

# ***CAN WOMEN PLAY A ROLE IN GREEN INNOVATION?***

Xiaoping He, China Center for Energy Economics Research, Xiamen University, China.

Tel: +86 17706014152.

Email: xphe@xmu.edu.cn

## **Overview**

In response to the increasing demands of the society to improve the environment, many firms have incorporated environmental priorities in the strategic planning to preserve the competitive position and the legitimacy in the areas of environment. Why are some firms more active in the area of environmental innovations, compared to their peers? The present research attempts to answer the question from a perspective of gender diversity, by exploring the relation between board gender diversity and corporate green innovation with panel data of the listed companies of China's manufacturing. The method of extended probit regressions is used to model the choices on green innovation. The empirical findings show that occurrence of green innovation at the firm-level is systematically related to the presence of women sitting on the boards - women can exhibit a positive and sizable effect on both types of green innovations, once they enjoy at least two seats on the boards. The results provide empirical evidence that the critical mass hypothesis is valid for women's role in shaping corporate strategies. The conclusions are of practical implications for improving the corporate governance with regard to environmental management..

## **Methods**

The sample contains 1585 listed firms of China's manufacturing over the period from 2010 to 2015. Two types of green innovations are investigated, including green product innovation and green process innovation. The former is assessed by ownership of valid "green" patents, and latter is assessed by attainment of ISO14001 certification of environmental management. The green patents are identified by combining patent classifications with Chinese characters keywords and phrases that appeared in patent titles and abstracts. Suppose adding a woman to the board is not gender neutral, effect of gender diversity on green innovation is captured by extended probit regressions with an endogenous discrete (or continuous) regressor.

## **Results**

The sample contains 1585 listed firms of China's manufacturing over the period from 2010 to 2015. Two types of green innovations are investigated, including green product innovation and green process innovation. The former is assessed by ownership of valid "green" patents, and latter is assessed by attainment of ISO14001 certification of environmental management. The green patents are identified by combining patent classifications with Chinese characters keywords and phrases that appeared in patent titles and abstracts. Suppose adding a woman to the board is not gender neutral, effect of gender diversity on green innovation is captured by extended probit regressions with an endogenous discrete (or continuous) regressor.

## **Conclusions**

This study provides empirical evidence on the positive role of women in transition of firms' environmental strategies, enriches the researches on corporate governance in the emerging markets, and the conclusions are of practical implications for those firms seeking environmental competitiveness by improving the corporate governance. The key implications include:

(a) The study emphasizes the role of gender diversity of the senior management level of corporates with regard to environmental management, offering new support for gender diversity of industrial organizations. The empirical

evidence is consistent with the hypothesis that women have stronger prosocial preferences and environmental awareness than men.

(b) The study reveals that firms can benefit from a gender-diverse board. Gender diversity of boards helps the firms to effectively track the complex needs of distinct stakeholders in terms of environmental strategies, via establishing extensive networks with the stakeholders. The positive role of women in green innovations implies that women on boards would take into account the demands of distinct stakeholders and make sure that the commitment to the stakeholders on improving firm's environmental performance is not overlooked.

(c) The study also reveals that gender diversity of corporate board can be influenced by many factors. The objective gender differences have been usually neglected, which is due to the traditionally disadvantaged position of women in society. In China women on the boards appear to face more barriers than in other countries. They have difficulties in enjoying equal chances of employment and promotion, compared to men; the proportion of women executives of the listed firms is significantly lower than that of men; in the major companies that may have the most environmental influences, women can hardly have equal opportunities of participation in the senior management; voice of the women at senior management are often neglected in the male-dominant environment. These problems would restrict females' ability to fully contribute to corporate environmental strategies, and removing the obstacles needs the common efforts of the whole society.