

Executive summary

Recent studies have shown at the firm and industry levels that green innovations currently have lower returns than non-green innovations. These results indicate that – given the current level of green promotion – free market incentives alone are not sufficient to allow the green innovation activities of industries to rise considerably. However, technological innovations are needed to solve environmental problems. Accordingly, policy intervention is required to stimulate green innovation activities.

This paper focuses on energy prices and investigates whether energy prices increase the probability of producing green inventions. More concretely, we investigate whether the effects of energy prices are different for ‘green’ inventions than for ‘non-green’ inventions based on industry-level panel data.

This study contributes to the existing literature primarily in two respects. First, the breadth of our data set allows us to draw much more general conclusions than was possible in previous studies, which have focused on single industries or countries. This enables us to generate an industry-level data set that covers the whole manufacturing sector (grouped into 10 industries), the most important countries for green innovation (18 OECD countries that are responsible for more than 95% of all green patents and total patents worldwide) and this over a period of 30 years. Secondly, in contrast to previous studies, we greatly reduce the probability of omitted variable bias, which makes our results more reliable.

We find that energy prices stimulate both the level of green invention as well as the share of green invention. In our model, a 10% increase in the average energy prices over the previous five years results in a 3.4% and 4.8% increase of the number of green inventions and the ratio of green inventions to non-green inventions, respectively. Knowledge about potential political instruments to stimulate invention in this area is of great importance. This study shows that energy prices may serve as such an instrument. An increase in energy prices may stimulate the

building of a green knowledge stock that: (a) would help to achieve a country's climate targets; and, (b) may help to establish a cleantech market for which long-term growth is predicted.