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Green Loan and Subsidy for Promoting Clean Production Innovation^{☆1}

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Abstract

Green loan has attracted worldwide attention in recent years due to the increasingly striking environmental problems caused by economic activities. This paper considers a game on the application of green loans for technique innovation among the enterprises, banks and government, and addresses the effectiveness of green loan and government subsidy on promoting clean production. Serial profit-risk models are established and then solved according to the intention of enterprises to technique innovation for promoting clean production. Energy emission is selected as a measure capturing the production effects on environment in this paper. The conditions that enterprises execute technique innovation with loans and that banks approve loans for enterprises are derived. Two threshold values on technique maturity are presented to support these conditions. The most importantly, it is rigorously proved that green loan subsidy provided by the government could improve environmental quality through reducing the energy emissions from enterprises. It is also shown that subsidy not only improves the intention of enterprises to technique innovation, but also increases the innovation risks.

Keywords: Green loan, Subsidy, Game models, Technique innovation, Environmental protection

1. Introduction

Resource waste and environmental pollution have been problems preventing human from subsistence and development. The international community is increasingly concerned about the coordinated development of economic growth and ecological environment. Numbers of agreements such as the “United Nations Framework Convention on Climate Change” in 1992, the “Kyoto Protocol” in 1997, the “Equator Principles” proposed by financial institutions

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