



Analysis

Does slow growth lead to rising inequality? Some theoretical reflections and numerical simulations

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ABSTRACT

This paper explores the hypothesis (most notably made by French economist Thomas Piketty) that slow growth rates lead to rising inequality. If true, this hypothesis would pose serious challenges to achieving 'prosperity without growth' or meeting the ambitions of those who call for an intentional slowing down of growth on ecological grounds. It would also create problems of social justice in the context of a 'secular stagnation'. The paper describes a closed, demand-driven, stock-flow consistent model of Savings, Inequality and Growth in a Macroeconomic framework (SIGMA) with exogenous growth and savings rates. SIGMA is used to examine the evolution of inequality in the context of declining economic growth. Contrary to the general hypothesis, we find that inequality does not necessarily increase as growth slows down. In fact, there are certain conditions under which inequality can be reduced significantly, or even eliminated entirely, as growth declines. The paper discusses the implications of this finding for questions of employment, government fiscal policy and the politics of de-growth.

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1. Introduction

The French economist, Piketty (2014a), has received widespread acclaim for his book *Capital in the 21st Century*. Building on over 700 pages of painstaking statistical analysis, the central thesis of the book is nonetheless relatively straightforward to describe. Piketty argues that the increase in inequality witnessed in recent decades is a direct result of the slowing down of economic growth in modern capitalist economies. Under circumstances in which growth rates decline further, he suggests, this challenge would be exacerbated.

So, for example, any future movement towards a 'secular stagnation' (Gordon, 2012; MGI, 2015; OECD, 2014) is likely to be associated with even greater inequality. Equally, any policies aimed at deliberately 'dethroning' the Gross Domestic Product (GDP) as an indicator of progress (Turner, 2008) could have perverse impacts on the distribution of incomes. Likewise, any objective of 'degrowth' for ecological or social reasons (Kallis et al., 2012; Latouche, 2007; Schneider et al., 2010) might be expected to have undesirable social outcomes.

Piketty's hypothesis that a slowing down of growth increases structural inequality poses a particular challenge to those ecological economists who, from the earliest days of the discipline (Daly, 1972;

Meadows et al., 1972), have been critical of society's 'GDP fetish' (Stiglitz et al., 2009) and sought to establish alternative approaches (d'Alisa et al., 2014; Daly, 1996; Jackson, 2009; Rezaei et al., 2013; Victor, 2008) in which socio-economic goals are achieved without assuming continual throughput growth.¹ Certainly, the prospects for 'prosperity without growth' (Jackson, 2009) would appear slim at best if Piketty's thesis were unconditionally true.

The aim of this paper is therefore to unravel the extent of this challenge in more detail. To this end, we develop a simple closed, demand-driven model of Savings, Investment and Growth in a Macroeconomic framework (SIGMA).² We then use SIGMA to test for the implications of a slowdown of growth on a) capital's share of income and b) the distribution of incomes in the economy. By adding a government sector to the model, we are able to explore the potential to mitigate regressive impacts through a progressive taxation system. The inclusion of a banking sector allows us to establish clear relationships between the real and the financial economy and discuss questions of household wealth. Our ultimate aim is to tease out the implications of our findings for the wider project of developing an 'ecological

¹ For an overview of such alternative approaches see Røpke, 2016-in this volume.

² A user-version of the SIGMA model is available online at <http://www.prosperitas.org.uk/sigma> to allow the interested reader to reproduce the results in this paper and conduct their own scenarios.

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macroeconomics'. First, however, we outline the structure of Piketty's argument in more detail.

2. Piketty's Two 'Fundamental Laws' of Capitalism

There are two core strands to Piketty's case. One of them (Piketty, 2014a: 22–25) concerns the power that accrues increasingly to the owners of capital, once the distribution of both capital and income becomes skewed. The power of accumulated or inherited wealth to set the conditions for the rates of return to capital and labour increasingly favours the owners of capital over wage-earners and reinforces the advantages of the rich over the poor. These arguments are of course relatively well-known from Marxist and post-Marxist critiques of capitalism (Buchanan, 1982; Goodwin, 1967; Giddens, 1995).

Piketty's principal contribution, however, is to identify what he calls a 'fundamental force for divergence' of incomes, in the structure of modern capitalism (Piketty 2014a: 25–27). In the simplest possible terms it relates to the relative size of the rate of return on capital r to the growth rate g . When the rate of return on capital r is consistently higher than the rate of growth g , it leads to an accumulation of capital by the owners of capital and this tends to reinforce inequality, through the mechanism described above.

Piketty advances his argument through the formulation of two 'fundamental laws' of capitalism. The first of these (Piketty, 2014a: 52 et seq) relates the capital stock (more precisely the capital to income ratio β) to the share of income α flowing to the owners of capital. Specifically, the first fundamental law of capitalism says that³:

$$\alpha = r\beta, \tag{1}$$

where r is the rate of return on capital. Since β is defined as K/Y where K is capital and Y is income, it is easy to see that this 'law' is, as Piketty acknowledges, an *accounting identity*:

$$\alpha Y = rK. \tag{2}$$

Formally speaking, the income accruing to capital equals the total capital multiplied by the rate of return on that capital. Though this 'law' on its own does not force the economy in one direction or another, it provides the foundation from which to explore the evolution of historical relationships between capital, income and rates of return. In particular, it can be seen from this identity that for any given rate of return r the share of income accruing to the owners of capital rises as the capital to income ratio rises.⁴

It is the second of Piketty's 'fundamental laws of capitalism' (Piketty 2014a: 168 et seq; see also Piketty, 2010) that generates particular concern in the context of declining growth rates. This law states that in the long run, the capital to income ratio β tends towards the ratio of the savings rate s to the growth rate g , i.e.:

$$\beta \rightarrow \frac{s}{g} \text{ as } t \rightarrow \infty. \tag{3}$$

This asymptotic law suggests that, as growth rates fall towards zero, the capital to income ratio will tend to rise dramatically — depending of course on what happens to savings rates. Taken together with the first

law, Eq. (3) suggests that over the long term, capital's share of income is governed by the following relationship:

$$\alpha \rightarrow r \frac{s}{g} \text{ as } t \rightarrow \infty. \tag{4}$$

In other words, as growth declines, the rising capital to income ratio β leads to an increasing share of income going to capital and a declining share of income going to labour. Unless the distribution of capital is itself entirely equal (a situation we discuss in more detail later) this relationship therefore presents the spectre of a rapidly escalating level of income inequality. Rising wealth inequality would also flow from this. Differential savings rates – in which higher income earners save proportionately more than lower income earners (or, equally, where there are lower propensities to consume from capital than from income) – would reinforce these inequalities further by allowing the owners of capital to accumulate even more capital and command even higher wages. The superior power of capital (Piketty 2014a 22–25) then precipitates a rising structural inequality.

It is important to stress that relationships (3) and (4) are long-term equilibria to which the economy evolves, provided that the savings rate s and the growth rate g stay constant. As Piketty points out, 'the accumulation of wealth takes time: it will take several decades for the law $\beta = s/g$ to become true' (Piketty 2014a: 168). In any real economy, the growth rate g and the savings rate s are likely to be changing continually, so that at any point in time, the economy is striving towards, but may never in fact achieve, the asymptotic result. Nonetheless, as Krusell and Smith (2014: 2) argue, Eq. (4) is 'alarming because it suggests that, were the economy's growth rate to decline towards zero, as Piketty argues it will, capital's share of income could increase explosively'.

The principal aim of this paper is to test this hypothesis; i.e. to determine the extent to which declining rates of growth in national income, NI , might lead to rising capital to income ratios and thence to an increasing share of income to capital. In either formulation, much depends on the parallel movements in the rate of return on capital r and on the savings rate s . In order to explore these relationships in more detail, we built a simple macroeconomic model of savings, inequality and growth, calibrated loosely against UK and Canadian data. The background and structure for the model are described in the next section. The subsequent section presents our findings.

3. The SIGMA Model

Working together over the last four years, the authors of this paper have developed an approach to macroeconomics which seeks to integrate ecological, real and financial variables in a single system dynamics framework (Jackson et al., 2014; Jackson and Victor, 2015).

An important intellectual foundation for our work comes from the insights of post-Keynesian economics, and in particular from an approach known as Stock-Flow Consistent (SFC) macro-economics, pioneered by Copeland (1949) and developed extensively by Godley and Lavoie (2007) amongst others.⁵ The essence of SFC modelling is consistency in accounting for all monetary flows. Each sector's expenditure is another sector's income. Each sector's financial asset is another's liability. Changes in stocks of financial assets are consistently related to flows within and between economic sectors. These simple understandings lead to a set of accounting principles which can be used to test the consistency of economic models. The approach has come to the fore in the wake of the financial crisis, precisely because of these consistent accounting principles and the transparency they bring to an understanding not just of conventional macroeconomic aggregates like the GDP but also of the underlying balance sheets. It has even been argued that

³ In what follows, we suppress specific reference to time-dependency of variables except where absolutely necessary. Thus all variables should be read as time dependent unless specifically denominated with a subscripted suffix 0. Occasionally, we will have reason to use the subscripted suffix (-1) to denote the first lag of a time-dependent variable.

⁴ We will see later that the *ceteris paribus* clause relating to constant r here is important. In fact, the rate of return will typically change as the capital to income ratio rises; and to the extent that this ratio declines with increasing β , it can potentially mitigate the accumulation of the capital share of income.

⁵ Similar post-Keynesian approaches have also been developed by Taylor et al. (2016-in this volume) and Fontana and Sawyer (2016-in this volume). A paper by Campiglio (2016-in this volume) explores policy implications drawn from such approaches.

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