Modelling Universal Basic Income: Macroeconomic and Distributional Perspective

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The idea of universal basic income (UBI) is not new. It has been advocated by thinkers from Thomas Paine and John Stuart Mill to, more recently, Joseph Stiglitz and Thomas Piketty. The recent increase in interest in this topic is connected with two trends. The first is growing inequality in major developed countries (e.g. US and UK). This includes a proliferation of in-work poverty and sustained pockets of deprivation. The second is anticipation that future advances in automation and a continued trend of labour market hollowing will lead to a substantial substitution of workers by robots. Proponents of UBI say that it can have the following positive effects:

•   Increased productivity. Security of the UBI will allow some individuals to invest more into education, health and other means of development which might have positive impact on aggregate productivity.

•   Reduction of poverty and inequality.

•   Removal of disincentive to work among recipients of welfare benefits. Current means tested benefits often create significant disincentives to work, with marginal rates sometime as high as 100% (Muller, 2004). This creates poverty traps
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•   Reduction in the administrative costs of complex means tested welfare systems.

At the same time there are concerns that it will reduce incentives to work, at least in part of the population, and become a catalyst to even greater social inequality. The district of Besós in Barcelona, Utrecht in the Netherlands and the Finnish city of Helsinki will run UBI trials funded by the European Union. Although those trials will

only cover low income families and in this sense are not pure examples of the UBI, they might be able to answer some of the concerns about the incentives to work for low income households. The aim of this paper is to evaluate the impact of UBI reform on the economy, in particular on poverty, income distribution and economic efficiency. We use Scotland as an example but the conclusions and identified transmission mechanisms are applicable in a wider international context. In this paper we use a combination of a CGE and microsimulation models developed at the Fraser of Allander Institute (FAI) to look at the macroeconomic and distributional effects of the introduction of UBI in Scotland. Recent devolution of the new fiscal powers makes it possible and Scotland is preparing to run its own UBI pilot.

Our microsimulation model has a detailed treatment of income tax and detailed description of the Scottish households. The model is calibrated on the 2014/15 Survey of Personal Incomes which contains an administrative sample of UK taxpayers. The model is static but can give us initial cost of the policy and income effects and taxation effects by detailed categories of households.

For macroeconomic simulations we use AMOS (A Macro-micro model Of Scotland) CGE model. The version employed here is the forward-looking model (Lecca et al, 2013) with households disaggregated by income quintiles, calibrated on the 2014 Scottish Social Accounting Matrix (SAM). AMOS is essentially a regional, multi-sectoral, forward looking variant of the Layard, Nickell, and Jackman (1991) model. It has detailed treatment of the labour market and allows for interregional migration. In the long-run equilibrium of this economy, all stocks are optimally adjusted and so it is characterised by both zero net migration and zero net investment. In the short-run, all sectoral capital stocks and population are fixed. AMOS has three domestic transactor groups, namely, households, firms and government; and four major components of final demand: consumption, investment, government expenditure and exports. In the version used here there are eighteen commodities/activities. The demand for Scottish exports is determined by export demand functions. Imports are modelled by an Armington link (Armington, 1969) and are price sensitive. The size of the labour force only varies due to net migration flows, modelled in accordance with Layard et al (1991). The fiscal side of the model is fully developed to allow for a realistic representation of the new Fiscal Framework, which describes newly devolved fiscal powers. We can control all major welfare payments and substitute them with UBI. We also adjust other government expenditures to account for the smaller administrative cost of such reformed welfare system. Overall fiscal changes are modelled with balanced budget closure, where increased welfare payments are paid for via various taxes. We compare whether the choice of taxation mechanism has an effect on macroeconomic and distributional consequences of this policy by financing the policy by income tax or VAT.

The labour supply in the model reacts to income, benefits and taxation. We also investigate how sensitive the results are to labour market closure and assumptions about migration. The model tracks dynamic effects of the policy on income of different categories of households, associated with it changes in demand, taxation, prices and competitiveness.

This modelling framework cannot demonstrate the effect of behavioural changes as a result of introduction of BUI. For this we need more evidence to be able to calibrate the models appropriately. But as currently running experiments continue and new evidence on behavioural changes becomes available, we will be able to augment our analysis to include them. Our CGE model in particular has a number of modifiable labour market closures that we can use to account for changes in work incentives. We can also estimate the magnitude of potential productivity effects.