Introduction: economic growth and change

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In the long march of human affairs, economic growth is a new idea and a new reality. Only in the past 200 years has the possibility of cumulative secular gains in output been convincingly established by such leader countries as England and the United States and such follower states as Germany, Japan, Korea and Brazil. After World War II, the judgement that the people of every nation are entitled to experience rising standards of living has pervaded all corners of the globe. The quest to discover exactly what combinations of conditions and policies will ignite growth in varied contexts has become the search for the holy grail in modern aggregate economics. On a practical basis, governments that fail to motivate and steer amplifying economic capacities, in order to meet their citizens' rising expectations, are questioned, challenged and more than occasionally pulled down. The global community has scant patience with backsliders in the modern integrated international economy. First-aid teams from international agencies and major commercial partners show up in capital cities just as soon as macroeconomic and financial indicators point downwards. Fellow trade-association participants prod laggards impatiently when their growth momentum stalls, in recognition of the linkages and spillovers that bind together nations' economic fortunes.

David Landes titles his new study of long-term growth in economic history, The Wealth and Poverty of Nations, Why Some Are So Rich and Some So Poor (1998). His explanation for comparative growth trajectories is complex and incorporates geography and initial resource endowments, the importance of innovation-friendly cultures and incentives, education and knowledge and a conducive environment of stable government and strong personal rights. Mancur Olson, Jr headed a recent essay, 'Big Bills Left on the Sidewalk: Why Some Nations are Rich, and Others Poor' (1996). Olson summarized the thesis of his lustrous essay by remarking, 'Since neither differences in endowments of any of the three classical aggregate factors of production nor differential access to technology explain much of the great variation in per capita incomes we are left with the… [possibility]… that much the most important explanation of the differences in incomes across countries is the difference in their economic policies and institutions' (p. 7).

If economic growth were easily attained, or compatible with a wide range of resource profiles, social attitudes and cultural institutions, it would certainly have been more common in human experience than it has been. Likewise, if the capital, knowledge and technology spillovers from already growing nations, to those only starting down the road to affluence, were frictionless and instantaneous, then catching-up would be swift and convergence the norm. Understanding why spontaneous growth has been such a rare event, perhaps even a singular one, devolving from the British case and ascertaining why the derivative follower cases are still fairly few in number, are the tasks that lie at the heart of growth economics.

PART I: THE FABRIC OF GLOBAL ECONOMIC GROWTH

The authors of the five chapters that comprise Part I do not flinch from confronting the challenges inherent in deciphering the complexities inherent in the multiple paths of economic growth. Although strikingly different in their chosen methodologies, their contributions fall within the wide theoretic orbit delineated by Landes and Olson. They examine how institutional patterns, technological progress and governmental policies shape national economic destinies.

This section opens with an essay by Dennis Mueller that stands the conventional question on its head. Rather than inquire why nations grow, Mueller wonders why advanced nations falter. His attention focuses on that peculiar institution of capitalism, the modern corporation and its managerial leadership, in effect looking underneath the traditional economic aggregates, like labour or capital, to search for microeconomic processes that shape the applications of these conventional factors at the level of the firm. Certainly, it is convincing that the rise and fall in the relative positions of the more mature economies hinge to a large degree on their corporations' performance. Economists from Adam Smith to Douglass North have emphasized the role of market institutions, but in Mueller's view we must give equal attention, following Ronald Coase's insights, to the hallmark non-market institution of capitalism, the big corporation. Mirroring Joseph Schumpeter's identification of the path-clearing entrepreneur as the prime agent of change in capitalism, Mueller looks at the motivations and incentives that managers face in the modern mixed capitalist states. Mueller argues that periods of poor economic performance are accompanied by waves of ineffective mergers and by a falling rate of return, especially among older firms, as managers engage in self-serving rent-seeking, as does society at large when the welfare state expands at the same time. In contrast to Japan and possibly Europe, the United States' individualistic values and flow of motivated immigrants may equip it to stay indefinitely at the forefront of global economic leadership.

In the late 20th century the world is experiencing an era of freer trade and burgeoning capital movements, but such globalization of economic relations is not new, for the latter part of the 19th century had parallel features. Much of the recognized upward divergence of the rich from the poor nations has occurred in the last 100 years, but why did the combination of growth in Europe and the United States, in conjunction with the open world economy of the late 1800s, not trigger catch-up processes on a wide scale? In the second chapter, Shahid Alam argues that sovereignty, defined as the capacity of a people to set its own economic agenda, apart from colonial overlordship, is crucial in explaining the pattern of global divergence in this century. He constructs an index of sovereignty and demonstrates with compelling evidence that the greater the range of its economic and political autonomy, the more rapid was a nation's progress over the time span, 1870–1950. Afterwards, the wave of national liberation movements opened the door to the adoption of independent development strategies and the showings of former colonies improved sharply.

One of the most influential and provocative early studies of the concomitants of economic growth was Society, Politics, and Economic Development (1967) by Cynthia Taft Morris and Irma Adelman. The authors were audacious enough to propose that about two-thirds of the differences among national growth rates could be attributed solely to social and political variables. The third chapter of Part I represents Irma Adelman's revisit to this terrain. Insofar as possible, the same cases (67 instead of 74) and variables are used, and the reference period is moved to the 1980s and 1990s. Again, factor analysis, a flexible statistical method eschewed too widely in economics, is applied. A common feature of the prior and present studies is that social and political processes have different influences on growth in the developing world at low, intermediate and higher levels of social and economic development. Adelman regards this robust finding as a serious challenge to any one-size-fits-all theorization. With this three-fold stratification, the statistical results are formidable; for example, four factors explain a full 85 per cent of the variance in growth rates in the high sample.

Although it is widely believed that the adoption of freer trade regimes and openness with respect to capital movements are policy moves that enhance a nation's growth prospects, finding robust statistical links has been elusive. A preliminary problem has been the construction of measures of openness that were credible and based on widely available, objective indicators. In Chapter 4, Hui Pan surmounts both hurdles and, using a sample of 140 national cases, establishes that trade openness and capital freedom are positively associated with growth prospects. His indexes have the merit that they are based on readily available International Monetary Fund reports and may be replicated or updated as necessary. Country per capita income levels will converge, in the conditional sense, when one controls for such variables as human capital, political stability and tropical location. In the framework of such a convergence model, Pan demonstrates that a country that is open to trade will grow 1.25 percentage points faster per year than one that is closed and 1.39 percentage points faster if it is financially knitted into the world's capital flows.

In the fifth and final chapter of the first part of this book, Livio Cricelli and Agostino La Bella parallel Mueller's opening presentation by reverting to the examination of central microfoundational processes that affect growth outcomes. Following Robert Solow's pioneering specification, most neoclassical models treat technological change as exogenous and do not try to account for what is arguably the most important source of growth. Once the R&D process is introduced into debate, societies have the option of investing resources in the advance of technologies. Because technology is largely non-rivalrous, so that others' use does not diminish one's use, its accumulation is key to economic progress (Romer, 1990). Looking at the records of 15 developed countries over the years 1973–1993, Cricelli and La Bella explore a number of possible relationships among the growth of knowledge, national conditions and total factor productivity. The picture is complicated but, broadly, a positive relationship between the nation's stock of knowledge and productivity growth is affirmed.

All in all, Part I is a merry mix of styles and methods. The papers are unified by their global perspectives and by their quest to unearth underlying processes that account for differences in long-term national economic performance. Each ranges well beyond the scope of narrow convergence studies. Mueller and Cricelli–La Bella focus on meso-processes involving the firm, incentives, innovation and the social character of governmental policies. Alam introduces the influence of power and dominance, showing that international relations, even in a period of openness, are not always benign and conducive of universal progress. This finding for the pre-1950 era does not confute Pan's conclusion that in a different international milieu benefits may be seized by strategic engagement with the global economy. Adelman again demonstrates the effectiveness of using ingenuity and persistence in devising creative proxies for difficult-to-quantify social and political parameters, and reaps a fruitful harvest. Collectively, the chapters raise issues and identify processes that are echoed in the continental and national essays contained in Parts II and III.

PART II: CONTRASTING PATTERNS: THE UNITED STATES AND EUROPE

Should the per capita incomes of regions of an economically integrated area converge? If so, are there reasons to believe that the mechanisms leading to convergence should be stronger at the regional than at the country level? In 1970, Nicholas Kaldor wrote his seminal paper on cumulative causation in which he asserted that divergence rather than convergence could prevail as the outcome of economic integration between regions at different stages of development. His analysis was based on the existence of localized dynamic increasing returns in industry, so that 'in the case of the ''opening of trade" in industrial products the differences in comparative costs may be enlarged… with the result that the industrial centre of the [initially less industrialized] region will lose its market…' (Kaldor, 1978, p. 144). As a consequence, 'trade may injure one region to the greater benefit of the other' (ibid.), even though such trade-induced divergence can be somehow mitigated by labour migration (p. 150).

Although this view has been influential in regional economics, the recent enormous interest in regional data sets stems from a different theoretical research project, inspired by the prediction of absolute aggregate convergence obtained for regions of a country by Robert Barro and Xavier Sala-i-Martin, who drew their inspiration from Solow's model of growth (Solow, 1956). As Barro and Sala-i-Martin put it, '[a]lthough differences in technology, preferences, and institutions do exist across regions, these differences are likely to be smaller than those across countries' (p. 382), so that 'absolute convergence is more likely to apply across regions than across countries' (ibid.). Barro and Sala-i-Martin therefore offer a positive answer to both of the above questions. Indeed, they have one additional reason to reach this conclusion. Because regions are more open than countries, factors are supposed to move freely across their borders. Within the neoclassical model of growth, with one final good produced under constant returns to scale, no externalities and uniform technology across all areas, such easier factor mobility simply accelerates the process of convergence. A broad analysis of the effects of factor mobility on convergence is found in Olivier Blanchard (1991). Kaldor's worries about the unequalizing consequences of economic integration find no room in this context.

It is well known that the regional income and product data for the United States show that a strong process of convergence does characterize the American experience. The two chapters by Andrew Sum and Neil Fogg that lead off Part II yield new and extremely detailed evidence from 1929 onwards showing that regional per capita income inequality across the United States has decreased constantly in all decades, with the exception of the 1980s. By 1995, statewise inequality had reached its lowest historical level. Moreover, Sum and Fogg show that the little inequality still remaining in the data was mainly due to differences in hourly earnings and labour force participation rates. Although this outcome is compatible with a range of different theoretical arguments, including some endogenous growth ones, Solow's neoclassical model is certainly a prominent candidate for affirmation, especially if one applies the criterion of simplicity or parsimony.

Does the outcome for the United States generalize to other areas marked by initial regional divergence? The evidence is mixed. Europe's case in particular turns out to be very controversial. Even if we abstract from well-documented cases of absence of convergence within some European nations, as shown in Part III of this volume, the overall picture on European regional dynamics appears unfavourable to the strong neoclassical prediction of convergence. Although some convergence characterizes the regional data during the 1960s and the 1970s, no such pattern is present during the 1980s (Fagerberg and Verspagen, 1996; Paci, 1997; Quah, 1996). It is worth noticing that convergence in Europe comes to a halt in a period still characterized by a high degree of regional heterogeneity, relative to US standards, in terms of per capita incomes, unemployment rates and sectoral mixes. Another idiosyncrasy is the persistent dualism in the productive structures of a number of Southern European regions. Moreover, the slowdown of convergence takes place in a period in which the process of European economic integration accelerates substantially and in the presence of the European Union's commitments to reduce disparities between its core and periphery.

Not surprisingly, some of Kaldor's themes play a part in a variety of explanations put forward to deal with the European case. In particular, much of the current research concentrates on how economic integration interacts with the presence of dynamic increasing returns based on endogenous and localized components of the accumulation of technological knowledge. The diffusion of technology appears to depend upon some characteristics of the local productive structures, including the regional sectoral mix, so that knowledge spillovers vary across space and sectors. In this context, openness can have complex effects. As the literature on endogenous growth and trade shows, if innovative activities are both sector-and location-specific, specialization may easily generate uneven growth (Lucas, 1988; Grossman and Helpman, 1991). Under less restrictive assumptions, such as presuming that technological spillovers spread to some extent across sectors and areas, the effects on growth of the sectoral composition translate into a less dramatic but still important level effect. Local economies with unfavourable initial conditions may lag permanently behind in terms of per capita income (Grossman and Helpman, 1990; Murat and Pigliaru, 1998). Factor mobility in the presence of this class of localized externalities may add further obstacles to the process of convergence (Bertola, 1993; Krugman, 1991), rather than reduce inequality.

Two important suggestions arise from this literature on the effects of economic integration on growth. The first is that sectoral mixes and their structural evolution are critical in understanding the relative performance of individual economies. The second is that if technological spillovers do not spread uniformly across the whole space the performance of each region is affected by those of the surrounding regions (Quah, 1996). As for the sectoral component, Chapter 8 by Raffaele Paci and Francesco Pigliaru in this section shows that sectors do indeed matter for regional growth in Europe. Using several methods, including one proposed in Bernard and Jones (1996), they show that large part of the convergence in labour productivity is associated with shifts of factors from low- to high-productivity sectors. Further, this process is more intensive in many of the lagging southern regions.

Chapter 9, contributed by Bart Verspagen, yields new evidence in favour of the idea that space is important to assess the economic prospects of each individual region. He finds that both economically and technologically advanced clusters exist, and that the former are much broader than the latter. As a consequence, there is the possibility that spillovers from high-tech regions strongly affect the surrounding areas. The policy implications of this crucial finding are clearly important, so that further research along these lines will be very valuable to help determine how technology diffusion channels may be opened and widened as a means of securing an on-going closure of economic divisions.

On a separate but related topic, Sergio Lodde’s chapter offers new evidence on the rather controversial relationship between human capital accumulation and growth across European regions. His detailed empirical work shows the existence of a robust positive correlation between labour productivity growth and the share of active population allocated to those technical jobs that require formal education. Lodde's finding suggests that one hypothesis worth further investigation is that the spillovers accruing from the high-tech clusters to other regions may be related to the composition of the latter's human capital stocks.

Finally, in Chapter 11, Gustav Schachter, Carmelina Bevilacqua and Levanto Schachter produce new evidence on the economic criteria used by the European Union to allocate development funds and loans across regions. They find that a few simple macroeconomic characteristics of the regions, such as relative per capita income and unemployment rates, are important explanatory variables of this allocation process. Their exploratory work opens the portal to two exciting avenues. First, what explicit and implicit criteria have guided the EU's allocation of structural funds? Second, are those criteria consistent with regional needs and conditions, as outlined in the previous chapters, so that the impact of the massive pro-cohesion transfers and credits is weighty enough to help dispel disparities?

Taken as a whole, the chapters in this part reflect appropriately one feature of the current research on regional convergence. They underline that convergence is not always an automatic process, and that a satisfactory understanding will only be achieved when both the American and European experiences are accounted for within a common framework.

PART III: REGIONAL MOSAICS IN NATIONAL CONTEXTS

The picture emerging from the vast empirical work of Robert Barro and Xavier Sala-i-Martin on regional convergence in the United States, Europe and Japan highlights the 'surprising… similarity of the speed of β-convergence across data sets. The estimates of the rate of β-convergence are around 2 to 3 per cent per year in various contexts' (Barro and Sala-i-Martin, 1995, p. 413). So, convergence appears to be a slow but steady and automatic process, which is unaffected by factors other than the initial levels of per capita income. Regional policy, to name one such factor, remains firmly outside the picture frame. Both the econometric robustness of that result and even its economic interpretation have been the object of much controversy, as Durlauf and Quah (1998) explain in their comprehensive survey. Regional dynamics are often not so well-behaved as is also shown by a number of in-depth studies of national cases, especially in Europe. These studies have the obvious advantage that more detailed data are available to the researcher, which makes it easier to take account of dimensions of the historical, institutional and policy context in which regional economies operate.

The chapters in Part III confirm the usefulness of the national approach. In general, they report that convergence is not a pervasive phenomenon, at least in many parts of Europe. Episodes of convergence are rarely independent of either regional policies or the institutional context. In line with a long-standing tradition, the Italian experience captures much of the attention in this section. At least since Gunnar Myrdal's work on underdevelopment and cumulative causation (Myrdal, 1957), economists have given steady attention to the impressive persistence of this country's North–South economic divide. All available data sets have consistently yielded a picture in which Southern regions on average do not catch up with the richer Northern ones. Some convergence has indeed occurred, but it involves the initially lagging regions of the centre and of the North-East, rather than the much poorer areas of the Mezzogiorno.

Raffaele Paci and Francesco Pigliaru use a new dataset as the basis for Chapter 15, which confirms that a process of absolute convergence did characterize the regional data in the 1950s and in the 1960s, but then came to a halt in 1975. From then on, economic inequality between Northern and Southern regions has increased again. In this phase, the regional distribution of per capita income takes a bimodal polarization in which most of the Northern regions are part of the richer club, and the non-Adriatic Southern regions are part of the poorer one. Further, Paci and Pigliaru use a model of the dual economy to assess the importance for convergence of structural dynamics, especially in the form of the large outflows of labour from the backward agriculture of the poorer regions. In their analysis industrialization, or its failure, appears to be the key to understand why some of the lagging regions converge and others do not.

So, as Andrea Boltho, Wendy Carlin and Pasquale Scaramozzino put it in Chapter 13, 'the North–South gap has remained stubbornly in place' (p. 329), in spite of the huge amount of resources transferred to the Southern regions over the last four decades. They offer a comprehensive analysis of why a mix of policy and institutional factors are essential to obtain a consistent story about the dynamics of the Italian regions. The lessons they draw from the 'Italian failure' are then used to assess the economic prospects of the former East Germany. First, policy matters, in both conceivable ways. The brief convergence season in Italy was linked to a sustained policy effort focused on direct investment in equipment and machinery. The subsequent period in which the absence of convergence was restored is instead characterized by 'the retrenchment in public investment… offset by a sharp shift towards income maintenance flows and the recruitment of civil servants' (p. 332), with the associated improved opportunities for growth-damaging rent-seeking activities.

Second, factor market institutions matter as well. The halt of convergence happens in a period in which an additional problem was the sudden abolition of regional wage differentials.

Regional policy and its controversial role as a convergence-enhancing factor is also the main topic of Chapter 14, in which Teresa Garcia-Milà and Ramon Marimon consider the fate of the Spanish regions. To identify a role for policy, they first carefully decompose regional growth rates into sectoral and regional effects and show that positive regional effects are present in some of the poorer regions. Are these positive effects due to the redistributive nature of the public investment policy adopted by the Spanish government? The answer is yes, but with an important qualification. Evidence at the sectoral level shows that the positive impact of such policies stays within the semi-public sector and does not seem capable of extending its influence to the private sector. Although some of the observed productivity convergence is therefore associated with public investment in poorer regions, productivity gaps in the private sectors remain largely unaffected. As the authors put it, 'if this is the … policy's only effect, it would be very difficult to sustain or justify it, in the long run' (p. 350).

All together, the findings of these country-based chapters point, explicitly and implicitly, to a further component of the relationship between regional policy and convergence. Although 'good' policies can crucially enhance convergence by acting as a catalyst for the private sector of the lagging regions, redistributive policies may perversely hamper one of the market mechanisms that often spurs convergence: labour migration. The chapter by Luca Dedola, Stefano Usai and Marco Vannini presents some indirect but suggestive evidence on one of the mechanisms through which redistributive policies may slow down migration flows. The authors analyse regional data on Italy and on the United Kingdom to assess how well the changes in consumption across regions within each country are correlated. The economies of these two countries differ in many respects: financial markets are far more efficient in the United Kingdom, the variability of regional product relative to national output is much higher and labour mobility lower in Italy. In spite of all this, the authors find that in the short run cross-region risk-sharing is considerable in both countries; for instance, it is significantly higher than in the United States. Given the above-mentioned differences, the Italian result is surprising. Are Italy's redistributive policies responsible for it? The answer is a qualified yes. First, income transfers by the government represent a significant channel in Italy (one-fifth of the total) but not in the United Kingdom. Second, in Italy the major market channel acting through holdings of financial assets is also strongly influenced by actions of the government. In particular, the need to finance a persistently high public debt made a powerful financial channel (the bond market) available in a country where the share market is traditionally thin. This suggests, at least as a hypothesis deserving further investigation, that redistributive policies were crucial in obtaining a high degree of risk-sharing together with a low degree of interregional labour mobility.

Lastly, the chapter by Jeroen van den Bergh and Peter Nijkamp reminds us that economic integration has an often forgotten environmental dimension. Offering yet another methodological instrument, a simulation technique, they reason that production processes in a region depend in several ways on the local environment and themselves affect the environment and therefore influence the production processes of the surrounding regions. For instance, both pollution and the benefits of pollution abatement innovations may not be confined within the region which originates them and therefore may help explain the relative dynamics of adjacent regions.

ECONOMIC GROWTH AND CHANGE

Looking at the book as a whole, its chapters collectively demonstrate the diversity of approaches necessary to advance on all fronts towards a more comprehensive understanding of the complexity of growth processes, on the global, national and regional levels. Further, the contributors offer an impressive range of theoretical and quantitative skills, leavened by judicious insights and qualitative assessments. The composite list of factors that probably contribute to the spatial and temporal distribution of growth tendencies, depending on local conditions and experiences, is prodigious and we are only beginning to grasp cardinal relationships.

The determinants of a country's growth certainly include: the nature of firms' goals and their managements' rewards, the on-going interplay of dominance and subjugation within the family of nations, the strength of well-devised linkages to the international economy, congeries of social and political parameters that operate with different weight at different states of development and national capacities to sustain applied R&D efforts. The United States and the emerging European Union have much in common as high-income, industrialized conglomerations of states and regions, but contrast sharply in their experiences with spatial convergence. Labour-force participation rates, sectoral shifts, technology spillovers, local human capital and policy interventions are only a few of the decisive factors. Finally, the European nations themselves display disparate individual experiences both with spontaneous convergence over time as well as with the success or perverseness of policy interventions.

The core-periphery pattern of the European Union, and its peculiarly obdurate Italian example, serve as a constant reminder of how much remains to be learned about the dynamics of economic growth.

REFERENCES

Adelman, Irma and Cynthia Taft Morris (1967), Society, Politics, and Economic Development, Baltimore: The Johns Hopkins University Press.

Barro, Robert and Xavier Sala-i-Martin (1995), Economic Growth, New York: McGraw-Hill.

Bernard, Andrew and Charles Jones (1996), 'Productivity and convergence across U.S. states and industries', Empirical Economics, **21**, 113–35.

Bertola, Giuseppe (1993), 'Models of Economic Integration and Localised Growth', in: F. Torres and F. Giavazzi (eds), Adjustment and Growth in the European Monetary Union, New York: Cambridge University Press.

Blanchard Olivier J. (1991), 'Comment on Convergence across States and Regions by R.J. Barro and X. Sala-i-Martin', Brookings Papers on Economic Activity, **1**, 159–74.

Durlauf, Steven N. and Danny T. Quah (1998), 'The new empirics of economic growth', Centre for Economic Performance, Discussion Paper no. 384.

Fagerberg, Jan and Bert Verspagen (1996), 'Heading for divergence? Regional growth in Europe reconsidered', Journal of Common Market Studies, **34**, 432–48.

Grossman, Gene M. and Elhanan Helpman (1990), 'Trade, innovation and growth', American Economic Review, **80** (Papers and Proceedings), 86–91.

Grossman, Gene M. and Elhanan Helpman (1991), Innovation and Growth in the Global Economy, Cambridge, MA: The MIT Press.

Kaldor, Nicholas (1978), 'The Case for Regional Policies', in N. Kaldor, Further Essays on Economic Theory, London: Duckworth.

Krugman, Paul (1991), 'Increasing returns and economic geography', Journal of Political Economy, **99**, 113–21.

Landes, David S. (1998), The Wealth and Poverty of Nations, Why Some Are So Rich and Some So Poor, New York: Norton & Company.

Lucas, Robert E. (1988), 'On the mechanics of economic development', Journal of Monetary Economics, **22**, 3–42.

Murat, Marina and Francesco Pigliaru (1998), 'International trade and uneven growth: a model with intersectoral spillovers of knowledge', Journal of International Trade & Economic Development, **7**, 221–36.

Myrdal, Gunnar (1957), Economic Theory and the Underdeveloped Regions, London: Duckworth.

Olson, Mancur, Jr (1996), 'Big bills left on the sidewalk: why some nations are rich, and others poor', Journal of Economic Perspectives, **10**, 3–24.

Paci, Raffaele (1997), 'More similar and less equal: economic growth in the European regions', Weltwirtschaftliches Archiv, **133**, 609–34.

Quah, Danny T. (1996), 'Regional convergence clusters across Europe', European Economic Review, **20**, 951–8.

Romer, Paul M. (1990), 'Endogenous technological change', Journal of Political Economy, **98,** S71–S102.

Solow, Robert M. (1956), 'A contribution to the theory of economic growth', Quarterly Journal of Economics, **70**, 65–94.