

Energy-saving innovation effect of policy instruments: evidence based on the data of energy technology patents

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Abstract: In the new era, it matters a lot to implement an innovation-driven strategy in order to improve the quality of development and realize the harmonious coexistence between man and nature. In the case of endogenous technological progress, the failure of the factor market makes the policy an important factor affecting technological innovation. So, what are the energy-saving innovation effects of the existing policy tools such as technology-driven tools and demand-driven tools? And do they share the consistent effect? To this end, based on the energy technology patent data, we analyzed the heterogeneity of the energy-saving innovation effects of policy instruments and the effects of various policy instruments. The study found that (1) all policy tools have certain energy-saving innovation effects, but they are cyclical and phased; (2) technology-driven, price-based and output-oriented policies are the key factors affecting the energy-saving innovation effect, and the impact of each policy on the effect of energy-saving innovation is heterogeneous; (3) the impact of each policy on energy-saving innovation effect is both direct and indirect, and the parameter coefficients including direct and indirect path coefficients are more representative of the variable relationship. The conclusion is that the energy-saving innovation effects of policy instruments can be improved from the following aspects: (1) expanding the scale of government fossil energy R&D investment and improving the input structure; (2) improving the energy price formation mechanism and forming a comprehensive energy price index; (3) giving full play to the role of specific policies and utilizing various policies comprehensively to form a scientific energy technology innovation path.