On the effectiveness of feed-in tariffs in the development of solar photovoltaics

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Executive summary

In the last few decades, an increasing number of governments have responded to growing concern about climate change and rising prices of fossil fuels by stimulating the development of renewable electricity sources, such as photovoltaic (PV) solar. A so-called feed-in tariff (FIT) has evolved as the most popular policy instrument in support of PV generation. The general idea of a FIT is that the owner of a PV system receives a guaranteed price for every produced kWh that is fed into the grid during a fixed period of time. This paper empirically studies whether or not FIT policies have been effective in encouraging the development of solar power and how various FIT design features and policy consistency have influenced the success of the FIT policy. This is the first paper in the literature in which design features and consistency of FIT policies are explicitly taken into account. In contrast to the current empirical literature, which only measures the average effect of applied FITs, this paper reveals - via the estimated effects of the different FIT design features - what drives the effectiveness of FITs and gives policy makers tools to optimize the instrument.

We employ panel data estimations, using data on 30 OECD member countries over the period 1990-2011, to test the effectiveness of FITs. This technique makes it possible to use both information from differences between countries and changes over time. As endogenous variable, we take the country's yearly added capacity of PV per capita. We explain this variable in terms of a set of variables, including the availability of a FIT, its features (height of tariff, contract duration and the presence of a cap) and the consistency of a FIT (measured by the standard deviation of the features). We use robustness analyses to test whether or not our conclusions change if we make other assumptions.

We find a positive effect of the presence of a FIT on the development of a country's added yearly capacity of PV per capita. This is in line with the results found in the existing literature. However, our study shows that the literature underestimates the potential impact of FITs, as the effect of a well-designed FIT is much larger than the average effect of the currently applied FITs. Not only the height of the tariff is important, but also the duration of the contract and the absence/presence of a cap have an impact. We also show that consistency has large effects on the effectiveness of FITs. Consistency is especially important when the tariff of a FIT is low. The total effect of a FIT can be seven times as large if it is well designed. Our results are robust for differences between countries with respect to the availability of other policy instruments, the use of nuclear or hydro power and the level of CO_2 emissions.

Keywords: energy policy; solar photovoltaics; feed-in tariff; policy consistency; OECD.

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