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Juin-jen Chang, Wei-Neng Wang, Jhy-Yuan Shieh



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Environmental Rebounds/Backfires: Macroeconomic Implications for the Promotion of Environmentally-Friendly Products

Juin-jen Chang, Academia Sinica Wei-Neng Wang, Academia Sinica
Jhy-Yuan Shieh, Soochow University

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Abstract: This paper develops a dynamic two-good (clean and dirty goods), two-sector model to explore the implications of the *macroeconomic environmental rebound/backfire effect* for environmentally-friendly product promotions on not only the demand side (a subsidy on the clean-good consumption), but also the supply side (a technology promotion in the clean-good production). The macroeconomic environmental rebound/backfire is decomposed into three effects – the substitution, wealth, and sectoral reallocation effects. We show that the steady-state pollution stock exhibits a U-shaped relationship with either demand-side or supply-side green promotions. Our calibrated result indicates that in terms of *pollution*, the *macroeconomic rebound effect* for the economy as a whole appears to be substantial. More pronounced rebound effects are present when the elasticity of substitution between the clean- and dirty-good consumption is lower, the labor supply is more elastic, the environmental efficiency of clean goods is lower, and the technology level in the clean-good production is higher. We also show that a pollution rebound can result in a social welfare improvement, implying that the rebound effect somewhat improves economic efficiency, and so policies aimed at mitigating the rebound effect may be counterproductive from a welfare perspective.

JEL Classification: H53, O40, Q58

Keywords: Rebound/backfire effects, green consumption subsidy, green technology promotion, the substitution, wealth, and sectoral reallocation effects.

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Correspondence: Dr. Wei-Neng Wang, Institute of Economics, 128 Academia Road, Section 2, Taipei 115, TAIWAN, ROC, Phone: 886-2-2782-2791, ext. 510, Fax: 886-2-2785-3946; E-mail: wei7656@gmail.com.

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