Fifty Years of Growth Economics

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Abstract

The global economy has enjoyed more than a half-century of unprecedented economic growth and a growth ideology is firmly entrenched in advanced and developing countries alike. It is the axis for policy making and is buttressed by a wealth of theorizing and empirical research on the sources of growth and how these can be mobilized by dint of policy making and institution building. But with policy-makers now demanding growth that is sustainable, green, and inclusive, growth economics must enlarge the menu of practical policy options so as to: enable countries to increase capital investment embodying advances in (green) technology; improve education delivery in order to enhance the quality of human capital, increase employability, and arrive at equitable outcomes; and implement vital institutional reforms to yoke and temper
market forces. Growth economics is in great demand but arguably overdue for a “scientific revolution” to accommodate new demands.

**Keywords:** total factor productivity, endogenous growth, green growth, human capital, technology gap, general-purpose technologies, demand management, performance metrics
Introduction

As the global economy recovers from the financial crisis of 2007–08 and struggles with the smoldering eurozone crisis, two questions are uppermost for policy-makers: (i) whether and how industrialized and industrializing countries might be able to restore the robust performance of the 1993–2007 period (minus the bubbles), and (ii) the contribution that growth economics could make to the policy agenda. Most developing and middle-income countries continue to envisage growth rates averaging six to eight percent. They are convinced that the extraordinary performance of a handful of countries during the past quarter century can be replicated by the many in the decades ahead.

The purpose of this chapter is to review how thinking on growth has evolved since the 1950s through the interplay of international politics, country-level experience, and theorizing almost exclusively conducted in Western countries. It reflects on how this body of thinking has diffused through a variety of channels and influenced policies in virtually all developing countries.
Finally, the paper considers whether economic research based on the experience of a few countries, over a limited period of time, can provide relevant and effective policy guidance.

The chapter is divided into three parts. Part 1 examines the experience of the early post-war decades and the worldwide spread of a “growth ideology” that marked a shift from the prewar beliefs and experiences of the majority of nations. Part 2 discusses economic theory and empirical findings underlying the new growth ideology from the 1960s onwards. Part 3 reflects on the policy prescriptions to be garnered from growth economics.

**Industrialization and growth: the new normal**

Starting in the 1950s, with post-war recovery and decolonization in full swing, industrialization moved into high gear. Many factors contributed to this surge: for example, cheap energy, the transport revolution, and changing terms of trade. Perhaps most significant was the germination of a growth ideology among national elites, who had become increasingly aware of enhanced economic opportunities and eager to secure material prosperity comparable to what they saw in the West. In the grip of this new fervor, developing countries began planning for rapid growth.
They took their cues from the leading Western economies and also drew lessons from compressed development achieved by the former Soviet Union, Japan, and China.

The nascent growth ideology of national elites was powerfully reinforced by the ideologies of the great powers that defined the political economy of international development throughout the more than three-decade-long Cold War. Michael Latham (2003: 9) observes that “though American visions of the true and only heaven differed from Soviet visions of the ‘end of history,’ both models stressed the ability of enlightened elites to accelerate an inevitable, universal movement through historical stages and posited that technological diffusion would engender a new consciousness and a new society.” And both sides used virtually identical means to achieve desired geopolitical and economic outcomes: foreign aid, power projection and arm twisting, technical assistance, training programs, arming of militaries, soft power, and, not infrequently, proxy wars to prop up favored regimes (some of which persisted for years, making life nastier and more brutish for millions). Econometrically sharpened hindsight shows that aid in pursuit of geopolitical objectives contributed little to investment, growth, or poverty reduction. However, it cemented alliances with ruling elites, trained the focus on modernization and development, and through technology transfers hard as well as soft, kept growth at the center of policy attention and the preferred yardstick for measuring economic progress.
Post-war thinking was influenced by the efficacy of state economic control during World War II and the embracing of Keynesian policies following the Great Depression to help smooth business cycle fluctuations, or at least reduce their amplitude. The belief was that policy-makers had the tools to sustain economic activity at high levels or, in other words, to minimize the threat of prolonged downturns that eroded past gains. As a result of these policies and beliefs, the role of the state, already greatly enlarged during the course of the long war, was steadily augmented, and the state acquired the responsibility to strive for and maintain rapid growth. The emergence of a large and initially economically successful Communist Bloc (and active economic proselytizing by the countries of the Bloc) contributed to a widespread belief in the augmented role of the state. Fiscal policy, including direct public-sector intervention, was seen as a way to promote private initiative and industrialization. State-guided capitalism received a strong endorsement from the performance of the Republic of Korea; Taiwan, China; Singapore; Malaysia; and Thailand, and it provided other developing economies with both inspiration and a proven model, at least through the early 1990s. The performance of the Chinese economy, once market-oriented reforms were introduced in the early 1980s, further underscored the advantages of market institutions tempered by state control and an outward orientation to harness the power of globalization.
The growth expectations that took root during the halcyon 1960s were reinforced by widespread growth accelerations during that decade, and—in spite of what followed—they proved to be remarkably durable. Europe endured a long spell of stagnation during the 1970s, and growth was slow also in the United States through the early 1980s. Latin America, after an initial surge, lost ground starting in the 1980s and suffered from “lost decades.” China was hobbled first by the havoc caused by the Great Leap in 1958–60, and then, after a short spell of recovery in the first half of the 1960s, by more than ten years of disruption resulting from the Cultural Revolution that Mao choreographed in 1966. By the mid-1970s, Africa had entered a long economic twilight that persisted for over two decades, and India remained on the treadmill of the “Hindu growth rate” induced by stifling state regulations, until the onset of reforms in the early 1990s. Only the “tiger economies” in East Asia defied gravity and exploited international market opportunities to grow their economies at high speed with the help of investment in industry and buoyant exports.

The gloom lifted in the 1990s, arguably because of four main developments: (i) accelerating globalization assisted by the lowering of trade barriers; (ii) the stripping away of capital controls and declining transport costs; (iii) the tonic effects of general-purpose technologies (GPTs), such as semiconductors and the Internet, that released a flood of innovations; and (iv) the spread of
regulatory reforms to weed out market distortions that stifled competition,\(^5\) caused inefficiency, and promoted rent seeking. The neoliberal argument for enlarging the role of markets and reining in the activities of the state\(^6\) received a boost first from the collapse of the former Soviet Union and the discrediting of the socialist planned approach to development, and then, more convincingly, from the surge in global economic activity.

Could the growth ideology have become so all-pervasive absent the parallel rise of growth economics? This is difficult to answer because growth and development have become inextricably linked, and growth is widely accepted as the touchstone of performance. However, it is fair to say that the rise and teaching of neoclassical growth economics in leading Western universities from the mid-1950s did much to build the analytic and empirical scaffolding to support the idea that a steady-state growth path was theoretically feasible and was being demonstrated in practice by a number of countries. After a slow start, growth modeling exploded in the 1960s as economists became more accustomed to using mathematics and began elaborating the “science of growth” in conscious imitation of the methodologies of the hard sciences.\(^7\) As national income data accumulated, especially on the United States, theoretical models were put to the test and the growth industry was born, providing much-needed intellectual underpinnings for the growth ideology and a few conceptual tools for policy-makers.
wanting to translate political promises into tangible economic results. Sections 2 and 3 of this paper discuss how economics accounts for growth, but before getting to that it is worth listing a number of other reasons for the popularity of the growth ideology and why it has survived and will continue to survive setbacks and disappointments.

**Growth as a Belief System**

The growth “ideology” has permeated the discourse on development and proven compelling for good and bad performers alike for several reasons. First, the growth rate for the global economy between 1950 and 1999 averaged four percent per year, well in excess of pre-1850 levels. Moreover, there is the demonstration effect generated by highly successful performers, however small they might be—and Singapore; Hong Kong SAR, China; Taiwan, China; and the Republic of Korea were small economies in the 1970s and 1980s. These resource-poor countries on the periphery showed that steady progress from the lowest rung to near the top of the income ladder was possible in as little as four decades through technological catching-up and the patient building of human and physical capital largely from internal resources. Growth was achieved not through the virtuosity of policy but through macroeconomic and political stability, successful efforts at resource mobilization, learning and absorbing technologies from abroad, and the
exploiting of market opportunities opened up by globalization. The early and later “tigers” served as a beacon of hope for the majority of economies that have struggled with low or negative growth rates. Had the tigers not materialized, it is doubtful that the growth ideology could have acquired such a loyal following. No amount of modeling can substitute for seven percent rates of growth sustained for three decades.

Second, perhaps one can claim with little exaggeration (witness the concerns expressed in the United States circa 2012) that in democracies and autocracies alike, political legitimacy of governments has come to hinge on the delivery of good economic results over the medium term. If incomes stagnate and become more unequal or employment is hard to come by, democracies will show governments the door. The Arab Spring uprisings have demonstrated that populations can eventually become restive even in tightly policed autocracies. Rightly or wrongly, the notion that governments must deliver growth has acquired worldwide currency—and politicians have had a large hand in embedding it more firmly through the promises they make as they seek office.

Third, a number of developments over the past fifty years have rendered growth more urgent and made it harder to think of a world without growth. Population increase is a critical concern for a
number of countries and, even as it slows, they will still have to convert a youth bulge into a youth dividend. A related factor is the promises many governments—and the international community—have made (and will continue to make) to reduce if not eliminate poverty and, more guardedly, inequality. The evidence suggests that countries (such as China) that have successfully tackled poverty have relied upon high rates of growth, which generate jobs, finance social safety nets, and enable governments to provide the poor with services that will equip them with capabilities.8 Hence out of necessity, all parties must hold tight to the growth ideology and hope for the best.

Increasing resource and energy scarcities, climate change, and environmental degradation demand an urgent greening of growth. Although debate continues on the advantages of early and precautionary action, the weight of evidence points increasingly to net growth benefits of green policies and green technologies.9 The evidence also suggests that two to three degrees of warming is becoming unavoidable, a development that will entail costly mitigating efforts in the future, in particular to increase the resilience of cities. In anticipation of a harsher environment, countries need to build their resource bases, because wealthier countries are far better able to weather shocks and repair the damage.10 These three developments increase the pressure on governments to assign priority to growth.
Fourth—and there are other factors I will not list—industrialized and industrializing countries are aging and faced with a shrinkage of the workforce a decade or two into the future. A number of economies are weighed down with large debts and even larger contingent liabilities, which will be difficult to pay down or accommodate (absent a drastic downscaling of the safety net) without fairly robust growth. Therefore, for fiscal and welfare reasons at the very least, a resumption of “adequate” growth rates in these countries is vital if they are to maintain or improve their current living standards.

The above sketches the emergence and sixty-year dominance of the growth ideology. But while average growth rates are handily above the levels reached prior to the mid-nineteenth century for many countries, sustaining growth rates of seven percent or more has proven difficult, and this confronts growth economics with a severe challenge: to convincingly explain the relatively few instances of high growth rates sustained for a decade or more, and with the benefit of such analyses, to arrive at policy recommendations tailored to individual country circumstances that will enable others to replicate what thus far has been the lot of a favored few.
Growth: supply push and demand pulled

The literature on growth is forbiddingly large and the expanding international army of researchers guarantees an endless stream of additions. The two volumes of the *Handbook of Economic Growth* provide a sense of the scope and richness of the research. These were published in 2005 and much new material has appeared since then. Capturing the many-sidedness of this literature in a few pages is impossible. However, mercifully, the central threads and stylized facts are few and they have changed little over time.

Growth can be viewed from two angles and because this is economics, they are supply and demand. In a contribution to the debate on capital theory that raged between the two Cambridge (Massachusetts and UK) schools, Paul Samuelson (1966: 444) ringingly announced that “until the laws of thermodynamics are repealed, I will continue to relate outputs to inputs—i.e., to believe in production functions.” And factor inputs have remained the drivers of growth in the supply side version of growth economics. However, whether or not supply materializes is a function of demand for outputs. Thus demand provides a complementary perspective on growth.
The reign of capital followed by total factor productivity

In the beginning, when the Harrod-Domar model was the workhorse of growth economics, only capital and labor mattered. These were the two basic factors whose entry into the production function caused growth, depending on a combination determined by technological relationships. The dominance of capital lasted until the middle of the 1950s, when papers by Trevor Swan (1956) and more famously by Solow (1956, 1957) revolutionized thinking on the sources of growth. These papers showed that as much as seventy percent of the growth in the United States could not be traced to factor inputs but instead was caused by a residual, including technology and other intangibles. By singling out technological change as a key factor, Solow (and others such as Abramovitz) highlighted the role that knowledge had come to play since the dawn of the Industrial Revolution.

Solow’s findings were subsequently validated by others, and triggered theoretical and empirical research to track down the “quarks” that inhabit the residual—or total factor productivity (TFP), as it has come to be known. This quest is now in its sixth decade, and although a multitude of suspects have been identified, a theory that convincingly accounts for the residual/TFP, lays bare its dynamics, and points unequivocally to effective policies has proven elusive. Researchers
attempting to explain the differences in performance among countries have marshaled scores of so-called fundamental variables including geography, entrepreneurship, financial deepening, religion, ethnic fractionalization, and natural resources. But after examining the explanatory robustness of the leading candidate growth theories, Durlauf, Kourtellos, and Tan (2008: 344) are forced to conclude that there is a lack of “strong evidence that any of the new growth theories are robust direct determinants of growth when we account for model uncertainty. . . . [However,] variation in growth rates across countries are more robustly explained by differences in macroeconomic polices and unknown heterogeneity associated with regional groupings.”

Recent attempts at estimating TFP for a large number of countries range from a quarter of growth to over two-thirds, with the average falling somewhere in the fifty percent range. Over the longer term, the consensus is that growth of GDP and divergences in per capita GDP will be closely tied to individual country performance with regard to productivity. Technological change and innovation (some embodied in new equipment) are seen as the mainsprings of productivity growth. Underlying these is a learning and innovation system that produces human capital and determines its quality; helps to absorb technology and refines it through incremental innovations; generates ideas, some of which are translated into commercial innovations; and through the agency of greater technical, vocational, managerial, and organizational skills, brings about gains
in efficiency. Physical capital is still very much in the picture by creating productive capacity and serving as a vehicle for research and technology transfer. In addition, since 1995, information technology (IT) capital has acquired a substantial role, especially in the United States and Europe. IT is complemented by technology that is at the heart of what Baumol (2002) describes as the “capitalist growth machine.” As Parente and Prescott (2000), Comin and Hobijn (2010), Allen (2012), and many others note, the main reason that some countries are so far down on the income scale and convergence is so halting is that these economies have difficulty borrowing technologies from more advanced countries and tailoring it to their own purposes.

A number of reasons have been put forward to explain why frontier technologies have been slow to diffuse. Bad institutions that place limits on absorptive capacity, regulatory constraints, vested interests, and poor governance must take some of the blame. But the nature of technologies closer to the frontier may also slow diffusion. These technologies tend to be capital intensive because they were developed in countries where labor is relatively expensive and skills are abundant. They are less cost effective in countries where labor costs are low relative to those of capital.
A country such as China offers a good illustration of how technology gaps can be narrowed and productivity raised. China has invested massively in state-of-the-art production equipment, financed by equally massive domestic savings channeled to enterprises through state-owned banks at state-controlled rates of interest that substantially depress the cost of capital. At the same time, China has successfully enlarged its pool of skills, thus facilitating absorption of technology from overseas. This brings us back to the refinements and advances in growth theory, as expounded in work by Paul Romer that modeled endogenous growth and explicitly accounted for the role of knowledge.

*From Solow to endogenous growth*

The Solow model, by clarifying the relationship between capital accumulation and growth, helped to partially dislodge the orthodoxy that saw capital as the key to growth and focused growth-augmenting policies exclusively on measures to raise the rate of investment. Solow showed that increasing capital accumulation eventually runs into diminishing returns as an economy shifts from extensive to intensive growth, but in avoiding the problem the model assumed exogenous technological change that limited its explanatory power. This deficiency was remedied by explicitly incorporating (endogenizing) knowledge into the growth model.
Endogenous growth theory assumes that learning by doing and investment in education creates knowledge and knowledge spillovers. Thus, externalities reverse the diminishing returns to capital, allowing growth to be sustained. In other words, the continuous production of knowledge through a variety of avenues staves off what would otherwise be an inevitable onset of diminishing returns that would negate the deepening of capital. It is arguable whether endogenous growth theory constitutes a significant advance, however, as Solow (2007: 6) remarks, “the most valuable contribution of endogenous growth theory has not been the theory itself, but rather the stimulus it has provided to thinking about the actual production of human capital and useful technological knowledge.”

The literature is replete with an immensity of small variations and minor extensions, including the role played by institutions (whether viewed as rules or as organizations with specific governance mechanisms), but the action revolves around capital and TFP and ways of parsing TFP. The contribution of TFP appears to be rising, according to a recent study by Arezki and Cherif (2010) of 94 countries covering the period 1970–2000. The question that refuses to go away is whether all the fuss over TFP is increasing the stock of effective policy instruments and institutions, and helping us understand why growth is so persistently uneven and all too often
unresponsive to the moving of conventional policy levers. Policy instruments and institutions are discussed in the next section.

**Introducing demand**

Much of the attention of growth theory has been on the supply side, with demand attracting sporadic attention during business downturns, as has been the case since 2008. During the extended period of calm prior to 2008, the majority of macroeconomists were content to track the movements of the economy using variants of dynamic stochastic general equilibrium (DSGE) models that incorporated consumption smoothing and rational expectations, which papered over the differences between the Keynesian and new classical models.

From the perspective of growth economics, this neglect of demand management (including the demand generated by net exports) and the risk of crises are hard to explain, given crises’ frequency (though mainly in developing countries). A literature going back several decades has established that poor demand management—by injecting macroeconomic volatility, inflationary pressures, or adverse expectations—has been responsible for depressing investment and growth in many countries. One reason the East Asian tiger economies performed at such a
high level is that, for the most part, they were able to create stable macroeconomic environments conducive to investment and to risk taking. A second reason of equal importance was the emphasis that East Asian economies placed on trade (and foreign direct investment) policies aimed at maximizing the growth impetus from exports. Thus, growth was supported both in the form of demand and through gains in productivity, technology transfer, and the encouragement that an open trading environment offered to foreign investors. It was the relative neglect of such policies at the very time when globalization was widening opportunities for growth through trade that stifled growth in many developing economies and enabled the East Asians to pluck the low-hanging fruit.

The experience of Japan also shows how poor macroeconomic management can undermine efforts at accumulating knowledge and inducing innovation. Japan is home to some of the most innovative multinational corporations, spends in excess of three percent of GDP on research and development (R&D), is second only to the United States in the number of patents it registers each year, and is not short of science and technology skills. Nevertheless, following the bursting of the real estate bubble in 1989 and the ensuing financial crisis, Japan’s growth slowed to a crawl, with TFP growing by just 0.6 percent per year between 1990 and 2003. In other words,
investment in knowledge to augment science, technology, and innovation (ST&I) activities cannot boost growth if demand is persistently weak.

As Keynes (1936) observed, deficient demand tilts the odds against the entrepreneur and can stifle innovation and eat into the growth of productivity. Amazingly, after so much research on macroeconomic policy, the financial crisis and the problems of the eurozone have uncovered a singular lack of consensus regarding the efficacy of demand management and how it can be most effectively conducted, once monetary policy is reduced to near impotence when interest rates are at the zero bound. Perhaps most disconcerting is that the debate is being conducted exclusively among participants drawn from a handful of schools (with strong ideological leanings) in North America and Western Europe. On demand management as on the supply-related aspects of growth, a few Western universities continue to call the shots by training and indoctrinating the majority of those who worldwide conduct influential research and advise policy-makers. The epicenter of growth economics remains highly localized, and more than sixty years after the birth of growth economics, Western ideas, fashions, and methodologies continue to determine what is researched, how it is researched, and what gets translated into policies.
Policies for growth: a small pot of gold

Long immersion in the literature on growth leaves one with the feeling that a lot of incremental innovation is afoot wherever economics is being taught or practised—and not just in a few Western hotspots. But then one stops to remember the last 1,000 papers read. That is when the sense of moving in circles becomes apparent and the impossible task of summarizing a few stylized policies begins to seem manageable.

King capital

Although the spotlight might have shifted to TFP, capital is the driver of growth for most low- and lower-middle-income countries far from the technological frontier, with low capital labor ratios, and still on the extensive margin of development. For these countries, the first order of business is to put in place the infrastructure that undergirds development and to build the productive capacity. Capital investment does this, and also serves as the avenue through which technology is transferred from more advanced to developing countries. China is the foremost exemplar of this approach. It telescoped decades of development into years by pulling out the
stops on capital investment and in the process transferring technology at a much faster pace than
would ordinarily have been possible. How can a country raise investment to upwards of twenty-
five percent of GDP? Only a few have managed this through a combination of resource
mobilization through the fiscal system and public sector entities; by harnessing publicly owned
and controlled banks; by exerting financial repression, which depresses interest rates over long
periods; through state capitalism in combination with industrial policy vigorously implemented
through fiscal and organizational incentives; and with the help of an exchange rate policy that
undervalues the domestic currency relative to that of major trading partners. This is impossible to
codify, much less customize, for individual countries, and the World Trade Organization (WTO)
now disallows some of the incentives utilized in the past. In fact, even countries that once
achieved high rates of investment, such as Malaysia, have fallen far below earlier levels. Other
countries such as Brazil and South Africa have been unable to approach East Asian levels in
spite of the introduction of generous fiscal incentives for investment and a deepening of the
financial sector to mobilize and allocate savings.

Improving the business climate can in principle increase investment, but it is difficult to identify
countries that have moved to a high growth path by working on the indicators that affect
transaction costs. In the 1980s and a part of the 1990s, low rates of saving and investment in
Latin American and sub-Saharan countries was blamed on macroeconomic mismanagement. However, better macro-management has increased investment only modestly, if at all. Between 1995 and 2009, gross investment was unchanged in Latin America and rose from an average of eighteen percent to an average of twenty-one percent in sub-Saharan Africa. Low levels of private investment in productive capacity and limited investment in physical infrastructure constrain growth, both directly and by dampening the gains in TFP from embodied technological progress and learning.

Horizontal and matrix-based approaches (as distinct from the earlier vertical ones) to industrial policy that were pushed aside by market fundamentalism in the 1990s are back in favor and past state failures are being airbrushed as countries struggle to raise the level of investment and orient it towards the productive sectors rather than housing or real estate. The jury is still out on whether such policies or others will make a tangible difference in primarily market-based economies operating with reference to WTO rules.
**Human capital, the knowledge producer**

Endogenous growth theory and the research on human capital have brought out the vital role of education and ST&I skills. They serve both as drivers of (inclusive) growth in themselves and as complements to increasingly more sophisticated capital/IT equipment based on technologies introduced in the advanced countries. Research by Hanushek and others\(^\text{29}\) has demonstrated that the quality of human capital (based on standardized tests) counts for more than quantity, especially in the race to narrow technological gaps and to raise factor productivity by improving management, soft skills, allocative efficiency, and policy implementation. Learning from countries that are high on the quality ladder has become a growth industry in its own right, even as some of these countries (for example, Singapore and Finland) begin to worry about the emphasis on rote learning and on the inability to instill sufficient creativity and problem-solving skills. It is clear from Western experience that greater spending on education, smaller class size, and provision of computers do not suffice. A teacher’s knowledge of a subject and the incentive regime can make a difference but each success story (as in the case of Finland) has tight and unreplicable cultural correlates. Human capital has emerged as an axis of growth economics, and many of the answers countries are seeking must be found in the swampland of education “science,” itself full of interesting papers and dead ends (Glewwe et al., 2011).
Innovation systems

Human capital development—and the learning economy it represents—is inseparable from the ST&I system that uses human capital to generate ideas and commercial innovations facilitated by legal and regulatory institutions to move the TFP needle. The architecture of innovation systems in the leading economies has been exhaustively mapped to the following conditions: the role of the government, universities, and the financial system (including venture capital providers); legal institutions supporting intellectual property and the trading of ideas; industrial composition; the entrepreneurial dynamics of the business community, both domestic and foreign; and the contribution of a competitive market environment. A series of OECD reports30 elucidates country experiences and offers policy advice. Lundvall (2007) provides a historical perspective and Martin (2012) nicely summarizes the state of the field and notes the challenge of coordinating the actions of several participants in the innovation game. The idea- and innovation-generating machine must function smoothly to extract the maximum TFP from capital investment and the accumulation of human capital. This is very much in the spirit of endogenous growth theory, but it should be noted that endogenous growth policies and innovation activities are not really separable. They are carried out more or less in tandem, given
the fast-moving nature of the technological environment. A universal roadmap exists only as a broad sketch. With the U.S. and Finnish innovation systems showing signs of strain, two of the global icons are tottering on their pedestals.

**Demand management**

Demand management is linked to economic openness and the role of trade in creating opportunities for firms (especially in small countries). Through demand management, firms can realize economies of scale and connect with international value chains. This creates avenues for technology transfer and subjects domestic firms to competitive pressures. Whether or not trade enhances productivity through these channels remains undecided. Bernard and his co-authors³¹ show that firms entering export markets are already the productive ones. Others find that trade does cause productivity to rise.³² As with macroeconomic policy, the answer seems to boil down to a matter of belief, because there are an equal number of papers arguing both sides of the case. I tend to go with the ayes. But this expression of belief only underlines the larger question: How does a country become a successful exporter? If one takes China as a model, then the answer appears to lie in making massive investments in physical and human capital to build manufacturing capability; creating an innovation system to enhance absorptivity; exploiting
foreign direct investment to increase access to technology; maximizing fiscal, financial, and exchange incentives; and applying pressure from the party organization to achieve state-mandated export targets. However, hard-won export successes can give rise to structural imbalances that China now has to correct.

Conclusion

There is no denying the scale of the economic research conducted over the past half century, but growth economics is struggling to provide detailed and meaningful answers to policy concerns. If TFP is indeed the driver of growth, its measurement is becoming something of an art, appreciated by practitioners (there are scores of estimates, no two alike) but contributing little to the content and precision of policies for raising TFP. There is no consensus on how growth that is evenly shared might be accelerated in advanced countries and sustained by middle-income ones fearing the onset of sclerosis. The limitations of theory and policy are highlighted by two facts: between 1960 and 2011, only eight of 190 countries averaged a growth rate of seven percent or more for two decades; and the correlation between decadal rates of growth is low—in fact, between growth in the 2000s and that in the 1990s it is close to zero. In the absence
of fresh ideas, the professional and public debate mindlessly regurgitates well-worn nostrums on investment in education and science and technology; on stimulating innovation; and on creating an institutionally well-stocked, regulation-lite, market-friendly, enabling business environment. The one apparent innovation is the greening of several of the latest offerings on growth.

Since the early 1970s, leading economists have periodically warned that their profession would be marginalized by the trend towards technical specialization, mathematical modeling, and a focus on the testing of narrow hypotheses using increasingly abstruse econometrics. These warnings have gone unheeded. As a consequence, in the face of a crying need for rapid and effective policy action on many fronts, growth economics is not forthcoming with convincing analysis, plus the kind of fine-grained policy informed by the institutions and political economy of individual countries, that determine whether and how policies are implemented and the nature of outcomes (also noted by Harriss in this volume). Policy-makers looking for practical proposals are not helped by recommendations to “strengthen institutions,” or move from the periphery to the “core of the product space,” or increase R&D, or improve the quality of education, or, most dishearteningly, raise TFP.
1 A large literature on the relationship between aid and growth comes to at best inconclusive findings. See Doucouliagos and Paldam (2006, 2009); Easterly (2006); Roodman (2007).

2 See also the discussion on the role of the state in Kanbur and Devarajan (this volume).

3 State-guided capitalism in the Republic of Korea and Taiwan, China was the subject of two well-known publications by Wade (1990) and Amsden (1989). A sampling of the voluminous literature on industrial policy is summarized in Yusuf (2011).

4 In the Indian case, the first steps towards deregulation in the 1980s had already begun raising growth rates, but the release from the prolonged stagnation took place in the 1990s.

5 This was a time when concerns about state failure were making deep inroads into thinking in the United States, spurred by the ideas emanating from the Chicago School and the activities of increasingly influential neoliberal and libertarian think tanks (Backhouse 2010).

6 This was enshrined in the “Washington Consensus,” first tabled by John Williamson in 1989.

7 The introduction of a ‘Nobel’ Prize (actually the Swedish Central Bank Prize in Economic Sciences) in 1969 encouraged economists to imitate the physical sciences. On “scientific economics,” see also Williams (this volume).


9 See Hallegatte and others (2012).

10 On investment and growth under conditions of climate change, see EIB (2012).

11 See Aghion and Durlauf (2005). These are volumes 1A and 1B. Volume 2 is to come.

12 Kuznets (1966) recognized the importance of capital saving innovations and investment in education and the development of skills.

13 For Abramovitz (1993), technology accounted for only a part of the coefficient of ignorance or the residual.

14 One compact source of cross-country growth analysis is Barro (1997).

15 See also the detailed weighing of approaches to modeling growth and econometrically tracing its causes in Durlauf, Johnson, and Temple (2005). Kenny and Williams (2001) also observe that the empirical evidence does not enable one to select among competing explanatory factors.

16 Among a legion of TFP enumerators, see Bosworth and Collins (2003), Crafts (2010), Jorgenson and Vu (2010), and Allen (2012).

17 Financial repression is a notable accompaniment of capital-intensive development in several of the East Asian economies.

18 Romer (1986, 1994).

19 The endogenizing of technological change as a profit-making activity in its own right was foreshadowed by Arrow in a landmark 1962 paper where he used capital investment as the vehicle through which learning/technological change occurs endogenously rather than being introduced exogenously.

20 See Aghion and Howitt (2009); and Howitt (2004).
According to some researchers, institutions (represented by a proxy for which data can be found) are the keys to growth. Institutions such as property rights and intellectual property surely matter, but how and how much they impinge on TFP is difficult to determine. As policy instruments, institutional variables are tricky to define and manipulate, and the returns can accrue non-linearly over a long period of time.

Between the mid-1980s and 2007, there was a relative lull in financial crises and defaults, which, according to Reinhart and Rogoff (2008), set the stage for the “big one.”

New Keynesian models assume (difficult to measure) sticky prices.

Burnside and Tabova (2009) find that a country’s average growth rate is correlated with its exposure to risk factors: the greater its exposure to shocks, the lower its average growth. In other words, riskier countries depress domestic investment and attract less capital from abroad.

See Sirimaneetham and Temple (2009) for a reexamination of the evidence using a new index of instability and for references to a large earlier literature.

Jorgenson and Motohashi (2005).


On the role of the state and state failure, see also Harriss and Kanbur and Devarajan (this volume).


See http://www.oecd.org/document/62/0,3746,en_2649_34273_38848318_1_1_1_1,00.html.

Bernard (2006). Iacovone and Javorcik (2012) also find that potential exporters upgrade quality prior to entering the export market.

See Lopez (2005).

A survey of the econometrics of TFP by Van Beveren (2012) indicates how many tools and tests the modeler can now marshal to enhance the joys of estimation.
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