TARC
Tax Administration Research Centre

Improving the realism of Tax Computable General Equilibrium (CGE) Models.

Overview

HMRC uses and maintains a *CGE model for analysis into how an economy might react to changes in policy, technology or other external factors.

There has been growing policy interest in taxes on capital and on financial transactions and the likely impact.

Similarly, an interest in policies such as childcare subsidies, that use the tax system to encourage labour supply in place of income tax cuts.

*CGE model is a large-scale numerical model that simulates the core economic interactions in the economy. It uses data on the structure of the economy along with a set of equations based on economic theory to estimate the effects of fiscal policies on the economy.

Challenge

The 2013 version of HMRC's CGE model incorporates a choice between debt and equity, but does not model the risk that determines that choice. It models the choice as one between two inputs into a function that aggregates the amounts of debt and equity, with the ratio depending on the relative costs of the two forms of finance. This produces a measure of total capital which is different from the sum of the two components, and cannot be compared to financial measures of capital.

Another difficulty with the model is that the data on transactions between different sectors of the economy are based on Consumption and Use Tables from the Office of National Statistics. These are a useful approach to tracing the way in which price and quantity changes are diffused through the economy. In the case of the financial services industry, the data do not distinguish between activities related to business investment, which could attract transaction taxes, and activities related to the day-to-activity of maintaining payment services. This means that it is not possible to accurately estimate the extent to which taxes might discourage investment.

Finally, the way in which consumption is modelled in the HMRC model does not allow changes in relative consumer prices to affect labour supply, and so cannot capture the effect of policies like childcare subsidies on labour supply.

Analysis

Specific aspects of HMRC's CGE model were analysed including choices that firms make between different forms of financing investment -such as debt versus equity; ways in which the effects of financial transaction taxes on investment can be modelled and the way in which taxes on consumption (such as VAT or excise duties) might influence households' labour supply choices.

Research Outcomes

- A better way of modelling the debt-equity choice is used by the *IfoMod* model which looks at the cost difference between debt and equity as determined by the risk of bankruptcy, which depends on the riskiness of the business and the debt-equity ratio.
- The data problem with the financial services industry requires a detailed study of the split between the activities related to investment and to payments.
- The effect of prices on labour supply can be modelled by existing models of household behaviour.
- The critical evaluation and comparison between the HMRC CGE model and alternative approaches will be looked at in detail in an internal discussion paper with HMRC/HMT.

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