

Comments on “The Economic Effects of Low-Level Carbon Taxes”

I have been asked to comment on the above paper prepared by Infometrics, which uses the ESSAM model to evaluate the economy-wide effects of low-level carbon taxes. Because the same model was used for a previous modelling programme for the Ministry for the Environment, the new runs represent an updating of the previous results along with modifications to the detailed specification for some of the model runs.

Using an updated data set, the model successfully replicates the main results from the 1993-1994 research programme. Imposition of a carbon tax when the revenues are used to retire Government debt has the results expected for any net tax increase in a model without Ricardian equivalence¹, namely a reduction in economic activity. Imposing year-by-year revenue neutrality by “recycling” the carbon tax revenues back to reductions in other taxes yields the now-familiar double-dividend outcome with output, employment, and private consumption increasing as carbon emissions fall. As in the 1993 experiments, the most striking economic gains are encountered when carbon tax revenue is used to reduce the rate of GST.

Experiments which recycle revenue via a lowering of other existing energy taxes conclude, not surprisingly, that this greatly reduces the effectiveness of the policy in achieving the target of greenhouse-gas emission abatement. Similarly, introducing a carbon tax in tandem with negotiated exemptions for energy-intensive industries substantially reduces the effectiveness of the tax in achieving its goals.

Both the limited budget available for this round of modelling, and the tight timeframe, have clearly ruled out the extensive literature review and sensitivity testing that would have been expected for a full-fledged research project. The double-dividend result (an apparent win-win for OECD economies from revenue-neutral imposition of carbon taxes, even when this is done on a country-by-country stand-alone basis) has been obtained by many research teams overseas using one-shot CGE models similar to ESSAM, and there is a rapidly growing literature assessing the reasonableness of this result.²

¹ Ricardian Equivalence is the proposition that by increasing taxes to retire public debt now, Government reduces the tax burden required for debt servicing in future and thereby increases households' perceived wealth (discounted after-tax income). The resulting increase in consumption, due to the wealth effect of expected future tax reductions, offsets the contractionary impact of the tax increases. The ESSAM model, in common with most other similar CGE models worldwide, does not include intertemporal optimisation routines for the household sector.

² For example Bosello, F., Carraro, C. and Galeotti, M., “The Double Dividend Issue: Modeling Strategies and Empirical Findings”, *Environment and Development Economics* 6(1):9-46, February 2001; Bovemberg, A.L. and de Mooij, R., “Environmental Taxation and the Double Dividend: the Role of Factor Substitution and Capital Mobility”, in Carraro, C. and Siniscalco, D. (eds) *Environmental Fiscal Reform and Unemployment*, Kluwer, 1996; Goulder, L., “Do the Costs of a Carbon Tax Vanish when Interactions with Other Taxes are Accounted For?”, *NBER Research Working Paper 4061*, 1992; Parry, I. And Bento, A.M., “Tax Deductions, Environmental policy, and the ‘Double Dividend’ Hypothesis”, *Journal of Environmental Economics and Management* 39:67-96, 2000.

One common interpretation is that welfare gains are predicted from a tax restructuring which shifts the tax base towards commodities with low demand elasticity (the so-called Ramsey approach to optimal taxation). Hence the carbon tax is in a sense a more “efficient” revenue-gathering device than, e.g., taxes on labour, in terms of the extent of the distortions it induces in resource allocation.

GST however (within some limits) minimises distortions to resource allocation by being a universal tax on value-added, and the conditions for a shift from GST to a carbon tax to be welfare improving are more demanding than is the case for reductions in personal or corporate taxes. As the report notes on p.7, the strongly positive results from GST reduction are explicable mainly by the labour-market closure rule used, which changes the volume of aggregate employment in response to movements in the real product wage³ and hence in the economy's international competitiveness. Combined with the imposition of an exogenously-fixed current-account deficit, such a competitiveness gain necessarily expands domestic activity, with exports boosted by the competitiveness gain and the required offsetting rise in imports generated by an expansion of domestic demand sufficient to overcome reduced import penetration of the local market.

To establish how much of the economic gains are attributable to increased tax efficiency and how much to the particular model closures used would require sensitivity testing beyond the scope of the present modelling project.

Overall the report presents results from competently-conducted experiments with an established CGE model. There are a few novelties
but in general the study finds that previous results from the ESSAM model are replicated with updated data.

³ As the report notes, p.7. the labour-market closure assumption is that the real income wage is fixed, which means that any reductions in consumer prices translate directly to lower labour costs for employers.

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