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DIFFUSION OF ENERGY SAVING TECHNOLOGIES THROUGH FOREIGN DIRECT INVESTMENT:

Empirical Evidence from Indonesian Manufacturing

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Overview

Economic growth is a primary goal for most developing countries, yet the side effects of rising energy demand and resulting Greenhouse Gas (GHG) emissions are increasingly proving to be problematic in light of sustainable development. Concerns over energy security and climate change have urged a call for the development and adoption of energy-saving technologies in the developing world. While it might be difficult for developing countries to achieve the goal by themselves, one possible 'shortcut' is to absorb technology diffusion from developed countries, which are considered to have lager potentials for development and innovation in energy saving technologies. Foreign Direct Investment (FDI) is often regarded as a key channel of technology diffusion. A broad strand of literature has examined the technology diffusion effect as a whole through FDI, but little exists regarding the diffusion of energy saving technologies specifically. Our paper therefore aims to fill this gap by (1) providing empirical evidence on whether the diffusion of energy saving technologies through FDI takes place or not, and (2) exploring the conditions that might influence the diffusion of energy saving technologies.

Methods

A firm-level panel data in Indonesian manufacturing for the period 1993 to 2009 is employed in our paper. To capture the diffusion effect of energy saving technologies through FDI, estimation models are developed to examine whether FDI inflows could help local firms in the same industry to reduce their energy intensity. It is assumed that with more FDI inflows, namely, with foreign firms more involved in local productivity, larger potentials would be generated for the diffusion of energy saving technologies by means of labour turnover, demonstration effects, competition effects and so on. Thus, local firms could benefit from this diffusion, and therefore improve their energy efficiency and reduce the energy intensity. We further interact FDI with technology gap between foreign and local firms in the estimation models so as to see how the diffusion effect varies between different capability levels of local firms.

Results

Results show that in general foreign firms have lower energy intensity compared to local firms, which suggests foreign firms are more efficient in energy use, whereas both types of firms are lowering their energy intensity and the distance between foreign and domestic is narrowing down over the time.

More FDI inflows in the same industry have a significant negative effect on energy intensity of local firms, implying that FDI helps energy intensity reduction of local firms, which confirms the existence of energy saving technologies diffusion through FDI. Moreover, this diffusion effect is larger for industries with a smaller technology gap between foreign and local firms.

Conclusions

Our paper found that diffusion of energy saving technologies through FDI is evident in Indonesian manufacturing. Besides, the diffusion effect is conditional on the absorptive capacity of local firms. Firms with a small technology gap benefit more. It implies that technological competence and the absorptive capacity does matter for local firms to better adopt the energy saving technologies.

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