The Effect of a Value Added Tax Increase on The South African Economy: A Dynamic Stochastic General Equilibrium Model

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Abstract

In April 2018, South Africa experienced its first post-Apartheid increase in the value added tax (VAT). Although this may be effective in increasing government revenues, it may impact low income households negatively. We build an open New Keynesian Dynamic Stochastic General Equilibrium model for the South African economy to analyze the impact of the VAT to the economy. The model comprises two types of households, with one being grants beneficiary. Three types of firms characterize this economy. A continuum of intermediate good firms that produce differentiated goods, competitive final good producers that distribute the goods to retailers who collect the VAT on behalf of the Government. The results show that a VAT increase hurts the grant beneficiary household more than the non-grant. However, the model with an anticipated shock shows a smaller impact than the non-anticipated. The end result is a fall in output.

Keywords: Value Added Tax, Economic Growth, Dynamic Stochastic General Equilibrium Model

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1 Introduction

In April 2018, South Africa experienced its first post-Apartheid value added tax (VAT) increase. Although a rise may be effective in increasing government revenues, its impact to households, particularly the low-income ones, may be substantial. Taxes in general impose some economic costs due to their effects on employment, investment and savings decisions (Claus, 2013).

We analyse the impact of a VAT increase on the South African economy using a small open dynamic stochastic general equilibrium (DSGE) model. we consider two types of households. The first is a group of financially constrained households while the second is financially unconstrained. Both groups therefore represent the low and the middle-income households respectively. The households consume private and public goods. The private goods can be domestic or imported goods.

2 The Model

2.1 Households

The economy consists of households, indexed by by $i = [0, 1]$. There are two groups of households. The first group represents households that are not financially constrained. In that sense they can be thought of comprising the middle and high income households. The second group is composed of households that are financially constrained. This group captures essentially the low income households. Both households derive their utility from private consumption C_t^p and public consumption C_t^g respectively as in Pappa (2009) and Pappa et al. (2015). The effective consumption of i is specified as a non-separable constant elasticity of substitution aggregator that comprises both of these goods and is given by:

$$\tilde{C}_t^i = \left[(1-\varrho)^{\frac{1}{\varphi_i}} C_t^{p\,\frac{\varphi_i - 1}{\varphi}} + \varrho^{\frac{1}{\varphi_i}} C_t^{g\,\frac{1}{\varphi_i}} \right]^{\frac{1}{\varphi_i}}; \tag{1}$$

where $\varrho \in [0, 1]$ denotes the share of government consumption into the consumption aggregator and φ_i denotes the elasticity of substitution between private and government consumption. As $\varphi_i \to 0$ both private and public goods tend become perfect complements. However, when $\varphi_i \to \infty$, they become perfect substitutes goods.

Private consumption is separated between domestic and imported goods. Private consumpton is

therefore given by:

$$C_t^p = \left[(1-\vartheta)^{\frac{1}{\varsigma_i}} C_t^{d\,\frac{\varsigma_i - 1}{\varsigma}} + \vartheta^{\frac{1}{\varsigma_i}} C_t^{m\,\frac{1}{\varsigma_i}} \right]^{\frac{1}{\varsigma_i}}; \tag{2}$$

where $\vartheta \in [0,1]$ indicates the share of imported goods into private consumption and ς_i denotes the elasticity of substitution between domestic and imported goods.

Each income group maximises the following instantaneous utility function:

$$E_t \left\{ \sum_{t=0}^{\infty} \beta^t \psi_t^u \left[\frac{(\tilde{C}_t^i - \chi_i \kappa \tilde{C}_{t-1}^i)^{1-\theta_i}}{1-\theta_i} - \psi \frac{N_t^{i\,1+\frac{1}{\eta_i}}}{1+\frac{1}{\eta_i}} \right] \right\} \tag{3}$$

where $\beta \in [0,1]$ is the subjective discount factor, θ_i and η_i represent the group specific consumption risk aversion and the Frisch labour supply respectively. $\kappa \in [0,1]$ is the external habit formation and χ_i is a binary variable so that when $i = r$, we have the high income households and $\chi_r = 1$. When $i = h$, we have the low-income households and $\chi_h = 0$. Therefore, as in Di Bartolomeo et al. (2011), the high income households consume and accumulate wealth while the low income households cannot smooth consumption and consume their entire disposable income.

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