

## Economic Growth and Distribution



# Economic Growth and Distribution

On the Nature and Causes of the Wealth of  
Nations

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*Edited by*

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# Introduction

**Neri Salvadori**

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The interest in the study of economic growth has experienced remarkable ups and downs in the history of economics. It was central in classical political economy from Adam Smith to David Ricardo, and then in the critique of it by Karl Marx, but was moved to the periphery during the so-called 'marginal revolution'. John von Neumann's growth model and Roy Harrod's attempt to generalise Keynes's principle of effective demand to the long run re-ignited an interest in growth theory. Following the publication of papers by Robert Solow and Nicholas Kaldor in the mid 1950s, growth theory became one of the central topics of the economics profession until the early 1970s. After a decade of dormancy, since the mid 1980s, economic growth has once again become a central topic in economic theorizing. The recent 'new' growth theory (NGT) is also called 'endogenous growth theory', since the growth rate is determined accordingly from within the model and is not given as an exogenous variable.

The interaction between economic growth and distribution was the hallmark of classical economic theorizing. After the Second World War this theme experienced a revival, especially within the post-Keynesian, classical, and Marxian schools. With the development of the 'new growth theory', the connection between distribution and growth has become the subject of intensive research. It has been a lens through which the complex interplay of the factors explaining the nature and causes of the wealth of nations has been investigated. Particular attention has been devoted to population growth, structural change, technological progress and (physical, social and human) capital accumulation.

A conference held in Lucca in the summer of 2004 was a forum for the presentation and discussion of different approaches to the issues of growth and distribution, and their theoretical, empirical, historical and methodological implications. This book is the main product of the conference. Other papers will soon appear in a special issue of *Metroeconomica* (2006).<sup>1</sup> The conference was hosted by a research group, and several of the papers elaborated by members of the group were delivered at the conference. The main products of the research group are companion

books on *Innovation, Unemployment and Policy in the Theories of Growth and Distribution* (Salvadori and Balducci, 2006) and on *Classical, Neoclassical and Keynesian Views on Growth and Distribution* (Salvadori and Panico, 2006). There is, of course, no overlap among the mentioned publications, which constitute the proceedings of the conference. The papers more directly related to the title of the conference have been inserted in this volume, which shares the same title as the conference itself. The result is that the book analyses the recent developments in the interplay of economic growth and distribution.

The book opens with a chapter by Oded Galor, who proposes a unified theory able to explain both the epoch of Malthusian stagnation, characterizing most of human history, and the contemporary era of modern economic growth. The proposed theory also underlies the driving forces that triggered the transition between these regimes and the associated phenomenon of the Great Divergence in income per capita across countries. It unifies two fundamental approaches regarding the effect of income distribution on the process of development: the classical approach and the Credit Market Imperfection approach. In this way an intertemporal reconciliation between the conflicting viewpoints regarding the effect of inequality on economic growth is provided. The classical viewpoint is interpreted as reflecting the state of the world in early stages of industrialization when physical capital accumulation was the prime engine of economic growth. In contrast, the credit market imperfection approach is interpreted as reflecting later stages of development, when human capital accumulation becomes a prime engine of economic growth and credit constraints are largely binding. The following chapter, by Amit Bhaduri, also seeks to blend elements of the classical tradition with modern theory. Bhaduri focuses on the Keynesian theory of effective demand and the Schumpeterian emphasis on the influence of market structures on technological change. The third chapter, by Ferdinando Meacci is, by contrast, mainly historical: it completes the two previous viewpoints on the classical economists with a reconstruction of Smith's competition-of-capitals doctrine.

The next four chapters introduce heterodox models and comparison among them. Chapter 4, by Duncan Foley and Lance Taylor, describes a heterodox macroeconomic model put together with two explicit aims in mind: 'to set out a benchmark for comparison of heterodox and orthodox approaches to economic growth and income distribution, and to point out similarities shared by a wide range of heterodox models'. Chapter 5, by Gennaro Zezza and Claudio Dos Santos, presents a stock-flow model of growth for a closed economy that encompasses virtually all one-sector post-Keynesian growth models as special cases and uses it to analyse the

relationship between growth and the distribution of income in financially sophisticated economies. Chapter 6, by Fabio Hideki Ono and José Luís Oreiro, presents a post-Keynesian growth model in which, on the one hand, the mark-up rate varies in the long-term due to a misalignment between the actual rate and the ‘desired’ profit rate and, on the other, the capital–output ratio may shift as a result of technological progress. Finally, chapter 7, by Graham White, analyses not only the differences between post-Keynesian and Kaleckian growth theory but also the implications for growth theory flowing from a Sraffian analysis of value and distribution.

Chapters 8 to 11 introduce problems of policy. Chapter 8, by Cecilia García-Peñalosa and Stephen J. Turnovsky, employs a stochastic growth model to analyse the effect of macroeconomic volatility on the relationship between income distribution and growth. In the first part of the chapter, the authors first show how the distribution of income depends upon the initial distribution of capital and the equilibrium labour supply and then find that an increase in volatility raises the mean growth rate and income inequality. The second part of the chapter uses this framework to analyse the design of tax policy to achieve desired growth, distribution and welfare objectives. Chapter 9, by Sergio Cesaratto, brings new insights on the current debates on pension reforms. The chapter seeks to show that even if a reform aiming to create a fully funded pension scheme (based on the accumulation of real assets) is successful at raising the marginal propensity to save, the larger potential saving supply is not necessarily translated into an increased amount of investment. Chapter 10, by Maurizio Ciaschini and Claudio Soggi, introduces the income distribution process in a SAM (Social Accounting Matrix) and applies the method to the relationship between income distribution and output change in a region in Italy. A SAM is also used in Chapter 11, by Oscar De-Juan, to build a model which may be relevant both to policy evaluation and growth analysis.

The next two chapters introduce dynamics and business cycles. Chapter 12, by Lance Taylor, Nelson H. Barbosa-Filho and Codrina Rada, outlines an approach to the analysis of cyclical macroeconomic fluctuations in industrialized economies based on low-order systems of differential equations. It combines partial models of both the real and financial sides of the economy into a higher order analytical framework, which may shed light both on observed cycles and their policy. Chapter 13, by Alberto Russo, Domenico Delli Gatti and Mauro Gallegati, suggests a scaling approach to business cycles by developing a heterogeneous interacting agents model that replicates well-known stylized facts of industrial dynamics; agent-based simulations show that power law shifts are a consequence of changes in firms’ capital accumulation behaviour due to technological progress and a wage–firm size relationship.

The last (but not least) three chapters introduce institutions into the picture. Chapter 14, by Graziella Bertocchi, illustrates the ongoing research line which adds a historical and institutional dimension to economic growth analysis both at the theoretical and empirical level: it presents applications of this research strategy to the impact of colonization on growth, the extension of the franchise and the welfare state, the evolution of educational systems, the relationship between industrialization and democratization, and international migration. Chapter 15, by Michele Bagella, Leonardo Becchetti and Stefano Caiazza, argues that religious differences among countries are crucial determinants of the evolution of market rules and financial institutions; it shows that a positive link between institutions and growth arises only in those countries whose cultural background allowed them to reach a sufficient degree of institutional development and that the effect of institutions on growth is, for a significant part, exogenous. Chapter 16, by Gabriella Berloff and Maria Luigia Segnana, questions the views that trade liberalization ‘is always good for growth’ and that ‘growth is always good for the poor’ and argues that the problem of poverty reduction cannot be separated from the context in which trade is liberalized.

Almost all the chapters of this book as well as all the papers included in the special issue of *Metroeconomica* have been peer-reviewed (the exceptions are the invited lectures to the conference). I would like to take this opportunity to thank all the referees who contributed to improving the published papers and advised me of their publishability. The following scholars helped me with this task:<sup>2</sup> Syed M. Ahsan (Concordia University, Canada), Fahim Al-Marhubi (Department of Economics, Sultanate of Oman), Nelson H. Barbosa Filho (Federal University of Rio de Janeiro, Brazil), Leonardo Becchetti (‘Tor Vergata’ University, Rome, Italy), Enrico Bellino (University Cattolica del Sacro Cuore, Milan, Italy), Roland J. Benabou (Princeton University, USA), Amit Bhaduri (University of Pavia, Italy), Claudia Biancotti (Bank of Italy), Harry Bloc (Curtin University of Technology, Australia), Tony Brewer (University of Bristol, UK), Elise S. Brezis (Bar-Ilan University, Israel), Alberto Bucci (Milan University, Italy), Maria Rosaria Carillo (‘Parthenope’ University, Naples, Italy), Maurizio Ciaschini (Macerata University, Italy), Mario Cimoli (United Nations Economic Commission for Latin America and the Caribbean), Pasquale Commendatore (‘Federico II’ University, Naples, Italy), Guido Cozzi (Macerata University, Italy), John Cranfield (University of Guelph, Canada), Francesco Daveri (Parma University, Italy), Erik Dietzenbacher (University of Groningen, Netherlands), Francesco Drago (Siena University, Italy), Amitava Dutt (University of Notre Dame, USA), Alessandro Federici (‘La Sapienza’ University, Rome, Italy), Jesus Felipe (Asian Development Bank, Philippines), Davide Fiaschi (Pisa University, Italy), Franklin M. Fisher

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## NOTES

1. The call for papers of the Conference also provided special issues of two other journals: the *European Journal of the History of Economic Thought* and the *Journal of Economic Growth*. Unfortunately, the papers which were considered suitable for these outlets of the conference were too small in number to be able to produce the special issues mentioned. One paper suitable for the *European Journal of the History of Economic Thought* is published in this volume. One paper suitable for the *Journal of Economic Growth* will be published in that journal.
2. The list does not include the scholars asked to review papers which were made available only for the special issue of the *Journal of Economic Growth* by their authors, as these papers were processed directly by the office of the journal.

## REFERENCES

- Salvadori N. and R. Balducci (2006), *Innovation, Unemployment and Policy in the Theories of Growth and Distribution*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Salvadori N. and C. Panico (2006), *Classical, Neoclassical and Keynesian Views on Growth and Distribution*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.