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Growth and income inequality in South Africa

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Abstract

This paper uses a multi-region endogenous growth model to analyze the competing claims of income growth and income distribution in South Africa. The study makes a case for the use of redistributive taxes to offset limited capital mobility between high and low income regions to promote both greater income growth and greater income equality. Market based capital mobility is limited because low income regions are typically characterized by low levels of both physical and human capital which offer little incentive to outside investors. The model estimates annual cross regional convergence rates at $< 1\%$ in the absence of specific redistributive policies.

Keywords: Growth model; Redistributive taxes; Capital mobility

0. Introduction

In this paper, we address the apparent conflict between income growth and distribution theories and the related empirical evidence. In theory, with perfect capital mobility, capital should move from high income sectors to the higher return low income sectors which would tend to promote optimal aggregate income growth and to lessen income inequality. In practice, perhaps because of imperfect capital mobility, both income growth and income inequality appear to be significantly suboptimal. In Section 1 we use a neoclassical growth model to show how capital mobility can be promoted by taxing income differentially in the high and low income sectors. In Section 2 we introduce an endogenous growth model in which insufficient human capital in the low income sectors impedes capital mobility. In this situation the differential or redistributive tax is potentially quite useful. In Section 3 we further refine the model by introducing adjustments consistent with cross sectoral variations in economic structure and social capital. In Section 4 we illustrate these arguments with South African data.

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1. Growth and distribution in a neoclassical model

Optimal growth and income inequality are readily demonstrated in the context of a neoclassical growth model with a Cobb–Douglas technology. In this case per capita income is given by

$$y_{it} = ak_{it}^{\beta}, \quad 0 \leqslant \beta \leqslant 1 \quad \text{where} \tag{1.1}$$

$$\partial y_{it}/\partial k_{it} > 0 \quad \text{and} \quad \partial^2 y_{it}/\partial k_{it}^2 < 0$$

and where y_{it} denotes per capita (worker) income in sector i at time t, k_{it} per capita capital (or the capital/labor ratio), a the common prevailing technological environment, and β the common capital elasticity. A sector i can refer to an individual, a region, a population group, an industrial sector, an age cohort, or even a country. Since we are concerned with both aggregate income growth and income inequality we propose to maximize social welfare given by

$$W \equiv \sum_{t=1}^{T} \rho^{t-1}(\ln y_t - \theta\sigma^2_{\ln y_t}), \tag{1.2}$$

where θ is the penalty associated with income inequality measured as the variance of $\ln y_t$ and where ρ is the discount factor.

We consider first a two sector (region) model in which aggregate consumption and consumption inequality are considered and for which social welfare is given as

$$W = \sum_{t=1}^{T} \rho^{t-1}(\ln c_{1t} + \ln c_{2t} - \theta\sigma^2_{\ln c_t}),$$

where the variance can be approximated by

$$\sigma^2_{\ln c_t} \cong \tfrac{1}{4}(\ln c_{1t} - \ln c_{2t})^2 = \tfrac{1}{2}(\ln c_{1t} - \ln c_{2t}).$$

The relevant social welfare can therefore be expressed as

$$W \equiv \sum_{t=1}^{T} \rho^{t-1}\left[\ln c_{1t} + \ln c_{2t} - \frac{\theta}{2}(\ln c_{1t} - \ln c_{2t})\right] \quad \text{for } c_{1t} > c_{2t}.$$

Dividing through by $(1 - \theta/2)$ yields

$$W \equiv \sum_{t=1}^{T} \rho^{t-1}[\ln c_{1t} + \phi \ln c_{2t}] \quad \text{where } \phi \equiv \frac{1+\theta/2}{1-\theta/2} \text{ and } \frac{\partial\phi}{\partial\theta} > 0. \tag{1.3}$$

We wish to maximize (1.3) s.t.

$$k_{1t+1} = ak_{1t}^{\beta(1-\tau)} - c_{1t} \quad \text{and} \tag{1.4}$$

$$k_{2t+1} = ak_{2t}^{\beta(1+\tau)} - c_{2t}, \tag{1.4'}$$