

Rethinking Economic Development, Growth, & Institutions

JAIME ROS

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Links to third party websites are provided by Oxford in good faith and for information only. Oxford disclaims any responsibility for the materials contained in any third party website referenced in this work. To Adriana, my companion, and to our children, Alejandra, Diego, and Pablo

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Preface

This book is a sequel to *Development Theory and the Economics of Growth*, published in 2000 with the aim to vindicate the theoretical insights and accumulated empirical knowledge of classical development economics and to integrate them into the mainstream of modern growth economics. The growth and development field has expanded in the last twelve years in welcome directions that aim to deepen our understanding of the fundamental determinants of comparative development. This new book evaluates these new directions, including developments in endogenous growth theory and economic geography as well as the rise and challenge of the new institutional economics, in the light of the earlier, classical contributions to development theory.

As with the previous book, the professional economist and researcher will find in the present one original theses on the contributions that early development theory can make to the research program of the economics of growth and comparative development. Graduate and advanced undergraduate students in economics will find a balanced theoretical treatment and an assessment of the empirical evidence provided by new and earlier approaches to economic growth and development.

The elaboration of this book has drawn very heavily on my teaching activity over the past two decades at both the University of Notre Dame and the Universidad Nacional Autónoma de México (UNAM), my research over the years on the growth performance of developing countries, especially in Latin America, in the postwar period, and a long-time interest in classical development economics. While the book has had a very long gestation period, it is only over the past two years, with the generous support of the Faculty of Economics at UNAM, that it has taken its present shape.

I am grateful to the many students that provided feedback on my courses. Very special thanks are due to three students, Santiago Capraro, David Maldonado, and Luis Monroy Gómez Franco, who in addition to their feedback on many aspects of the book provided excellent and enthusiastic research assistance.

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Introduction

In the introduction to *Development Theory and the Economics of Growth* published in 2000, I described this book as a collection of essays in "trespassing" between two disciplines: development economics and growth theory. I saw the need for it given the lack of interactions between these two fields of economics that should have been one and the same. They were not. Growth theory and development economics continued to be distant cousins, and occasionally even hostile to one another.

A lot has happened in the two fields since 1999 when Development Theory and the Economics of Growth went to press. With Hall and Jones's 1999 paper on the role of "social infrastructure" in economic development, a big push was given to an expanding literature on institutionalist explanations of cross country differences in income per capita. At about the same time, there was also a remarkable revival of interest in the role of geographical advantages and disadvantages in economic development. Jeffrey Sachs and associates, in particular, asserted a powerful role for geography in the explanation of modern development and underdevelopment (see Gallup, Sachs, and Mellinger, 1999; Sachs 2000 and 2003). Soon after, an institutionalist counterattack followed, led by Acemoglu, Johnson, and Robinson (2001 and 2002), Easterly and Levine (2003) and Rodrik, Subramanian, and Trebbi (2004). More generally, the new institutional economics made enormous progress. In 2012, Acemoglu and Robinson published Why Nations Fail?, a book drawing on growth theory, economic history and political science that is bound to profoundly influence the field of comparative development. At the same time, "institutionalist growth empirics" came under attack from different perspectives (see, in particular, Chang 2011).

Alongside developments in the new institutionalist economics and the geography versus institutions controversy, attention also focused on other "deep determinants" of income levels and growth rates. The previous consensus in the endogenous growth literature on the adverse effects of inequality on economic growth was shaken by contributions by Forbes (2000), Barro (2000),

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and Banerjee and Duflo (2003). Engerman and Sokoloff (2002), providing a historical comparative perspective on the topic, and Easterly (2007) tended, in contrast, to reassert the previous conclusions. The sacred role of trade openness was also put into question. Rodriguez and Rodrik (2001) scrutinized the research on the role of trade policies in growth and shook the field by demonstrating that conventional wisdom on the effects of trade openness lacked solid empirical foundations. New evidence on the developmental effects of natural resource abundance by Lederman and Maloney (2007, 2008) also questioned previous results in Gelb (1988), Auty (1990, 2001), and Sachs and Warner (1995, 2001) that viewed the "natural resource curse" as a major factor explaining differences in growth performance across countries.

In general, all these contributions generated stronger interactions between growth theory and development economics as the two fields moved in parallel in the direction of searching for the fundamental determinants of comparative development. Other developments that contributed to bring the two fields closer to each other include the expanding theoretical literature on multiple equilibria and poverty traps models (see Azariadis and Stachurski, 2005, for a survey) and related policy debates on the kind of poverty traps prevailing in less developed countries. In particular, Easterly's 2006 criticism of Sachs's 2005 call for a massive increase in international aid to poor countries, reviewed in Chapter 3, is reminiscent of controversies in early development economics on the role of low savings and increasing returns to capital versus that of institutional weaknesses in keeping low-income countries in poverty and stagnation.

Developments in endogenous growth theory, with contributions such as Aghion and Howitt (1998 and subsequent writing), clarified the ultimate sources of technological progress and vindicated Schumpeter's approach and his notion of "creative destruction" as discussed in Chapter 5. The role of effective demand in economic growth has also been clarified in various papers; see, in particular, Bhaduri (2006), Dutt (2006), Dutt and Ros (2007), Rada (2007), and Ocampo, Rada, and Taylor (2009, ch. 8). Although unfortunately the contributions in this field have had so far a very limited impact on mainstream growth theory, recent developments in growth empirics, as we shall see in Chapter 11, increasingly recognize the role of demand in long-term growth. These two developments, in Schumpeterian and Keynesian growth theory respectively, have much in common, in particular in the attempt to endogeneize technological progress, but give a very different emphasis to supply side and demand side influences on productivity growth (as we shall see in Chapter 11). Other, more empirically oriented works over the past decade, include important books by Amsden (2001), Chang (2002), Reinert (2007), and Ocampo, Rada and Taylor (2009) that draw on economic history and a theoretical approach in the tradition of classical development economics.

As a result of these developments, it is possible today to go beyond a collection of essays in "trespassing" and give a much more unified account of the two disciplines than twelve years ago. Yet, despite this welcome trend, a major thesis of my 2000 book still holds: classical development theory, as I referred there to the early contributions to development economics, continues to be neglected by the mainstream. This is a puzzle. This approach had a lot to say about why poor countries are poor and what they need to do in order to escape underdevelopment. It is indeed puzzling why, in attempting to address the same issues, modern growth theory and, just as much, the new institutional economics, have largely ignored classical development theory and more recent contributions in this tradition.¹

Most of this introduction is about why this is so. The rest of the book is an effort to show why the contributions of the pioneers of development economics had many insights that are not only very valuable but can be made perfectly intelligible to researchers working on the economics of growth. After explaining what I mean by modern growth theory and classical development economics, I give an overview of the book's main themes.

Since the mid 1980s, after two decades of quasi-inactivity in the field, the economics of growth became again the subject of intense theoretical and empirical research. This renewed effort took initially two different directions. Some adapted and extended the neoclassical growth model as formalized by Robert Solow and Trevor Swan in the mid fifties, while retaining the assumptions of constant returns to scale and exogenous technical progress. Others have taken more radical departures from the neoclassical approach by bringing in increasing returns to scale and attempting to model technological change. This last is endogenous growth theory. In both cases, and this is perhaps the most novel feature of the reawakened field, these efforts try to explain the process of economic growth in developed and developing countries alike within a unified analytical framework. Important questions such as: Why are some nations poorer than others and why the economies of some countries grow so much faster than others, were put at the center of the research agenda of mainstream growth theory.

This revival of growth economics, or at least most of it until the recent ascent of the new institutional economics, proceeded on the rather astonishing premise that before the mid-1980s the only answers to those questions

¹ An example is the influential book by Barro and Sala-i-Martin (1995) which synthesizes contributions to old and new growth theory. The only reference there to early development theory is to Lewis' (1954) classic article which, strangely, is regarded as a big push model. There are, no doubt, exceptions and the contributions of that early period have been the object of a renewed interest with the revival of growth economics. I have already referred to the literature on poverty traps and multiple equilibria (see, in particular, Murphy, Shleifer and Vishny, 1989; Krugman, 1992, 1995; Rodrik, 1994; Ciccone and Matsuyama, 1996; Rodriguez-Clare, 1996; Skott and Ros, 1997; Ros, 2000; Azariadis and Stachurski, 2005).

were to be found in the neoclassical growth model. The premise is astonishing for at least two reasons. First, because some fifty years ago a then new field of economic theory emerged aiming to answer similar questions, to address issues about the persistence of underdevelopment and to search for remedies to overcome poverty. The nature of the issues addressed by the pioneers of development economics—Rosenstein-Rodan, Nurkse, Prebisch, Hirschman, and Leibenstein among others—forced the new field to rely on a paradigm built upon notions of imperfect competition, increasing returns and labor surpluses, which today are used extensively but were then poorly integrated, or altogether alien, to the established body of economic theory.

Second, and somewhat ironically given its central position in the economics of growth today, the Solow model was not meant primarily to answer those questions but rather to provide a solution to some perceived difficulties in growth theory at the time (Harrod's knife edge instability and the adjustment of the warranted to the natural rate of growth in the Harrod-Domar model). Having the neoclassical growth model explain differences in income levels and growth rates across countries requires a number of additional assumptions that Solow himself probably did not have in mind: in a nutshell, that economies differ among themselves only in their initial capital-labor ratios, savings rates and population growth rates.

This inadequacy of traditional neoclassical economics is perhaps one reason why development economics had already taken a distinctive approach a decade before the rise to dominance of neoclassical growth theory. Whether one could make fruitful empirical generalizations about the economic experience of developing countries or not, it was clear that the stylized facts on which traditional growth theory focused—with its emphasis on the stability of the capital-output ratio, savings rates and income shares—had little relevance to the experience of developing countries. Lewis (1954), for example, had tried to account for the trend increase, rather than the stability, of saving and investment rates in the course of economic development. Given its purposes, growth theory tended to adopt a very high level of aggregation, often an economy with one sector producing one good. The striking and persistent presence of dualism (technological and organizational) in underdeveloped countries, led development economics to operate at a lower level of aggregation, with at least two sectors using different technologies.

In addition, growth theory soon became concentrated on the analysis of steady states in which the main economic variables expand at the same rate. Because this analysis did not fit well the experience of developing countries, development theory had to focus instead on disequilibrium states and the process of transition from one steady state to another. As Rosenstein-Rodan (1984, pp. 207–8) argued: "... an analysis of the disequilibrium growth process is what is essential for understanding economic development problems. The

Economic Journal article of 1943 attempted to study the dynamic path towards equilibrium, not merely the conditions which must be satisfied at the point of equilibrium."

This does not mean that development theory was uninterested in steady states. It became concerned, however, with a particular kind of steady state quite alien to conventional growth theory: low level equilibrium traps which are, as the name suggests, equilibria that are locally stable (small departures from it generate forces that bring the economy back to the equilibrium state) but globally unstable, so that large shocks can cause a cumulative departure from the original equilibrium. Leibenstein (1957, p. 187), for example, stated: "The crucial aspect of our theory has to do with an explanation of why the subsistence equilibrium state should possess stability in the small but not in the large."

This leads us to a very important aspect. To the pioneers of development theory, underdevelopment appeared as a situation characterized by a lack of capital-which was consistent with labor receiving lower wages than in developed countries—but also, and this was the puzzle, by a low rate of return to capital. For Nurkse, for example, the scarcity of capital was "at the very centre of the problem of development in economically backward countries. The so-called "underdeveloped" areas, as compared with the advanced, are underequipped with capital in relation to their population and natural resources" (Nurkse, 1953, p. 1). This lack of capital resulted from a low capacity to save, given the low level of real income, but also from the "weakness of investment incentives" that had its source in a low rate of return to capital (Nurkse, 1953, ch. 1). The paradox of both capital and labor receiving lower returns, and the surprising conclusion that the lack of capital may have to be attributed to a low profit rate, understandably led to the search for a novel analytical framework, as anyone familiar with the modern controversies over neoclassical growth theory would probably agree.

This approach generated a model, or rather a set of economic growth models, that departs in two ways from the early neoclassical approach to growth theory.² The first difference refers to increasing returns to scale and the associated technological and pecuniary externalities. In his 1943 article on the problems of industrialization in Eastern and South-Eastern Europe, and in later contributions, Rosenstein-Rodan was probably the economist that most radically departed from traditional theory in this respect. Nurkse, drawing on Adam Smith and Allyn Young, stressed also the effects associated with increasing returns.

² "Avant la lettre", one might add, since most of these writings preceded the neoclassical model of growth at least as formalized by Solow in the mid-fifties.

The second departure refers to an elastic labor supply arising from the presence of labor surplus. Early views on underdevelopment as a situation characterized by a small capital endowment in relation to available labor supplies led to the conclusion that the elasticity of the labor supply in these conditions was likely to be higher than in developed economies that have much higher capital endowments per worker. With a low aggregate capital-labor ratio, the marginal product of labor at full employment in the capital-using sector would be so low that a fraction of the labor force would remain employed in a non-capitalist or subsistence sector, using technologies with negligible capital intensity. Lewis was the economist that developed and emphasized the labor surplus assumption.

These two ingredients—increasing returns and labor surplus—were present from the "beginning" in Rosenstein-Rodan (1943), as Rodan rightly claimed in his 1984 contribution (Rosenstein-Rodan, 1984).³ A moderate dose of increasing returns and an elastic labor supply can together generate multiple equilibria so that depending on initial conditions the economy can get stuck in a development trap. This was not the only development trap model in the early literature but it is, as this book argues, the most interesting and relevant one for the present state of growth theory.

1. Five Themes

Modern growth theory and classical development economics

The book develops five major themes. The first is the relation between modern growth theory and classical development economics. Just as in macroeconomic theory the neoclassical orthodoxy and its Keynesian critics differ among themselves in relation to the existence or strength of a spontaneous tendency to a full employment equilibrium in a laissez faire economy, in modern growth theory, the neoclassical orthodoxy and its non-neoclassical critics can be said to differ among themselves with respect to a tendency to convergence in income per capita levels across countries in a laissez faire, globalized world economy. The non-neoclassical criticisms come from recent endogenous growth theory, the other major brand of modern growth economics that has departed from old neoclassical theory in various directions. Classical development theorists, well before the convergence properties of the Solow-Swan model were fully explored, were also in the non-neoclassical camp. While neoclassical growth theory and empirics emphasize the conditional tendency to convergence to a unique steady state as rates of return to

 $^{^3}$ I believe it fair to say that only Rosenstein-Rodan fully perceived the general equilibrium implications of these two assumptions taken together.

capital would tend to be higher in low-income, capital-scarce countries, classical development theory took as its starting point the "paradox of underdevelopment", the fact that returns to *all* factors of production tended to be lower in low-income countries, a fact that can trap poor countries in a low level equilibrium and prevent convergence to a high level equilibrium.

Yet, despite the relevance of the analysis and implications of classical development theory, the recent wave of theoretical and empirical research on economic growth has generally ignored, as already indicated, these earlier contributions by development theory. I shall argue that this neglect is one reason why the lively controversies on convergence, technical progress and increasing returns, between followers of the Solow model and endogenous growth theorists, appear at times to be in a dead end, confused by an all or nothing situation: between the assumptions of constant returns to scale and the dramatically increasing returns to scale involved in the assumption of constant (or increasing) returns to capital.

This debate appears to have missed a simple implication of early development theory: that a moderate dose of increasing returns to scale combined with the presence of labor surplus can make a dramatic difference to the neoclassical model, a difference that modifies its transitional dynamics in a way that can overcome the long recognized empirical shortcomings of the Solow model⁴ while, at the same time, being free from some of the theoretical and empirical objections that have been raised against the new brand of endogenous growth models. As a result, we shall argue, the key contributions of classical development economics provide an approach to the problem of economic development that is more general and more promising empirically than those adopted in either old or new growth theory. The corollary of this argument is that it may be essential to draw much more heavily on the very rich past of development theory if the ongoing research effort is to tackle satisfactorily the formidable task that it has set for itself.

The scope of classical development theory, openness, and the big push argument

A second theme refers to the scope of early writing on development theory. We shall argue that this analytical framework can help us think about a much wider variety of development problems than those to which it was originally applied. Development traps can arise under a broad set of circumstances

⁴ Chapter 2 addresses the empirical shortcomings of the Solow model. Mankiw (1995) summarizes them well by saying that the predictions of Solow model: 1) understate differences in incomes per capita across countries; 2) overstate the rate of convergence to the steady state; 3) overstate differences in the rates of return on capital among capital-rich and capital-poor countries.

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involving increasing returns, demand elasticities and factor supply elasticities. These circumstances are not confined to low levels of economic development. Because the slow rate of accumulation in the trap is due to a low rate of return to capital, the approach has greater generality than other poverty trap models which rely, for example, on vicious circles between income and savings or population growth. The framework can be fruitfully applied to any situation in which a combination of demand and factor supply elasticities together with a dose of increasing returns in new industries interact to hold back the "inducement to invest".

Moreover, those circumstances are not confined to a closed system. Although sometimes formulated or illustrated with a closed economy, the argument survives the extension to the case of an open economy. Interestingly, opening the economy to trade and capital movements introduces important differences and modifies the policy implications but does not make the underlying coordination problems less important. Coordination failures are likely to emerge, in particular, in the transition from old to new patterns of production and trade specialization. Arguably, this situation is characteristic of a number of semi-industrial "sandwich economies" in which old comparative advantages in labor intensive industries are being eroded and the new ones in capital and technology intensive activities are only slowly emerging. Thus, in contrast to the counter-revolution in development economics⁵ which denied the usefulness of the approach for the small open economy of a "typical" developing country, I shall argue that it can be fruitfully applied to the development problems of open economies (Chapters 9 and 14).⁶

In fact, I would argue that it is when applied to the interpretation of postwar development experience that the approach taken by early development theory shows its strengths and most useful insights. From this perspective, we can view the staggering success stories of East Asia's industrialization (and, to a lesser extent, of a few Latin American countries for some time before the 1980s) as a succession of policy interventions that accelerated the transition between different patterns of production and trade specialization. It is difficult to see how a primarily market-driven development model, that inspires many of today's policy recommendations to developing countries, could have

⁵ I use the term "counter-revolution" in development theory or, in other places, "neoclassical resurgence" to indicate the partial abandonment in the 1960s of the labor surplus-increasing returns paradigm in development economics. Both of these terms are, however, somewhat misleading, as there was no neoclassical development economics before the 1940s.

⁶ The view that the scope of classical development economics is limited to a closed economy has different sources. One of them, perhaps the most popular, is a confusion between a savings trap (low income leading to low savings and investment) and a profitability trap (a low profit rate limiting investment opportunities). While the first poverty trap is easily overcome through international capital mobility, the second is not and, in fact, may be exacerbated by capital mobility. For a discussion of the topic, see Chapters 3 and 7).

"traversed" those transitions so successfully. This is not because market based successes have been entirely absent (this is very debatable). It is hard to see simply because sound theory suggests exactly the contrary: that market forces are unlikely to address effectively (or, at least, efficiently) the coordination problems of the transition. Chapters 9 and 14 provide the theoretical basis as well as empirical support for this assertion. The extension of the analysis to open economy issues addresses also the role of some neglected factors in cross country growth analysis, such as the pattern of trade specialization, as determined by industrial policies and natural resource endowments.

Keynesian growth theory and classical development economics

A third theme is the relationship of early development theory to Keynesian economics. Growth theory was "born macro" in the sense that in the early years of growth theory, in the writings of Harrod (1939) and later Keynesians, aggregate demand had an important role in the growth process. Development economics was also "born macro", as Taylor and Arida (1988) phrased it in their survey of development theories; but it was not born Keynesian or structuralist. In Lewis's view: "from the point of view of countries with surplus labor, Keynesianism is only a footnote to neo-classicism—albeit a long, important and fascinating footnote" (Lewis, 1954, p. 140). Nurkse was blunter:

We are here in the classical world of Say's law. In underdeveloped areas there is generally no 'deflationary gap' through excessive savings. Production creates its own demand, and the size of the market depends on the volume of production. In the last analysis, the market can be enlarged only through an all-round increase in productivity. Capacity to buy means capacity to produce. (Nurkse, 1953, pp. 8–9).

We need not take these warnings against the "Keynesian temptation" of development economics too literally to recognize that, no matter how valid Keynes's insights and later contributions to development macroeconomics based on them, the development problems on which Rosenstein-Rodan, Nurkse, and Lewis focused would remain even if Keynesian problems were successfully overcome. Increasing returns to scale are essential to the development problem, and irrelevant to the Keynesian argument. Despite some similarities—such as the presence of an elastic labor supply, which, however, need not arise as in Keynes from a low level of resource utilization—we should not confuse these development problems with the effective demand problems on which Keynes focused. Not much is lost, for example, by assuming Say's law when looking at income differences across countries: as briefly discussed in Chapter 1, differences in resource utilization account for a very small fraction of the large gaps in income per capita across the world.

Introduction

In the case of differences in growth performance, which approach to take depends on the particular questions one is seeking to answer. Keynesian growth economics seems insufficient to understand why Europe and Japan grew faster than the United States in the post-war period or why the East Asian newly industrializing countries grew faster than the Latin American countries during the 1960s and 1970s. In turn, full employment models may be a good first approximation to explain growth under the post war conditions up to the early 1970s when governments were able to follow high employment policies that effectively removed recurrent effective demand problems, except for rather short periods of time. Yet, economies depart from the full employment path, sometimes for prolonged periods of time, and Keynesian problems and structural constraints on effective demand are not always successfully overcome even when in Trevor Swan's words "the authorities have read the General Theory" (Swan, 1963, p. 205, in Sen, 1970). Abandoning Say's law seems then essential. This is the case, we shall argue, for understanding why Latin America grew so little in the 1980s as compared to its long-run performance, just as it is essential to understand the poor performance of Great Britain and the United States economies during the inter-war period, the Japanese economy in the 1990s, and the current growth slowdown following the Great Recession in the United States and Western Europe.

There are thus a number of situations (in developing and developed countries alike) in which medium or even long-term growth performance cannot be properly explained if one remains strictly within the framework of full employment models. This was well recognized by the later structuralist contributions to development economics. The neglect of effective demand failures and structural constraints, while in the spirit of early development theory, can therefore be an important limitation under some circumstances. Chapters 10 through 13 examine the interactions between effective demand, technical change and factor accumulation. These chapters include an analysis of Keynesian growth theory, Kalecki's dual economy model and the contributions of two gap models, and the foreign exchange and fiscal constraints on growth emphasized by later structuralist growth models.

The ascent and challenge of the new institutional economics

A fourth theme has to do with the recent ascent of the new institutional economics and its relation to classical development theory. The relationship between institutions and development was a central theme for Adam Smith in the *Wealth of Nations*. This theme has reflourished in recent times in the contributions of the new institutional economics by Douglass North and his collaborators and has, even more recently, come to occupy a central place in the economics of growth given that, in the view of the neo-institutionalists,

differences among countries in the levels of economic development are fundamentally explained by institutional differences. This thesis is expressed in the recent book by Daron Acemoglu and James Robinson (2012) with particular force, clarity and erudition.

Are Adam Smith, Douglass North and lately Daron Acemoglu and James Robinson correct in believing that institutions are the fundamental determinants of the wealth and poverty of nations? Are the political and economic institutions adopted by countries all that matters for development, as asserted by the strong version of the institutionalist thesis? Do the enforcement of the rule of law and the operation of the invisible hand in a laissez faire economy really provide the keys to the kingdom that will allow poor countries access to the first world? More precisely, are "the openness of a society, its willingness to permit creative destruction and the rule of law", to use the words in Kenneth Arrow's blurb of Why Nations Fail?, the decisive factors in economic development? Or is it the case, as Keynes would remind us, that policies and the ideas and ideologies shaping those policies are equally or more important? And, if institutions are most important, are those on which the new institutionalism focuses the truly important ones or is it the case, as Pranab Bardhan has argued, that "the new institutionalism got its institutions wrong"? These questions, which were completely absent in the 2000 book, are addressed in the third part of the book, especially in Chapter 17 on institutions and development, Chapter 18 on geography and colonialism, and Chapter 19 on successes and failures in economic development.

Structural change, factor accumulation, and economic growth

A final theme runs through the whole book and refers to the links between resource reallocation, factor accumulation and technological change. The traditional division between the "static" analysis of resource allocation and the "dynamic" analysis of growth as well as the analysis of growth as the outcome of two separate forces, factor accumulation and technical progress, become too artificial in the presence of increasing returns. A reallocation of resources (towards or away the activities affected by increasing returns) may then have long lasting effects on growth and growth itself has to be seen as a process of structural change rather than of mere factor accumulation cum technical change.

It is on this basis that Kaldor, in some of his late writings, built his radical critique of mainstream economics. After stressing the relevance of increasing returns, Kaldor examined the consequences for economic theory. He noted that the concept of equilibrium interpreted as an optimal allocation of given resources, is seriously undermined:

[t]he whole issue, as Young said, is whether an 'equilibrium of costs and advantages' is a meaningful notion in the presence of increasing returns. When every change in the use of resources—every reorganization of productive activities creates the opportunity for a further change which would not have existed otherwise, the notion of an 'optimum' allocation of resources—when every particular resource makes a great or greater contribution to output in its actual use as in any alternative use—becomes a meaningless and contradictory notion: the pattern of the use of resources at any one time can be no more than a link in the chain of an unending sequence and the very distinction, vital to equilibrium economics, between resource-creation and resource-allocation loses its validity.

In the same passage, Kaldor then concludes: "[t]here can be no such thing as an equilibrium state with optimum resource allocation where no further advantageous reorganization is possible, since every such reorganization may create a fresh opportunity for a further reorganization" (Kaldor 1975, p. 355).

Moreover, as Kaldor and others used to emphasize, the distinction between movements along a production function and technical progress (shifts of the production function) becomes blurred under increasing returns to scale. With the expansion of output, more capital-intensive (or "roundabout") methods of production become profitable and are adopted. This is so whether these techniques were already known, and not used because they were unprofitable at a lower scale of output, or truly new and become part of the stock of knowledge as the incentives for its invention appear with the expansion of the market. In developing economies, unlike those of developed countries, these technical changes mostly result from the adoption of technologies that were known elsewhere. From this perspective, they constitute a movement along a production function. Yet, their adoption, unlike the typical movement along a production function, is not the consequence of a change in factor prices leading to the substitution of capital for labor, but rather the result of these more capital-intensive techniques becoming profitable as the scale of output increases.

The links among resource reallocation, factor accumulation and technological change are evident in the process of economic growth over the last two centuries. This process has been marked by industrialization, understood as the expansion of the range of goods produced under increasing returns, and by the simultaneous sharp increase in the capital-labor ratio. These two aspects, which Chapter 1 highlights in the context of the experience of the last 4 decades, are intimately connected. Paraphrasing Allyn Young (1928), the division of a group of complex processes into a succession of simpler processes, that is made economical by the presence of increasing returns, lends itself to the use of "roundabout" methods of production which imply the use of more capital in relation to labor. This approach to growth as resource reallocation and structural change was present in classical development economics.⁷ The approach faded away, at least in the more theoretically oriented literature, with the triumph of the counter-revolution in development economics that started to dominate the field in the mid-1960s. The neoclassical resurgence brought back the assumptions of constant returns to scale and perfect competition, and restored the traditional distinction between resource allocation and factor accumulation. The move coincided with, and perhaps contributed to, a declining interest in the analysis of growth during the seventies. Endogenous growth theory has revived the interest in growth and has even brought back increasing returns to scale into the analysis. But, for the most part, it has remained largely within the framework of one sector or quasi-one sector models thus missing the links between growth and structural change.

Interacting with the development of these themes is an empirical analysis of a number of questions raised by the post war development experience as well as by the theoretical explanations: How extensively can savings rates and demographic factors account for the vast differences in incomes across the world? How much of these differences should instead be attributed to human capital gaps or to differences in technologies? Or are those differences perhaps the path-dependent outcome of vicious and virtuous circles of development and underdevelopment in otherwise structurally similar economies? The empirical evidence on these and other issues is presented in such a way as to justify the need for relaxing restrictive assumptions and to motivate extensions of, or departures from, simpler theoretical models. Almost every chapter refers to relevant empirical findings in the literature. Most chapters either present original findings or make new use of past research results—for instance, the literature on the Verdoorn law or research on cross-country growth regressions—to illuminate current debates.

Overall, a case for the approach of classical development economics emerges from this empirical analysis. This case is based largely on its consistency with the cross-country pattern of growth rates at low, middle and high income levels (Chapters 7 and 8) and its ability to accommodate the role of often neglected factors such as industrial policy and natural resources in explaining the links between growth and international trade (Chapters 14 and 15). At the same time, remaining within the original limits and motivations of this approach would imply taking too narrow a view of the development process. This view

 $^{^7}$ It is also present and certainly fully explicit, in a rather pure state, in Kaldor's later writing on economic development. For Kaldor (1967, pp. 27–8), growth is "the result of a complex process of interaction between demand increases which have been induced by increases in supply, and increases in supply caused by increases in demand....The speed of the chain reaction will be greater, the truer it is that consumers choose to buy more of those goods with a large supply response and the larger the response on the demand side caused by increases in production."

Introduction

of "underdevelopment" and its implications for the process of economic growth needs to be broadened to cover a fuller range of development traps that can arise as a result of interactions between capital accumulation and skill acquisition or between growth and economic inequality.

Is this theoretical and empirical vindication of development theory also a policy rehabilitation? The answer is not clear-cut. Classical development economics focused on the coordination problems that would remain in an otherwise well functioning market economy. One may criticize the associated policy prescriptions for having neglected other sources of malfunctioning and for an overoptimistic attitude towards government policy interventions. Yet these criticisms do not make those problems disappear. The aim of economic reforms in developing countries over the past 30 years has been to alleviate the malfunctioning of the market economy arising from policy distortions. Rather than reducing it, these reform processes may have enhanced the relevance of classical development economics: precisely because these other (policy) sources of malfunctioning are being removed, the focus may now have to shift again to the kind of market failures with which early development theory was concerned.

In any case, the scope of the book is largely confined to the positive, rather than the normative, implications of the approach taken by early development theory. In this sense, it is closer to Kaldor's later writing on economic development, with its concern on why do growth rates differ among countries (Kaldor, 1966, 1967), than to the normative concerns that inspired the pioneers of development economics.

2. A Brief Overview

After reviewing the main stylized facts of economic development in Chapter 1, the book contains four parts. The first reviews different approaches to growth theory in the neoclassical and endogenous growth traditions. These approaches focus on the supply side of the economy in the sense that the level of output and its growth rate are constrained by either factor accumulation and exogenous technological progress (neoclassical models), the productivity effects of capital accumulation in the presence of increasing returns to scale (some endogenous growth models), or the supply side factors affecting innovation and technological progress (new growth theory). These approaches make a variety of assumptions about key growth factors such as saving behavior, technology and the nature of technological innovation, or the role of human capital in the growth process, from which follow different predictions about convergence and divergence in incomes per capita across countries. The second part of the book is devoted to classical development theory. As indicated earlier, the nature of the big questions of development theory addressed by the pioneers of development economics, forced these authors to rely on a paradigm built upon notions of imperfect competition, increasing returns and labor surpluses. The presence of increasing returns to scale, a feature that these early contributions have in common with recent endogenous growth models, and a high elasticity of labor supplies, derived from the existence of labor surpluses at low levels of the economy wide capital labor ratio, are the basis of growth models with substantially different convergence properties than those of either neoclassical growth models and some endogenous growth models.

The focus on the supply side, which classical development theory has in common with neoclassical and endogenous growth models, may be a good way of approaching the growth process for most countries during the post-war period up to the mid or late 1970s, a period when governments were able to follow high employment policies that effectively removed recurrent effective demand problems, except for rather short periods of time. Its applicability is, however far from universal. This is why the third part of the book reviews growth theory in the Keynesian tradition in which effective demand can constrain the level and/or rate of growth of output for prolonged periods of time. This is the case, as already alluded to, of such episodes as the interwar period in the United States and several European countries or various situations, ranging from Latin American lost decade of the 1980s to Japan's stagnation of the 1990s or today's European slump, when macroeconomic policies were not able (or leaders were not willing) to remove those demand constraints.

The fourth part of the book focuses on the so-called deep determinants of income levels and growth rates following a distinction, going back to Abramovitz (1952) and Lewis (1955) and by now widely adopted in the modern economics of growth, between the "immediate" or "proximate" determinants and the "deep" or "fundamental" determinants of income levels or growth rates. Given the wide use of this distinction, we should recall Lewis warning in *The Theory of Economic Growth* that the "proximate" determinants, such as factor accumulation and productivity growth, can affect the "fundamental" determinants, such as institutions, so that what we really have is a multiplicity of causes interacting among themselves that are separated only for analytical purposes (see Lewis, 1955, p. 20).

The diagram below, adapted from Rodrik et al. (2004), helps to elaborate on Lewis's point. It presents the main direct and indirect effects of the "proximate" and "deep" determinants of income levels as well as the feedback effects of income on these determinants. The proximate determinants, physical and human capital accumulation as well as technical progress, are the variables on

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which modern growth theory focuses. Growth theory, and especially classical development theory, also considers the feed back effects of income levels on the rates of factor accumulation, such as, for example, the dependence of the capacity to save on the level of income or those of technical efficiency on income in the presence of increasing returns to scale. The deep or fundamental determinants, shown in the lower part of the diagram, include institutions (political and economic), openness to foreign trade and capital, and geography. Inequality and natural resource endowment can also be regarded, as we do in this book, as fundamental determinants but they are closely related to institutions in the first case and to geography in the second.

The arrows show the main effects and interactions. There are, first, interactions between income and the "proximate determinants": factor accumulation and technical progress affect income directly but income in turn affects investments in physical and human capital and, in the presence of increasing returns to scale, technical progress itself as, for example, when the expansion of markets makes profitable the introduction of new and more "roundabout" methods of production. These proximate determinants and their interactions are examined by the great variety of growth models in the first, second and third parts of the book.

There are also interactions between income and the "fundamental determinants", often mediated (although this is not shown in the figure) by the effects on the proximate determinants. This is the subject of the fourth part of the book which examines the controversies over the deep determinants of economic growth and development levels, i.e., on whether openness, geography, institutions, or other fundamental factors has primacy over the others. The direct effects of geography on income per capita emphasized by geographical determinists and operating through, for example, the level of agricultural productivity or the health environment, are captured by arrow (1). Arrow (2) refers to the effects of geography on institutions (and indirectly on income) through the health environment faced by colonizers and the type of colonization undertaken by Europeans. Arrow (3) makes reference to the effects of geography on openness and its indirect effects on income through the impact of geography on distance from markets or the extent of international integration. Chapter 18 reviews all these direct and indirect effects of geography, including the geography versus institutions debate on the relative importance of the direct as opposed to the indirect effects of geography operating through institutions. Arrow (4) refers to the institutionalist view, discussed in Chapter 17, on the importance of the rule of law and "inclusive" economic and political institutions on income while arrow (5) reminds us that institutions are endogenous given the presence of feedback effects of income on institutions (as claimed, for example, by modernization theory). The subject of Chapter 14, the effects of international integration on income per capita



Figure 1 Fundamental determinants of income levels

resulting from the static and dynamic gains from trade and technology transfers are considered by arrow (7) while arrow (6) refers to the feedback effects of incomes on openness through, for example, the adoption of restrictive trade policies at low-income levels in order to raise government revenue.

Finally, I stress again that the separation between proximate and deep determinants of income levels is to some extent artificial given the importance of feedback effects of income on its determinants and the fact that the various causes are interrelated. Not even geography is fully exogenous in the sense that the strength of the direct effects of geography on, say, the low productivity of tropical agriculture is mediated by the fact that tropical countries are generally poor and most agricultural research in the world has concentrated on temperate agriculture where the rich countries are located.

1

Some Stylized Facts of Economic Development

Why are some countries richer than others? Why do some economies grow faster than others? Following a distinction discussed at the end of the introduction, in this chapter I present some information on the "immediate determinants" of output levels and growth rates and on characteristics that relate to the deeper determinants. Much of this book is about how the factors highlighted here are determined and how they interact with each other. The main purpose of this chapter is simply to present some stylized facts in the form of robust statistical relationships. Explanations thereof begin in the next chapter.

1. International Differences in Incomes Per Capita

Let's look at differences in per capita incomes within a simple and widely used framework.¹ Income per capita is equal to income per worker times the ratio of workers to the total population (the activity rate). Higher incomes per capita may thus result from either a higher level of output per worker or from a higher ratio of workers to the total population. Demographic and social factors largely explain differences in activity rates. Output per worker can be related, in turn, to the amount of resources, human and nonhuman, per worker and to the efficiency with which these resources are used and allocated. Resources include the stock of capital, the skills, knowledge and energy level of the labor force, and the natural resources available. A higher efficiency may result from a better allocation of given resources, through, for example, specialization in international trade, technological advances arising from the expansion of the scale of economic activity or movements towards the production frontier (adoption of best practice techniques, reductions in X-inefficiencies).

¹ See, in particular, Maddison (1982, 1991, 1993).

	Averages for country groups				
	1	2	3	4	5
GDP per capita ^{a, b}	100	46.1	18.5	7.0	2.4
Activity rate (%) ^b	52	46	42	41	46
GDP per worker ^a	100	50.7	22.6	8.6	2.7
Capital per worker ^a	100	53.1	21.2	7.2	2.3
Education ^c	11.0	9.2	7.5	6.1	4.4
Arable land (hectares per worker) ^b	0.8	0.4	0.4	0.6	0.4
Trade share ^c	128	74	86	81	67
Market size ^{a, b}	100	48.3	17.7	54.5	1.9
Industrial employment share (%) ^b	22.2	24.5	21.0 ^e	18.2 ^f	4.6 ^g
Rate of growth (%), 1970–2010 ^d	2.4	2.3	1.5	1.1	0.3
Number of countries	17	17	17	18	18

Table 1.1 Comparative economic characteristics around 20	1	C
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Note: See the appendix to this chapter for countries in each group, definitions, and data sources.

^a As percentage of group 1 average. GDP in international dollars at PPP constant prices of 2005. ^b 2009 or the latest available year. ^c 2010. ^d Trend growth rate of GDP per capita at constant prices (LCU). See Table 1.4 and appendix for more details. ^e Average excludes Tunisia. ^f Average excludes Zambia, Cameroon, Mauritania, and Cote d`Ivoire. ^g Average excludes The Gambia, Lesotho, Bangladesh, Benin, Nepal, Rwanda, Guinea, Malawi, Burundi, and Zimbabwe.

Table 1.1 presents information on 87 countries, aggregated into five groups according to their 2008 GDP per worker adjusted for differences across countries in purchasing power.² The first group includes, broadly speaking, highincome OECD economies, i.e., Western European countries and Western offshoots (United States, Australia, and Canada) plus 2 high income East Asian countries (Hong Kong and Singapore). Group 2 is a diverse collection of high and upper middle-income countries in Latin America (6 countries), Southern Europe (3), Middle East (3), East Asia (3) plus Botswana in sub-Saharan Africa and New Zealand in Oceania. Group 3 includes 9 countries from Latin America and the Caribbean, 4 in the Middle East and North Africa, 3 in sub-Saharan Africa and 1 in East Asia. Group 4 comprises mostly lower middle and low-income countries in sub-Saharan Africa (8), South Asia (India and Pakistan), East Asia (3, including China), Latin America (3), plus Morocco in North Africa. Group 5 refers to the poorest countries in the world, all (with the exception of Nepal and Bangladesh) in sub-Saharan Africa. The information in the table refers to different variables reflecting or influencing the availability of resources and the efficiency in its use. The Appendix gives a full definition of these variables together with data sources and a detailed account of the composition of each country group.

² These 87 countries are the countries included in both the Penn World Table (PWT or Summers and Heston data set) and the World Bank World Development Indicators (WDI) excluding those countries for which: (a) oil extraction is the dominant activity, (b) central planning was dominant during most of the period since 1970; (c) data is not available going back to 1970; (d) population is less than 1 million. See Appendix for further discussion.

Table 1.1 reproduces a well-known feature of the world economy: its vast heterogeneity in terms of incomes per capita and per worker. Income gaps between rich and poor countries are enormous, over 40:1 when we compare groups 1 and 5. Lower activity rates in middle and low-income countries—determined by socio-demographic factors such as lower participation of women in the labor force and higher dependency ratios than those found in rich countries—account for part of the differences in income per capita. This is especially the case in groups 3 and 4.

On the whole, however, per capita income differences are clearly related to wide labor productivity gaps. What accounts for these large differences in output per worker? Perhaps the most salient feature of Table 1.1 is how closely output per worker correlates with both the stock of capital per worker and the educational level of the labor force. This last is measured by the mean number of years of schooling of the population aged 25 years and above, arguably the best indicator of the stock of human capital per worker that is available for current production.³ Figures 1.1 and 1.2 show these relationships for our sample of countries and Table 1.2 shows log linear regressions of GDP per worker and each of these two variables.

No aggregate measures of natural resources are available. A crude proxy is a country's arable land. Figure 1.3 shows the absence of any discernible relationship between arable land per worker and output per worker. High-income countries can be resource rich (Australia, Canada, and the United States) or resource poor (Japan, Hong Kong, and the Netherlands). Similarly, some



Figure 1.1 Output per worker and capital per worker Expressed as percentages of maximum value. See the appendix to this chapter for sources and definitions.

³ Other measures such as school enrollment ratios reflect current flows of education and adult literacy rates do not capture skills obtained beyond elementary education. For a discussion, see Barro and Lee (1993).





See the appendix to this chapter for sources and definitions.



Figure 1.3 Output per worker and arable land per worker

GDP per worker in 2008, measured at PPP in constant international dollars. See the appendix to this chapter for sources and definitions.

Regression Independent variable	1	2	3
Constant	0.79	5.79	0.84
log of capital per worker (K/L)	(3.64)	(16.39)	(3.49)
	(40.30)	-	(23.95)
Log of Education (EDU)	-	1.97 (10.89)	0.06 (0.66)
Log of arable land per capita (LAND)	-	_	0.03 (0.70)
Number of countries	87	87	85
Adjusted R ²	0.95	0.58	0.95

Table 1.2	Cross-country	regressions
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Note: See the appendix to this chapter for definitions and data sources. t-statistics in parentheses. Dependent variable: logarithm (log) of GDP per worker in 2008 (Y/L).

	Y/L	K/L	EDU	LAND	OPEN	SIZE	IND
Y/L	1.00	_	_	_	_	_	_
K/L	0.98**	1.00	_	_	_	_	_
EDU	0.76**	0.77**	1.00	_	_	_	_
LAND	-0.10	-0.12*	-0.06	1.00	_	_	_
OPEN	0.23*	0.28**	0.23*	-0.17	1.00	_	_
SIZE	0.71**	0.67**	0.51**	-0.10	-0.13	1.00	_
IND	0.73**	0.72**	0.65**	-0.15	0.17	0.50**	1.00

Table 1.3	Cross-country	^r correlations
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Note: See the appendix to this chapter for definitions and data sources.

*, ** Statistically significant at 5% and 1% level, respectively.

low-income countries in the sample are land poor (Bangladesh and Nepal) while others are land rich (Mali and Paraguay). The negative and insignificant correlation coefficient between arable land per capita and output per worker in Table 1.3 confirms the weakness of the relationship. Regression 3 in Table 1.2 indicates that, given other factor endowments, output per worker is positively correlated with arable land per capita, but the coefficient of this variable is very small and statistically insignificant at usual confidence levels. This suggests that—unlike what may have happened in the pre-industrial stages when the world economy was much more homogeneous in terms of capital and skills per worker than it is today-the natural resource endowment plays a very minor role as a determinant of income differences compared to other factor endowments (human and capital resources). Even then, before the industrial revolution, differences in natural resource endowment may have led to differences in population more than in per capita incomes. According to Kaldor (1967, p. 3): "If we go back a few hundred years for example, to 1700 or 1750, we do not find, as far as we can tell, such large differences in real income per capita between different countries or regions. The populations of most countries lived at about a subsistence level-they all had the appearance of underdeveloped countries, by present-day standards. Differences in natural endowment in climate or the fertility of the soil were fairly well balanced by differences in the density of the population; and the great majority of the population of all countries derived their living from primary production, that is, from agriculture."

I consider three efficiency variables: (1) the employment share of industrial activities, for gains from resource allocation towards sectors with increasing returns; (2) the trade share (exports plus imports over GDP) for allocative and technical efficiency gains resulting from specialization in international trade; (3) the economy's size as measured by total GDP, to capture efficiency gains resulting from pure scale effects. As shown in Table 1.1 and the cross-country correlations in Table 1.3, the industrial employment share is closely correlated

with output per worker, especially among groups 2 to 5 since group 1, with the highest incomes, shows a diversification away from industry characteristic of "post-industrial" societies. Both market size and trade share have the expected positive influence in the cross-country correlations presented in Table 1.3. The role of the economy's size is also apparent in Table 1.1. Its close correlation with income per capita becomes spoiled only when group 4 (which includes China and India) is brought in. That the influence of the trade share is less apparent in Table 1.1 (or in the simple correlations) may be due to the negative correlation between market size and trade shares (see Table 1.3). This is consistent with the observation that small economies (such as Hong Kong, Singapore, and Switzerland in our sample) have to be very open to achieve high levels of income while large economies, such as the United States or Japan, need not.

2. International Differences in Growth Rates

We now turn to growth performance during the period 1970–2008. Table 1.4 aggregates countries into five groups, according to the growth rate of GDP per worker. The table presents, for these five groups, the average growth rates of per capita and per worker GDP along with a number of other performance indicators.

	Averages for country groups					
Growth rates (%per year)	1	2	3	4	5	
GDP per capita ^a	3.9	2.1	1.4	0.6	-0.3	
GDP per worker ^a	3.4	1.7	0.9	0.2	-0.8	
Capital per worker ^a	3.8	1.7	1.6	0.5	-1.8	
Industrial Employment Share	0.9 ^c	-0.9^{d}	-0.0 ^e	0.7 ^f	-0.0 ^g	
Education	2.8	1.7	2.8 ^h	2.7 ⁱ	2.8 ^j	
Education 1970	3.6	5.7	3.7 ^h	3.0 ⁱ	2.4 ⁱ	
GDP per worker ^b	109.3	203.7	98.6	60.2	47.7	
Arable land (hectares per worker)	0.2	0.3	0.2	0.2	0.2	
Industrial Employment Share 1970 (%)	20.8	33.9	16.9	14.1	15.1	
Number of countries	17	17	17	18	18	

Table 1.4 Growth performance, 1970–2008

Note: See the appendix to this chapter for countries in each group, definitions, and data sources.

^a LCU, constant prices of 2005. Average of growth rate calculated as a trend over the period. ^b Average over the period. Mean value = 100. ^c Average excludes Lesotho. ^d Average excludes Tunisia. ^e Average excludes Nepal and The Gambia. ^f Average excludes Cameroon, Burundi, Guinea, Rwanda, and Malawi. ^g Average excludes Mauritania, Ghana, Cote d'Ivoire, Zimbabwe, and Zambia. ^h Average excludes Burkina Faso. ¹ Average excludes Ethiopia and Guinea. ¹ Average excludes Nigeria and Madagascar.

Growth and its proximate determinants

A first well-known observation refers to the wide dispersion of growth rates. Whether measured in per capita or per worker terms, the differences between the extremes of the distribution (groups 1 and 5) are staggering. They are such that while these two groups had similar average per capita income levels in 1970 (a 10 percent difference), by 2008, less than 40 years later, incomes in the fast growing economies were almost four times higher than in the stagnant or declining economies of group 5.

Growth rates of GDP per capita and per worker are closely associated. That is, in accounting for differences in the growth of per capita income, changes in activity rates—i.e. changes in labor input per capita, given by the difference between the two growth rates—play a secondary role compared to that of labor productivity growth. Activity rates in all five groups show a rising trend at a rate of 0.5–0.4 percent per year.

The accumulation of capital per worker appears as a major systematic influence on the growth of per capita and per worker GDP, showing a close positive correlation with these two indicators across country groups. Indeed, the very fast growth of capital per worker appears as the most distinctive characteristic of the rapidly growing economies in groups 1 and 2. This is not, however, their only attribute. They also feature, more than a rapid progress in education, an *initial* level of education well above those of the mostly developing economies in groups 4 and 5. At the other extreme, the stagnant economies of group 5 feature both a negative pace of capital accumulation per worker and the lowest initial levels of education. Regression (1) in Table 1.5 summarizes these

, ,			
	1	2	3
Constant	-0.17	0.2	-0.53
	(-0.43)	(1.20)	(-0.94)
Growth rate of capital per worker	0.58	0.73	. ,
	(14.09)	(15.04)	
Rate of progress in education	0.09	-	
	(1.00)		
Initial level of education (1970)	0.10	0.05	
	(1.69)	(1.43)	
Rate of industrialization			0.71
			(3.46)
Initial level of industrialization (1970)			0.07
			(3.20)
N	82	82	73
Adjusted R ²	0.72	0.72	0.12

Table 1.5 Cross-country regressions

Dependent variable: trend growth rate of GDP per worker 1970-2008.

t-statistics in parentheses.

See the appendix to this chapter for definitions and data sources.

observations by showing the growth rate of labor productivity positively correlated with the growth of the capital-labor ratio and (although not significantly) with both the initial level and the rate of progress of education.

The relationship between the initial level of education and subsequent growth deserves further attention. A common finding has been that countries that grow at fast rates tend to have exceptionally well qualified labor forces *given* their starting level of per capita income and that there seems to be a threshold level of education necessary for growth to take off. Azariadis and Drazen (1990), for example, observed in a data set of 29 countries that no country with a low ratio of literacy to GDP was able to grow fast in the period 1960–1980. More recently, Benhabib and Spiegel (2005), further discussed in Chapter 4, found that there is a critical level of education (around 1.8 years of schooling in 1960) necessary to guarantee convergence to the growth rate of the United States.

Figure 1.4 shows the relationship between the rate of growth of per capita GDP in 1970–2008 and the initial level of education measured by mean years of schooling of the population 25 years and over in 1970, for 82 countries for which information on education was available. The figure suggests a similar, albeit less definitive observation to those of Azariadis and Drazen or Benhabib and Spiegel. With the exception of 10 countries, no country with less than 3 years of schooling in 1970 (the median value being 3.1 years) was able to grow at rates above the median per capita growth rate. Among these countries, only



Figure 1.4 Initial level of education (1970) and per capita GDP growth, 1970–2008 See the appendix to this chapter for sources and definitions.

two (Botswana and China) were able to achieve per capita GDP growth rates above 4 percent per year.⁴

Figure 1.4 also illustrates that high initial levels of education are not a sufficient condition for the achievement of high growth rates. Countries with more than 4 years of schooling in 1970 and a per capita GDP growth rate below the median (1.6 percent per year) include Argentina, Jamaica, Philippines, New Zealand, South Africa, and Switzerland. The most remarkable of all countries in this category is probably Argentina, a middle-income country with 5.9 years of schooling in 1970 and a growth rate of 0.6.

It is worth noting the contrast between the significance of the *level* of education in *growth* performance (illustrated by Figure 1.4) and the insignificance of the *level* of education in the output *level* regression (once capital worker is taken into account, see regression 3 in Table 1.2) as well as of the rate of progress of education in the growth regression (see regression 1 in Table 1.5). In Chapter 4, when we discuss Nelson and Phelps's hypothesis on the role of human capital in the growth process, we shall come back to this puzzle.

3. Income Levels, Growth Performance, and the Deep Determinants of Development

As mentioned in the introduction, it is common in modern growth economics to distinguish between the "proximate" and the "fundamental" determinants of economic development. The former have been analyzed in previous sections. The latter include a variety of geographic, institutional, income distribution, and policy characteristics that affect income levels and growth rates (for a given income level) through various channels that we shall discuss in detail in later chapters.

Let's take a preliminary look at these characteristics. Table 1.6 presents the average value around 2008 of a number of indicators for each of the 5 income groups of our 87-country sample. Some striking features are apparent. First, there is a close positive correlation between income level and the value of a rule of law index based on perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

⁴ On the development experience of Botswana, see Griffin (1989), Acemoglu, Johnson, and Robinson (2003), and Acemoglu and Robinson (2012). Stable institutional and macroeconomic frameworks and a high savings and investment rates made possible by large natural resource rents (mining) appear to be the key to the fast rate of economic growth in Botswana.

Characteristic	Averages for country groups ^a					
	1	2	3	4	5	
Rule of Law ^b	92.9	64.9	41.6	27.4	31.8	
Population in non-democratic countries (%) ^c	1.1	11.9	20.3	47.4	30.3	
Population in tropical countries (%) ^c	1.9	26.0	71.1	53.6	64.3	
Population in landlocked countries (%) ^c	2.5	0.3	0	1.9	35.1	
Net-exports of primary goods (%) ^d	0.4	-1.0 ^f	-0.6	4.6 ^g	-3.2 ^h	
Gini coefficient of income concentration (%) ^b	32.0	41.6	47.7	43.3	42.3	
GDP per capita ^e	38,840.9	17,890.7	7,171.9	2,705.1	932.9	

Table 1.6 Main institutiona	l, geographical, and	political characteristics
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Notes: Characteristics refer to 2008 unless otherwise indicated.

^a Countries classified by their income per worker. ^b 2008 or latest available data. ^c Percentage of the total group population. ^d Primary goods exports as percentage of GDP. ^e GDP per capita in constant prices of 2005. ^f Average excludes Iran. ^g Average excludes Republic of Congo. ^h Average excludes Benin, Nepal and Sierra Leona. *Sources:* See the appendix to this chapter.

There is also a close correlation between level of economic development and political regime. The percentage of the population living in authoritarian regimes tends to increase as income per capita falls, a fit that is only disrupted by the presence, in group 4, of authoritarian China. Geographic determinists would emphasize the relationship in the third row. The level of income per worker tends to increase as we move away from the Equator: while only 1.9 percent of the population of the highest income group lives in the tropics (these are the populations of Singapore and Hong Kong), as much as 64.3 percent of the population of the poorest countries in group 5 lives in the tropics (the minority here are Bangladesh, Lesotho and Nepal). There is also a striking contrast in the percentage of the total group population living in landlocked countries between group 1 (2.5 percent) and group 5 (35.1 percent). Finally, the values of the Gini coefficient of income concentration show that more developed societies tend to be less inegalitarian than underdeveloped ones and there is some indication of a Kuznets curve, i.e. an inverted U-pattern with group 3 showing the highest Gini coefficient well above those of group 5 and, especially, of group 1.

Table 1.7 aggregates countries according to the rate of growth of GDP per worker in 1970–2008. A positive correlation is again visible between growth rate and a rule of law index but now the previously close correlation between income per worker and political regime disappears when we look at growth rates rather than levels of per capita incomes. The relationship is substantially altered now with more than a third of the population in the fastest growing countries living under authoritarian regimes. In fact, from groups 2 to 5 there is now a positive relationship between growth rates and the percentage of

	Averages for country groups ^a				
Characteristic	1	2	3	4	5
Rule of Law ^b	70.2	76.4	48.3	33.6	29.9
Population in non-democratic countries (%) ^c	36.0	81.2	34.3	10.1	3.8
Population in tropical countries (%) ^c	49.7	1.0	45.7	83.4	81.4
Population in landlocked countries (%) ^c	0.6	0.9	10.2	36.3	5.1
Net-exports of primary goods (%) ^d	-3.0	-2.4	-3.3 ^f	0.9	8.3 ^g
Gini income concentration coefficient (%) ^b	39.3	34.5	40.6	44.3	47.7
Growth rate of GDP per worker (%) ^e	3.4	1.7	0.9	0.2	-0.8

Table 1.7	Growth and	l main geographical	, political, and	institutional	characteristics
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Notes: Characteristics refer to 2008 unless otherwise indicated.

^a Countries classified by their growth rate of GDP per worker in 1970–2008. ^b 2008 or latest available data. ^c Percentage of the total group population; for political regimes it refers to 1970. ^d Primary goods exports as GDP percentage. ^e Trend growth rate of GDP per worker 1970–2008. ^f Average excludes Nepal, Republic of Congo, and Benin. ^g Average excludes Sierra Leone and Iran.

Sources: See the appendix to this chapter.

the population living under non-democratic regimes in 1970. At the same time, there is no apparent relationship between the percentage of population in the tropics and the growth rate of income per capita, although there is a high incidence of tropical countries in the slowest growth groups (as well as a high incidence of landlocked countries in group 4). Finally, and interestingly, there is a tendency for the Gini coefficient of income concentration to increase as we move down the growth table. In other words, there is a hint that more egalitarian countries tend to grow faster than inegalitarian ones. We shall come back in later chapters to these relationships and try to make sense of them.

4. The Evolution of the World's Distribution of Income

The international dispersion of per capita incomes has been on the rise since the industrial revolution began in Great Britain and spread to other European countries and Western offshoots in a process that the historian Kenneth Pomeranz (2000) has called the "Great Divergence". This process continued over the last century and a half: the high-income economies today have six to nine times the GDP per capita of the high-income economies in 1870 and the composition of this group has remained largely unaltered;⁵ in contrast, the low-income countries today barely increased their income per capita over the

⁵ See Maddison (1995) and De Long (1997). There were, however, significant changes in the rankings within this group. For example, the highest level of per capita income in 1870 was Australia's, which was ahead of the United Kingdom, in second place, by a large margin. Today, the United States, but not Australia and the United Kingdom, are among the five richest countries.

period and continue to be largely the same as the poor countries in 1870. In between, the median economy has around four times the income of 1870. This picture implies that the richest countries in 1870, with some exceptions such as Argentina, have been those that grew at the highest rates since 1870, even though they were not the only ones to grow fast. The poorest countries in 1870 have been those that clearly lagged behind. Thus, according to Pritchett (1997), the ratio of GDP per capita of the richest to the poorest country rose from 8.7 in 1870 to 51.6 in 1985, in a process that he calls "divergence, big-time". In 2008, in our sample of 87 countries, the income per worker ratio of the richest (Norway) to the poorest (Zimbabwe) country rose to 274:1.

The data for our 87 countries over a shorter and more recent period of time (1970-2008) shows, however, a more complex picture than simple divergence. Table 1.1 suggests a tendency to absolute divergence with growth rates falling as we move down the income scale. Table 1.4, which aggregates countries according to growth rates, suggests, however, that the relative high income countries of group 2 grow at a smaller pace than the middle-income countries of group 1 and, at the same time, at a faster rate than the lower income countries of groups 3, 4 and 5. In other words, there are definitely not tendencies to convergence since 1970^6 and, at the same time, there are weak and inconsistent tendencies to divergence. The lack of "absolute convergence" should not be confused with the absence of "conditional convergence"-the existence of an inverse relationship between the initial level of per capita incomes and its subsequent growth, once the determinants of the steady state level of income have been controlled for. The absence of absolute convergence can theoretically go together with conditional convergence; this, in fact, is the claim of the extensions of the neoclassical growth model discussed in Chapters 2, 3 and 4.

Great divergence and club convergence: the hump-shaped pattern of growth rates

A closer look at Table 1.4 reveals an interesting pattern. Consider groups 1 and 2 in Table 1.4 with above average incomes per worker. These two groups together include fast growing countries mostly in Asia, Western Europe, United States and Latin America. Within this set of countries there is a tendency to convergence of productivity levels; group 2 with the higher incomes has the lowest growth rate. There is thus an inverse relationship between growth and income level across the set of countries with above average levels of GDP per

⁶ Or even before that in the post war period. This was recognized early on in the recent literature (see, for example, Barro, 1991). Chapter 3, section 4, reviews the evidence and recent debates on convergence.

worker, a similar phenomenon to the repeatedly noted "convergence club" of OECD countries (see in particular, Abramovitz, 1986; Baumol, 1986, and Baumol and Wolff, 1988). Consider now the rest of the groups comprising developing countries with average or below average incomes per worker. The fastest growing countries (group 1) have the highest incomes, and rates of growth fall as we move down the income table. There is a positive relationship between growth rates and income levels across country groups and, thus, a tendency of per capita incomes to diverge. Evidence of the growing dispersion of incomes among developing countries has been noted in other studies; UNCTAD (1997) has estimated a near doubling of the income ratio between the richest and poorest developing countries over the four decades following 1960.

The lack of strong tendencies towards convergence or divergence for the whole sample is the result of the fact that growth acceleration tends to occur at middle-income levels, as has been noted several times and for other time periods.⁷ The consequence is a tendency towards divergence among middle and low-income countries (and to some extent among high and low-income countries) and a tendency towards convergence among middle and high-income countries. Figure 1.5, which shows growth rates and average levels of GDP per capita (for 1970–2008) for the whole sample, illustrates the hump-shaped pattern of growth rates that features the largest incidence of high growth rates occurring at middle-income levels. This pattern would probably emerge more clearly if the 1980s were excluded from the period of analysis, since a number of previously fast growing middle-income countries in Latin



Figure 1.5 Growth rates and levels of GDP per capita See the appendix to this chapter for sources and definitions.

⁷ See Kristensen (1974), Chenery and Syrquin (1975), Syrquin (1986), Baumol (1986), Abramovitz (1986), Baumol and Wolff (1988), Lucas (1988).

America then plunged into economic stagnation following the debt crisis of the early 1980s.

The acceleration of growth rates at middle-income levels has been given different explanations. These will be examined in later chapters. At this stage, it is worth pointing out that there is some support in the data for the view that the high growth rates at middle-income levels are characteristic of the transition towards an industrialized economy, with growth being rather slow before and slowing down after the process of industrialization. As Kaldor (1967, p.7) argued: "... fast rates of economic growth are almost invariably associated with the fast rate of growth of the secondary sector, mainly, manufacturing, and...this is an attribute of an intermediate stage of development; it is a characteristic of the transition from 'immaturity' to 'maturity'". Group 1 in Table 1.4 with the highest rates of growth of output per worker recorded the fastest rate of industrialization during the period. Growth is slower in both the more industrialized economies of group 2, which de-industrialized during the period, as well as in the industrializing (but from a much smaller initial base) economies of groups 3, 4, and 5. Regression 3 in Table 1.5 relates overall productivity growth to the pace of industrialization, measured by the difference in the growth rates of industrial and overall employment. This is one of so-called Kaldor's laws, qualified only insofar as it holds for a given initial level of industrialization. That is, given the initial industrial employment share, the faster the rate of industrialization the higher the rate of productivity growth in the economy as a whole.⁸ Similarly, given the rate of industrialization, the higher the level of industrialization the faster the overall rate of growth of productivity.

Middle-income traps and the "twin-peaked" distribution

The fact that the largest incidence of high growth rates tends to occur in middle-income groups is not the same as all middle-income economies being the fastest growing. The "transition from immaturity to maturity" is much less smooth than a superficial reading of Figure 1.5 could suggest and some of the major setbacks also appear to take place at middle-income levels. A number of economic and institutional upheavals, to be discussed in later chapters, can throw rapidly growing economies off the path of economic transformation that leads to high-income levels. In our sample and time period, we have already referred to the stagnation of highly indebted countries during the 1980s. The current crisis in Western Europe may be

⁸ On Kaldor's laws, see Cripps and Tarling (1973), Thirlwall (1983), and Kaldor (1966 and 1967). Chapters 7 and 8 review the mechanisms involved and the evidence on the Verdoorn Law, relating the growth of productivity and output in manufacturing.

the beginning of a similar prolonged stagnation period. In a longer time span, the relative decline of Argentina, once among the richest countries in the world, is another remarkable example.

Growth acceleration at middle-income levels, coupled with occasional setbacks, probably constitutes a major reason why the world's distribution of per capita incomes has evolved towards a persistent bimodal or "twin-peaked" distribution. Using data for 1962-1984, Quah (1993) calculated the probability that a country in one income group will move into another group in the following year. The resulting "transition matrix" with countries divided into five income groups, depending on their per capita income relative to the global average, can then be used to simulate the evolving dispersion of per capita incomes. Holding these probabilities constant over time, Quah shows that the distribution of incomes eventually stabilizes in a "twin-peak" distribution similar to that observed in the world economy today, with many poor and many rich countries and relatively few countries in between. As an illustration, using Quah's transition probabilities to simulate the distribution of per capita incomes, starting from an egalitarian distribution with a zero standard deviation in the log of per capita incomes, income dispersion increases within the first 70 years and then stabilizes with a standard deviation of around 1.5. The key feature of the transition matrix explaining this result is that, unlike middle-income countries in groups 2, 3, and 4, the highest (group 1) and lowest (group 5) income countries have very high probabilities of remaining within the same group from one year to the next.

The twin-peaked distribution has been taken as evidence supporting the existence of development traps and multiple "club convergence". As Feyrer (2008) says: "The most dramatic feature of Quah's distribution is the downward movement of a group of countries away from the world mean. Instead of converging to the income of the wealthy countries, these countries are diverging away from it" (p. 27). This is perhaps the stylized fact most difficult to explain by modern growth economics. To the extent that it is concerned by it, this book is partly an attempt to find the origins of Quah's twin-peaked distribution of per capita incomes.

Having said that, Quah's estimated transition matrix implies, with probability one, that any less developed country will eventually move up through all the stages to become a high-income country and conversely that any developed economy will eventually move down to become underdeveloped. This two-way movement produces the long-run stable distribution. Rowthorn and Kozul-Wright (1998) have observed that the experience of the past 150 years suggests that countries do move downwards but only to a limited extent. There is no recorded case, for example, of a country in the high income or even moderately developed category moving all the way down to the lowest income level. This suggests the presence of ratchet effects that limit downward