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From shadow to green: Linking environmental fiscal reforms and the informal economy

Anil Markandya [a], Mikel González-Eguino [b,*], Marta Escapa [c]

[a] Basque Centre for Climate Change (BC3) and IKERBASQUE, Basque Foundation for Science, Spain
[b] Basque Centre for Climate Change (BC3) and University of the Basque Country (UPV/EHU), Spain
[c] University of the Basque Country (UPV/EHU), Spain

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ABSTRACT

In the past few decades many papers have analysed in some depth different environmental tax reforms and the double dividend hypothesis, i.e. the possibility of improving not only the environment but also the economy through the reduction of distortions in the tax system. However, such studies have not modelled the effects of the presence of a shadow economy, even though informal markets account for a significant and growing part of GDP in many developed economies. This paper analyses this important link using a Computable General Equilibrium model for the case of Spain, with historically high unemployment rates and a large informal economy. Since the informal labour is not taxed, when the green tax is introduced and the tax on formal labour is reduced, the pre-existing non-environment-related inefficiency of the tax system is remarkably reduced. Our analysis shows that if the distortions created by the shadow economy are considered, the case for an environmental tax reform where revenues are used to reduce labour taxes is strengthened and the possibility to find a double divided is more likely. Our sensitivity analysis also shows that these results can also be extrapolated to some extent to other countries with different sizes of the shadow economy or different labour market conditions.

1. Introduction

The literature on environmental fiscal reforms is centred on the idea that environmental taxes produce not only improvements in the environment but also positive economic and social outcomes. In order to obtain this "double dividend" (Pearce, 1991), governments must use the revenues from environmental taxes to reduce the rates of other taxes in the economy. As long as environmental taxes are used to reduce rather than to replace other taxes the "tax-interaction-effect"[1] has to be considered, which gives rise to the distinction between the "weak" and the "strong" double dividend hypotheses (Goulder, 1995). How governments recycle revenues ("revenue-recycling effect") from environmental taxes back into the economy is a key issue in determining the type and size of the double dividend (see also Goulder, 2013).

The literature has focused, especially in the case of Europe, on the possibility of reducing taxes on labour in order to reduce unemployment as a consequence of the environmental fiscal reform. The findings suggest that switching taxation from labour to energy/carbon can increase welfare, employment and reduce emissions but there are disagreements as to the size of these effects[2]; Majocchi (1996) and Markandya (2011) provide surveys of the quantitative studies. There are a great number of different models that focus on different characteristics of the labour market and show different restrictions and conditions that have to be met for a double dividend (in employment) to be found (see Bovenberg and Goulder, 1996; Bovenberg and van der Ploeg, 1998, among others). One relevant point is whether involuntary unemployment is incorporated into the analysis or not (see Carraro et al, 1996; Kosquela and Schöb, 1999; Manresa and Sancho, 2005). In these circumstances there are two possible ways of increasing the demand for labour and reducing unemployment: (i) shifting the tax burden from workers to other groups (people on state benefits, living on capital income or from other countries); and (ii) improving the efficiency of the tax system by shifting taxation from labour to other factors such as capital, energy or carbon.

To date however, this large body of literature on the double dividend hypothesis includes no empirical[3] research on the link between the shadow economy and environmental fiscal reforms. This is an important gap considering that: i) labour taxes affect the decision whether to work in the formal or the informal sector; and ii) informal markets

* Corresponding author at: Basque Centre for Climate Change (BC3), Alameda Urquijo, 4, 4ª 48008 Bilbao, Spain. Tel.: +34 944014690; fax: +34 944054787.
E-mail address: mikel.gonzalez@bc3research.org (M. González-Eguino).

[1] The "tax-interaction effect" is associated with the impacts of environmental policy instruments on the returns to factors of production and the "revenue-recycling effect" is associated with the return to the economy of any revenues generated by an environmental policy instrument.

[2] There is also a debate about the political feasibility of an environmental fiscal reform and the need of gradualism when implementing this type of policies (see De Miguel and Manzano, 2011).

[3] Bovenberg and van der Ploeg (1998) analyse this issue from a theoretical perspective.

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Table 1
Size of the shadow economy in some developed countries, 2005 (% of GDP).

Greece, Italy, Spain, Portugal and Belgium	21–29%
Norway, Sweden, Denmark, Ireland, France, The Netherlands, Germany and Great Britain	12–18%
Japan, Austria, United States and Switzerland	8–10%
Spain (Arrazola et al., 2011)	19–23%

Source: Buehn and Schneider, 2011 and Arrazola et al., 2011.

account for a significant and growing part of GDP in many developed economies. According to Schneider et al., 2010, in OECD countries the shadow economy accounted for between 12 and 33% in 2005. Moreover, reducing the informal economy is an important policy target in itself because it creates significant economic problems such as efficiency distortions (allocation is determined not by productivity but by "fiscally effective" productivity), competition distortions (firms that pay taxes face higher costs and more regulation) and equity distortions (incomes not declared result in a loss of revenue for the public sector and a higher tax burden for those who pay taxes), among others. Although, admittedly, one of the main reasons for the lack of consideration of the informal economy in the economic models is lack of data, recent improvements in estimations (Schneider and Enste, 2000; Schneider et al., 2010 or Schneider, 2011 among others) suggest that it may be worth exploring this linkage.

In this paper we construct a model with the aim of shedding light on how a green fiscal reform can help to reduce the shadow economy and reducing unemployment. We analyse the effects of a revenue-neutral CO_2 tax reform by focusing on the revenue-recycling effect. We compare the effects of using revenues from a CO_2 tax to reduce taxes on labour, to reduce taxes on capital or to make lump sum transfers. We use a standard CGE model that contains two features, which are important regarding the labour market. First, there is involuntary unemployment and wages are determined endogenously following a wage curve. And second, formal and informal labour (which are substitutes in the production function) are linked through an equilibrium condition where expected wages in the two sectors are set equal to each other. This idea is taken from Harris and Todaro (1970), who used it to explain rural–urban mobility, and the same approach has been used by Rutherford and Light (2002) in a CGE model for Colombia.

We apply the model to Spain, which has a very high unemployment rate and one of the biggest informal economies (20–25%) of any wealthy country. The results obtained for the (employment) double dividend in previous studies have traditionally been more optimistic for Spain than for other European countries (see Labandeira et al., 2004; Manresa and Sancho, 2005 or Fæhn et al., 2009), reflecting perhaps greater inefficiencies in the labour market.[4] The studies mentioned show that replacing part of labour taxation by a carbon tax would reduce unemployment and result in either a small loss of welfare or a small gain (as measured by the equivalent variation (EV)).

Our results show that, if the distortions created by the shadow economy are considered, the double dividend hypothesis is more likely: important improvements in welfare can be found with a CGE model if revenues from green (CO_2) taxes are used to reduce taxes on labour. Since the informal labour is not taxed, when the CO_2 tax is introduced and the tax on formal labour is reduced, the pre-existing non-environment-related inefficiency of the tax system is remarkably reduced. Thus, via the CO_2 tax, the government manages to shift from (a) a system where only the formal sector pays taxes on factors to (b) a system where both the formal and the informal sector pay such taxes. This improves efficiency on non-environmental grounds by broadening the factor tax base.

The mechanism that generates the double dividend is not new (to overcome a pre-existing non-environment-related inefficiency in the tax system) and it is well documented (see Bovenberg and Goulder, 1997 or Bento and Jacobsen, 2007). Our main contribution is to include the shadow economy (and informal labour not taxed) as a new source of inefficiency and to estimate how that may increase the double dividend from a green tax reform.

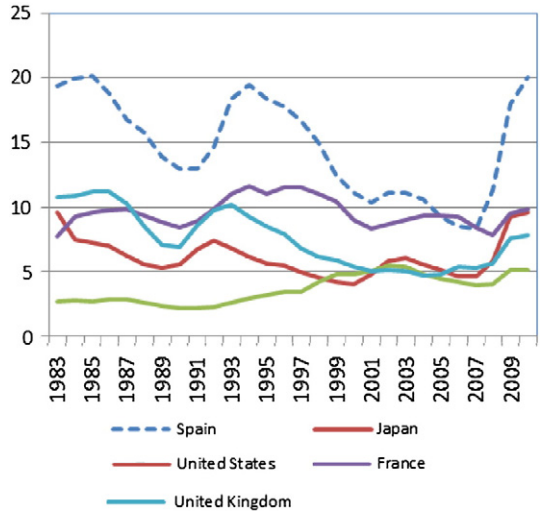

Fig. 1. Unemployment rates in some developed countries, 1983–2010. Source: OCDE (2009).

The paper is structured as follows. Section 2 discusses the relevance of the Spanish case study. Section 3 presents the algebraic model and the specificities of the labour market and Section 4 details the data used for calibration. Section 5 presents the results obtained from the different recycling schemes in the economy and in the environment. Finally, Section 6 concludes with some reflections on where further research is needed and provides some policy recommendations.

2. The shadow economy and unemployment in Spain

It is necessary to clarify what it is meant in this paper by "shadow economy", as there is no single precise and accepted definition of this concept. In fact, several different labels (shadow, informal, underground, irregular, hidden and subterranean) are used in reference to these economic activities. In this paper we follow the definition proposed by the OECD, which considers the shadow economy to include all production activities that are legal[5] but deliberately concealed from public authorities in order to avoid: i) paying taxes or social security contributions; ii) meeting certain legal standards such as minimum wages, maximum hours, safety and health standards; or iii) complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms. A shadow economy thus implies a shadow or informal labour market. According to the OECD (2009)[6] informal employment is the result of both people being excluded from official jobs and people voluntarily opting out of formal structures.

A comprehensive survey regarding definitions and estimation procedures for the shadow economy can be found in Schneider and Enste (2000) and Schneider (2005, 2011). One of the conclusions of these studies is that the main driving forces of the shadow economy are: i) tax and social security contribution burdens; ii) the lack of 'tax morale' or the intrinsic motivation of individuals to pay taxes; and iii) the intensity of state regulations. The bigger the difference between

[4] A comparison of some studies for Spain can be found in Markandya et al., 2012.

[5] Illegal activities such as drug dealing, crime and human trafficking are not included. Activities such as some household services that legally do not need to be reported to authorities are also excluded.

[6] At the world-wide level, informal jobs are the norm or the normal case: 1.8 billion people work in informal jobs, compared to 1.2 billion who enjoy formal contracts and social security protection (OECD, 2009).