

[COST PADDING AUDIT IN POVERTY ALLEVIATION OF PHOTOVOLTAIC POWER GENERATION]

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Overview

Climate change, calls for a worldwide trend to implement appropriate measures to reduce greenhouse gas (GHG) emissions, which has raised significant concerns among policymakers. Example of financial incentive includes feed-in-tariffs (FITs), which are being enacted by numerous countries and states across the world.

FITs scandal of photovoltaic power generation is a severe issue in many countries including China. National audit office of China (National audit office of the People's Republic of China, 2013) uncovered the audit results on the “three subjects” which are named as energy conservation, renewable energy and resources comprehensive utilization. Thereby, 348 project units of 5044 projects are disclosed having embezzled or making a fraudulent application and claim on this “three subjects” capital amounting to CNY 1.617 billion from 2011 to 2012, accounting for 2.6% of the extension amount of audit. This kind of violation also spreads among the photovoltaic (PV) poverty alleviation projects which are first raised as pilot in Feidong, Anhui province, 2013. For this reason, The State Council (The state council leading group office of poverty alleviation and development, 2018) required a verification of relevant information on photovoltaic poverty alleviation projects which are included in the list of state subsidies.

Since the poverty-stricken households can not afford the expenditure of power station construction, many PV power generation firms promise to construct power stations for her. By means of credit, the poverty-stricken households only need put into about 30% of the construction funds and the others will be financially supported by the bank loans. As a result, poverty-stricken households have to use the proceeds from power sales and the FITs to repay loans in every term. The poverty-stricken households will have the ownership of the power sales incomes and FITs, as well as the PV power stations after the loan period, as reward. On the other hand, the moral hazard behavior of cost padding often occurs on the PV power generation firms since the vast majority of the construction funds are at their disposal. Government, acting as regulator, has to implement cost padding or falsification (Bougheas & Worrall, 2012) audit to avoid this kind of unethical action among the PV power generation entities. Even though the central government thinks that PV poverty alleviation power stations are inappropriate to be constructed in debt, and enterprises are not suitable to take shares (National Energy Administration, 2018), the cost padding behavior is still difficult to audit and hard to overcome. Moreover, the poverty-stricken households could not afford such an expensive investment any longer without banking credit. Liaoning province, affected by this policy, even adopted absolute solution and cancelled all of the construction of PV poverty alleviation projects (Liaoning leading group office of poverty alleviation and development, 2018).

We perform this study to explore an audit approach to relieve the degree of unethical deed on cost padding without resorting to extreme methods such as some jurisdictions has conducted. In this study, we will deal with such issues as follows.

- (1) Does higher or lower level PV power generation firms have the motivation or act the behavior of cost padding?
- (2) Which type of PV power generation firms, higher or lower level, should be emphasized on by the audit?
- (3) What degree of audit by the government is fit for higher or lower type of PV power generation firms?

Methods

This paper adopts the **Dynamic Stackelberg Game** theoretical method (Sargent & Ljungqvist, 2004) to disclose the issues arised in the section of overview. To illustrate and analysis, we present 3 cases which named as *Central planning*, *Static analysis* and *Dynamic analysis* which is shown as follows.

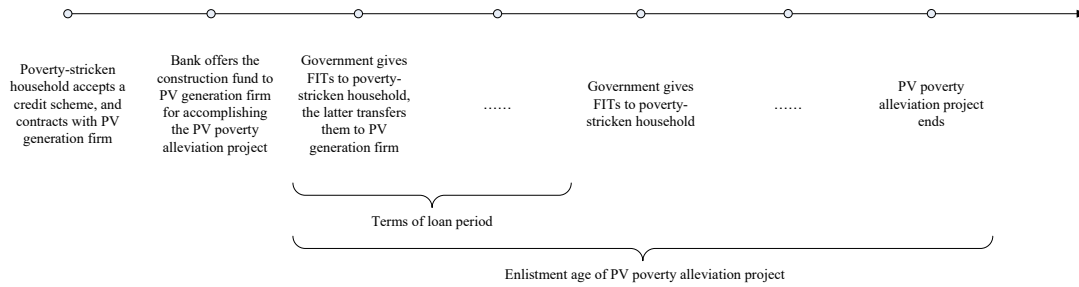


Fig. 1: Dynamic analysis

Results

Since the efficient type's marginal disutility of effort is equal to one, each dollar diverted through cost padding requires an extra effort, with monetary disutility equal to one; the efficient type thus does not engage in cost padding. In contrast, the inefficient type's marginal disutility of effort is lower than one, which may give it an incentive to engage in cost padding.

The imperfect audit induces the inefficient type's lower effort level than that of perfect audit. That is, the imperfect audit gives less powerful incentive.

Efficient type's utility is lower under imperfect audit than under perfect audit.

Conclusions

The ease of the behavior effect of moral hazard by means of cost padding audit is the purpose of this paper. Through theoretical analysis we get the following conclusions: **First**, more efficient firm types choose more powerful incentive schemes and engage in less cost padding at equilibrium and hence, feed-in-tariffs scandal of renewable generation is probably occurring on the lower efficiency firm types. **Second**, high type would prefer to survival in more powerful incentive of cost padding audit. **Third**, low type is more willing to accept imperfect audit so as to lessen effort. Our findings are valuable for regulator to alleviate the impact of the moral hazard of cost padding and hence, improve supervision effect of feed-in-tariffs scandal of renewable generation.

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