

Abstract

In general, the manufacturing firms produce the goods, they will emerge the carbon emission, which in turn induce the negative externality on the household in the neighborhood community. And in order to compensate the households' negative externality, the government usually either needs to provide some clean-air infrastructures or green facilities such as parks to households in terms of a local public goods which in general have a positive externality to benefit residents and then smooth the negative externality from carbon emissions, or using the taxation revenue to subsidy the households as an income transfer, thus the local government has the authority to levy the carbon pollution tax on the firms based on the amount of firms' emission, and also the government want to determine how to employ optimal fiscal policy on the using pollution taxation revenue.

In this paper, we complement the literature by focusing on the examination and analysis the optimal tax rate as well as the optimal allocation schemes of the carbon taxation revenue with respects to the household welfare within a theoretical framework. We discuss three alternative schemes of fiscal policies associated with carbon taxation, respectively. First, if the share of taxation revenue to finance the local public goods is exogenously given by a specific political policy consideration, the optimal tax rate is increasing in pollution externality, but decreasing in either in the consumption weight of the aggregate manufacturing good or local public good. Second, we determine the optimal distribution share of the taxation revenue to finance the local public goods when the carbon tax rate is given by the government with a specific political policy consideration. It is shown that the optimal distribution share is decreasing in the share of carbon emissions in the production process of manufacturing goods. Finally, we examine the more general scheme when both the share and tax rate endogenous determining by the government simultaneously. It documents that the optimal tax rate is independent of the share of carbon emissions in the production process, and is increasing in the negative externality of pollution and the elasticity of consumption manufacturing goods, and decreasing in the weight of public good consumption. As the optimal distribution share is decreasing either in weight or elasticity of consumption manufacturing goods, or the share of carbon emissions in the production process of manufacturing goods.

JEL Codes: H20, H23, H41, Q50, Q58.

Keywords: Carbon emission, Pollution taxation, Allocation share, Local public good, Negative externality.