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Teaching the multiplier: The value of a quantitative approach

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A B S T R A C T

To create an engaging and motivating learning environment, we have developed software which is based on estimated parameters for the UK economy. The program allows students to both simulate the effects of economic policy on national income and its components as well as the flexibility to vary key parameters of interest in order to assess the impact on economic performance. In this paper we present the main features of the software and the model on which it is based. We discuss the potential uses of the software within a class-room context and consider two simulations. The first of these is a fiscal expansion designed to bring down unemployment and the second is an exogenous shock to consumption affecting the parameters of the consumption–income relationship. This paper advocates that students' understanding of theoretical models can be greatly enhanced by the addition of practical examples that can be used in lectures and tutorials as well as for independent study.

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1. Introduction

Most undergraduate macroeconomics modules begin with the Keynesian income–expenditure model. This provides a platform in which more complex models which integrate the monetary sector and the supply side can then be developed in the form of the IS-LM and AD-AS models respectively. A key part of the development of the income–expenditure model is the use of simple numerical

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examples in which the equilibrium level of income is determined through the multiplier process. However, these examples frequently give a highly unrealistic impression of the size of real world multipliers because they start from a stylised model of a closed economy and lump-sum taxes.

We believe that there is value in developing a realistic quantitative framework for economic models at an early stage and which allow for more realistic simulations of multiplier effects. However, there is a surprising lack of accessible software which allows students to do this. MacDonald and Turner (1989) provided the widely used package *Ready-Reckoner* based on the output of a number of large scale UK macroeconomic models. However, this has not been updated and is no longer easily available. More recently Fair (2004) presents a large scale macroeconometric model which is available for download from his website but this requires a level of expertise beyond that which can be reasonably expected from undergraduate students. Finally, Kapinos (2010) presents a three equation New Keynesian model which allows students to vary key parameters but his model is based on assumed rather than estimated parameter values.

In order to facilitate a more active and comprehensive learning experience for students, we have developed software which is based on estimated parameters for the UK economy. The program allows students to both simulate the effects of economic policy on national income and its components as well as the ability to vary key parameters of interest in order to assess the impact on economic performance. We believe this software affords students the opportunity to better appreciate how a real world economy operates compared to existing learning techniques and software packages.

Pedagogical techniques that facilitate active, engaging class-room experiences are gaining credibility, acceptance, and becoming more mainstream. Schön (1983), Fink (2003) and Ihssen (2011) all strongly advocate active learning. Students who are highly engaged in their learning environment will have a deeper, more profound class-room experience. If there is an active learning atmosphere, it will encourage students to retain the information presented, transfer their knowledge to other unique situations, and make connections to other topics and modules. Bruner (1996) notes that by involving students and having them act as co-constructors of their learning experiences facilitates deeper comprehension, connection-building, and meaningful exercises and will reduce passive learning practise in lectures.

The software introduced in this paper has many effective applications for teaching. Practical examples presented during lecture can illustrate theoretical ideas and provide a better understanding of how different sectors of the economy work. After they have a basic foundation of how a model works, students can form groups and answer situational questions posed by the lecturer, gaining immediate feedback to assess their comprehension of the subject. Students will also benefit from having the software to practice examples while revising. Courts and McInerney (1993) advocate active lecturing techniques and developing independent problem solving skills in students by promoting self-directed learners. Students are enabled to see for themselves how small changes can have large effects on the economy. Pintrich (2003) reviews actions that lecturers could take to better support students' learning. Creating learning environments that will challenge students while enabling them to have control over the task should promote enhanced learning experiences. The introduction of practical exercises with the software presented in this paper should help further accomplish both of these principles.

In this paper we set out the main features of the software and the model on which it is based. We discuss the potential uses of the software within a class-room context and consider two simulations. The first of these is a fiscal expansion designed to bring down unemployment and the second is an exogenous shock to consumption affecting the parameters of the consumption–income relationship.

2. The model

At the core of our model is the Keynesian income–expenditure system. National income is defined as the sum of private sector consumption expenditures C, investment I, government consumption G, stock building SB and exports X minus expenditure on imported goods M:

$$Y = C + I + G + SB + X - M \tag{1}$$