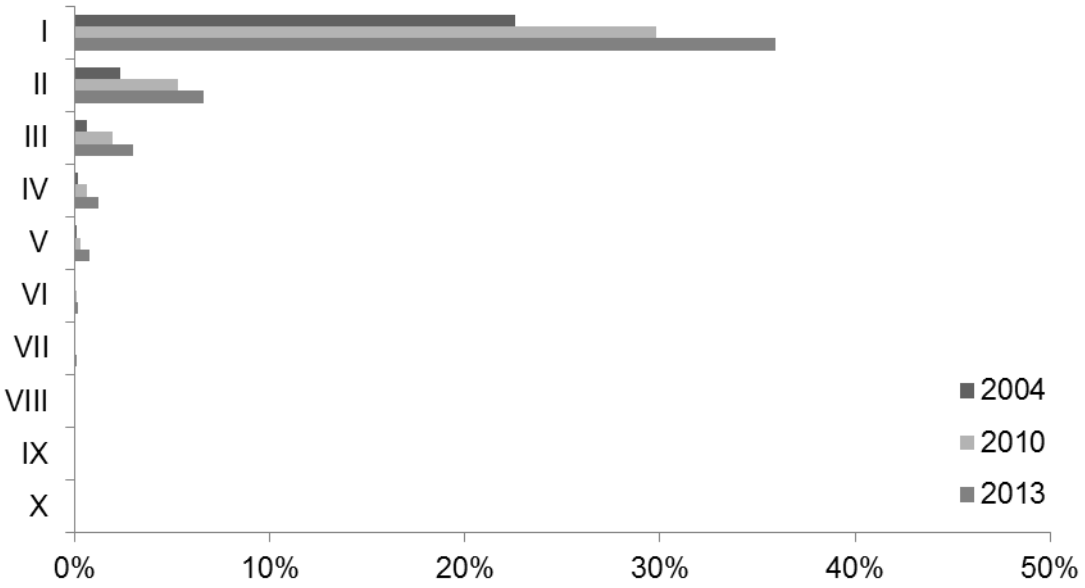
Results

This research first analyzes the issue of energy poverty in Japan in the past decade, focusing on the period before and after 2011 – the year of the Great East Japan Earthquake and the Fukushima nuclear plant accident. Here, I use the energy budget share approach for the definition of energy poverty (Pachauri et al., 2004; Boardman, 2010); specifically, I define households in energy poverty as those that spend more than 10% of their income on energy expenses (energy costs), namely electricity, gas, and heating oil. Figure 1 shows that the rate of energy poverty households in the lowest income decile group increases from 23% in 2004, 30% in 2010, to 36% in 2013. On the other side, the rates of energy poverty households are small in higher income groups and the changes are relatively minor. This result indicates that energy price hikes in the past decade are hurting low-income households, especially the lowest income group. The result also shows the severe impact of energy price hikes after the Fukushima accident on lower income households.

Second, the research specifies the types of households which are vulnerable to energy price escalation. From the result, mother–child households and single-aged households are categorized as vulnerable. In 2013 –after the

earthquake– the energy poverty rate of mother–child households increases to 20%, and that of single-aged households rises to 19%, while 16% of mother–child and 16% of single-aged households are in energy poverty even before the earthquake in 2010. The result clearly shows that the energy price hikes after 2011 stifle the livelihood of vulnerable households.

Figure 1 Energy poverty rate by income decile group



Third, the research proposes a decomposition of poverty indices and identifies the driving forces to the change of energy poverty in Japan. Figure 1 illustrates that the energy poverty rates in the lowest income decile group increase from 2004 to 2013; those are 23% (2004), 30% (2010), and 36% (2013). In the decomposition result, both energy cost factor and income factor positively contribute to the increase of energy poverty from 2004 to 2010 – before the earthquake. In contrast, from 2010 to 2013 – before and after the earthquake– the income turns to the alleviating force and the energy cost is the principal factor to the energy poverty rise. The research shows that there are major changes of the driving factors to the energy poverty increase before and after the Great East Japan Earthquake.

Conclusions

The research considers the past and present situation of energy poverty in Japan, especially around the year of the Great East Japan Earthquake. The result shows the aggravating energy poverty of low-income and vulnerable households, which is caused by the energy price escalation and lowering income in the past decade. This research also identifies the factors of changes in energy poverty in that period. In the result, the income factor is alleviating the energy poverty increase although the rise of energy costs becomes more essential in the context of energy poverty after 2011.

References

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