Green tax reforms and habits

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ABSTRACT

Using a dynamic general equilibrium model, we explore the role of habit formation when analyzing green tax reforms under the double dividend hypothesis. We assume increases in energy taxes and adjust capital taxation in a revenue-neutral framework to evaluate the effects on welfare. Since the existence of an environmental dividend is uncontroversial, we mainly focus on the efficiency dividend. Our findings show that, when taxes on household energy consumption increase, habits and transitional dynamics alter household decisions, and change the efficiency dividend. However, when the tax increase is on energy used as an input, reform always induces a welfare cost in terms of efficiency. In this case, habits play a less important role.

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1. Introduction

In recent years, green tax reforms have become an essential instrument in environmental policies (see, for example Pearce, 1991). These reforms are based on the double dividend hypothesis that supports the idea that environmental taxes improve welfare through two different channels: first, by improving the environment (first dividend or environmental dividend); second, by reducing the pre-existing distortionary taxes (second dividend or efficiency dividend).[1]

However, while the validity of the environmental dividend remains unquestioned, the existence of an efficiency dividend is controversial (see, for example, Bovenberg and Goulder, 2002). Thus, De Mooij (2000) shows how the efficiency dividend depends on the net effect of two factors: the revenue recycling factor and the tax base factor. The first one allows for a cut on pre-existing distortionary

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  [1] The double dividend hypothesis has been addressed in many papers. See, for example, Oates (1991) and Bovenberg and De Mooij (1994).

taxes; the second is the effect of the reform on the bases of the other existing taxes. The balance of these two effects may (or may not) lead to a second dividend.

The aim of this paper is to analyze green tax reforms in a model where individual preferences are subject to habit formation. A green tax reform can generate a double dividend, because, on the one hand it reduces the consumption of pollutant goods and, on the other, it allows the substitution of taxes thereby reducing the pre-existing distortionary taxation. However, if individuals have habits on consumption, these dividends can be affected. If the reform consists in increasing the tax on a pollutant good with habits, the environmental gain in welfare could become smaller because individuals are now more reluctant (at least in the short run) to reduce their consumption of this good. This could reduce the environmental dividend. Moreover, a good with habits has a more inelastic demand; literature indicates that taxing this type of goods produces less distortions. So, the green tax reform may imply efficiency improvements and positively affect the second dividend. In sum, considering habits could be potentially important when assessing the implications of a green tax reform.

Duesenberry (1949) was the first economist to propose the idea of "habit formation": the utility from current consumption can be affected by the level of past consumption. In fact, there is a strand of the literature that provides evidence of the existence of habit formation in consumption decisions (see, for example, De la Croix and Urbain, 1998; Houthakker et al., 2001; Carrasco et al., 2005 among others). Moreover, several recent papers have introduced habit formation in order to explain some empirical facts that cannot be reconciled with the traditional models that display time-separable preferences.[2] However, to our knowledge, habit formation as such has never been introduced in studies of green tax reforms.

In our model, we consider time non-separability in preferences by assuming habit formation in consumption in such a way that consumers' utility depends both on their own current consumption as well as on a reference level. This reference can be viewed as a (time varying) standard of living determined by individuals' own past consumption. The introduction of habit formation implies that the individual derives utility from the comparison of the current level of their own consumption with their consumption in the previous period. The point is that, confronted with a fiscal reform, individuals with habits will take into account how the reform affects their standard of living and thus, how it conditions their future levels of consumption. So, they will react differently than would an individual without habits. This is an important and untreated issue in the green tax reform literature.

Our goal is to shed light on how habits can influence the existence of an efficiency dividend. We address the question by simulating green tax reforms in a dynamic general equilibrium model calibrated to the Spanish economy. Such reforms consist in increasing taxation on energy, adjusting capital taxes and keeping total tax revenues constant. Given that habit formation affects intertemporal substitution, we choose to adjust capital taxes which also alter it and thereby potentially affects the efficiency dividend even more. Another reason to use a capital tax is its distortionary effect. Thus, beginning with the seminal work of Chamley (1986) and following Zhu (1992), Jones et al. (1993) and Chari et al. (1994), a robust result emerges whereby optimal capital tax is zero in the long run. Also, from Lucas (1990) and Cooley and Hansen (1992), we know that capital taxes have strong distortionary effects on welfare. As we are interested in looking for efficiency gains, a capital tax reduction seems appropriate.[3]

The main result of the paper indicates that the existence of an efficiency dividend depends both on transitional dynamics considerations and habit formation when the green tax reform increases taxes on household energy consumption. We need to bear in mind transitional dynamics to appropriately account for welfare changes because a large part of welfare gains can be lost in the adjustment process towards a new equilibrium. When we increase the tax on household energy, capital tax rates decrease and an incentive for savings emerges. With habits, the household is more willing to decrease leisure in order to keep current consumption, and more willing to decrease current leisure by working more

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[2] See, among many others, Constantinides (1990), Abel (1990), Carroll et al. (2000), and Fuhrer (2000).

[3] Although in general the double dividend literature considers tax revenues to be recycled through a decrease in labor taxes (because labor is often the only primary production input), there are papers like Glomm et al. (2008) that also analyze a revenue-neutral green tax reform using the extra revenue to reduce capital taxes.