Fifteen Years of New Growth Economics: What Have We Learned?

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Paul Romer's paper, "Increasing Returns and Long-Run Growth," is now fifteen years old. This pathbreaking contribution led to a resurgence in research on economic growth. The resulting literature has had a number of important impacts. In particular, it shifted the research focus of macroeconomists. From the time when Lucas, Barro, Prescott, and Sargent led the rational expectations revolution until Romer, Barro, and Lucas started the new literature on economic growth, macroeconomists devoted virtually no effort to the study of long-run issues; they were all doing research on business cycle theory. In this sense, the new growth theory represented a step in the right direction.

The new growth literature has had a similar impact on macroeconomics classes and textbooks. Until 1986, most macroeconomics classes and textbooks either relegated economic growth to a marginal role or neglected it altogether. Things are very different now. Modern undergraduate textbooks devote more than a third of their space to economic growth, and both graduate and undergraduate macroeconomics classes devote a substantial amount of time to this important subject. The impact of these two changes on the training of young economists is very important, and this should be viewed as another contribution of the new economic growth literature.

The contributions I wish to highlight in this conference, however, are the substantial ones: I want to discuss the most significant ways in which the new economic growth literature has expanded our understanding of economics.

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1. The Empirical Touch

One of the key differences between the current and the old literature is that this time around, growth economists address empirical issues much more seriously. This has led to the creation of a number of extremely useful data sets. The Summers and Heston data set tops the list. Summers and Heston (1988, 1991) construct national accounts data for a large cross-section of countries for a substantial period of time (for some countries the data start in 1950; for most countries they start in 1960). In principle, the data are adjusted for differences in purchasing power across countries, which allows for strict comparability of levels of gross domestic product (GDP) at a given point in time. Even though some researchers have complained about the quality of this data set, overall it represents one of the main contributions of this literature because it allows researchers to confront their theories with actual data. This was not true the last time growth economics was a popular area of research in the 1960s (perhaps because they did not have access to the data that we have today).

The Summers-Heston data set is not the only data set that has been created recently. Barro and Lee (1993), for example, also construct a large number of variables, mainly related to education and human capital. This is especially important because the first generation of endogenous growth theories emphasize the role of human capital as the main (or at least one of the main) engines of growth. Other recently constructed data sets include social and political variables that are especially useful for one of the newest lines of research, which emphasizes institutions (see, for example, Knack and Keefer, 1995; Deininger and Squire, 1996).

1.1 Better Relation between Theory and Empirics

A second important innovation of the new growth literature is that it has brought empirical studies closer to the predictions of economic theory. The neoclassical literature of the 1960s links theory and evidence by simply mentioning a number of stylized facts (such as the Kaldor "facts") and showing that the theory being proposed is consistent with one, two, or perhaps several of these so-called facts.[1]

1. Some of these facts, including the Kaldor facts, did not really come from careful empirical analysis, but they were quoted and used as if they were widely proved empirical facts.

Today's research, on the other hand, tends to derive more precise econometric specifications, and these relationships are taken to the data. The best example can be found in the convergence literature. Barro and Sala-i-Martin (1992) use the Ramsey-Cass-Koopmans growth model (Ramsey, 1928; Cass, 1975; Koopmans, 1965) to derive an econometric equation that relates the growth of Per capita GDP to the initial level of GDP. Mankiw, Romer, and Weil (1992) derive a similar equation from the Solow-Swan model (Solow, 1956; Swan, 1956). These researchers derive a relationship of the form

$$\gamma_{i,t,t+T} = \beta_0 - \beta \ln y_{it} + \beta \ln y_i^* + \varepsilon_{it} , \tag{1}$$

where $\gamma_{i,t,t+T}$ is the growth rate of per capita GDP for country *i* between time *t* and time $t + T$, y_{it} is per capita GDP for country *i* at time *t*, and y_i* is the steady-state value of per capita GDP for country *i*. The term ε_{it} is an error term. The coefficient is positive if the production function is neoclassical, and it is zero if the production function is linear in capital (which is usually the case in the first generation one-sector models of endogenous growth, also known as AK models).[2] In particular, if the production function is Cobb-Douglas with a capital share given by α then, the parameter β (also known as the speed of convergence) is given by $\beta = (1 - \alpha)(\delta + n)$, where d is the depreciation rate and *n* is the exogenous rate of population growth.[3] (Notice that when $\alpha = 1$, which corresponds to the AK model, the speed of convergence is $\beta = 0$.)

My main point is that the modern literature took equation 1 as a serious prediction of the theory and used it to test the new models of endogenous growth (the AK models, which predict $\beta = 0$) against the old neoclassical models (which predict $\beta > 0$.) Initially, some researchers mistakenly took equation 1 to suggest that neoclassical theory predicted absolute convergence. In other words, if $\beta > 0$ (that is, if the world is best described by the neoclassical model), then poor countries should be growing faster than others. People therefore started running regressions of the type

$$\gamma_{i,t,t+T} = \hat{b}_0 - \hat{b} \ln y_{it} + \omega_{it}, \tag{2}$$

2. Paul Romer's seminal paper (Romer, 1986) is an example of an AK model. See also Rebelo (1991); Jones and Manuelli (1990); Barro (1990).

3. The derivation of this equation assumes constant savings rates à la Solow-Swan.

and tested whether the coefficient $\hat{b}$ was positive. Notice that if $\hat{b} > 0$, then poor countries grow faster than rich ones, such that there is convergence across countries. On the other hand, if $\hat{b} = 0$, then the growth rate and the level of income are not related, and the neoclassical model was rejected in favor of the AK model of endogenous growth. The main empirical results found were that the estimated $\hat{b}$ was not significantly different from zero. This was thought to be good news for the new theories of endogenous growth and bad news for the neoclassical model.

Researchers quickly realized, however, that this conclusion is erroneous. Regressions of the form of equation 2 implicitly assume that all countries approach the same steady state, or at least that the steady-state is not correlated with the level of income. If $y_i^* = y^*$ in equation 1, then this term gets absorbed by the constant $\hat{b}_0$ in equation 2 and disappears from the regression. The problem is that if researchers assume that countries converge to the same steady state when, in fact, they don't, then equation 2 is misspecified and the error term becomes $\omega_{it} = \varepsilon_{it} + \ln y_i^*$. If the steady state is correlated with the initial level of income, then the error term is correlated with the explanatory variable, which biases the estimated coefficient toward zero. In other words, the early finding that there is no positive association between growth and the initial level of income could be a statistical artifact resulting from the misspecification of equation 2.

Researchers proposed various solutions to this problem, such as considering data in which the initial level of income is not correlated with the steady-state level of income. Many researchers therefore started using regional data sets (like states within the United States, prefectures within Japan, or regions within European, Latin American, and other Asian countries).[4]

Another solution is to use cross-country data but—instead of estimating the univariate regression as in equation 2—to estimate a multivariate regression in which, on top of the initial level of income, the researcher also holds constant proxies for the steady state. This came to be known as conditional convergence. Further research shows that the conditional convergence hypothesis is one of the strongest and most robust empirical regularities found in the data. Hence, by taking the theory seriously, researchers arrived at the exact opposite empirical conclusion: the neoclassical model is not rejected by the data, whereas the AK model is.

4. See Barro and Sala-i-Martin (1992; 1998, chaps. 10–12).

My reason for highlighting these results is not to emphasize the concepts of convergence or conditional convergence. Rather, my point is that the new growth economists took the theory seriously when they took it to the data. This was a substantial improvement over the previous round of economic growth research.

1.2 Models That Are Consistent with Convergence

The results from the convergence literature are interesting for a variety of reasons. Most importantly, the literature finds that conditional convergence is a strong empirical regularity, indicating that the data are consistent with the neoclassical theory based on diminishing returns. This was the initial and most widespread interpretation. These empirical results also mean that the simple closed-economy, one-sector model of endogenous growth (the AK model) is easily rejected by the data. However, more sophisticated models of endogenous growth that display transitional dynamics are also consistent with the convergence evidence.[5] For example, the two-sector models of endogenous growth proposed by Uzawa (1965) and Lucas (1988) were later shown to be consistent with this evidence. AK models of technological diffusion (where the A flows slowly from rich countries to poor countries) also tend to make similar predictions.

1.3 Other Findings from the Convergence Literature

The first reason for studying convergence is to test theories. A second reason is to discover whether the world is such that the standard of living of the poor tends to improve more rapidly than that of the rich or whether the rich get richer while the poor become poorer. In dealing with these questions, perhaps the concept of conditional convergence is not as interesting as the concept of absolute convergence. Another relevant concept is that of σ-convergence, which looks at the level of inequality across countries (measured, for example, as the variance of the log of per capita GDP) and checks whether this level increases over time. The key result here is that inequality across countries tends to increase over time.[6]

5. See Barro and Sala-i-Martin (1998, chaps. 6 and 8).

6. This led Lance Pritchett to write a paper entitled “Divergence Big Time.” The title is self-explanatory.

This analysis has recently come under criticism from two fronts. The first is the so-called Twin Peaks literature led by Danny Quah (1996, 1997). These researchers are interested in the evolution of the world distribution of income, and the variance is only one aspect of this distribution. Quah notices that in 1960, the world distribution of income was unimodal, whereas it became bimodal in the 1990s,. He then uses Markov transitional matrices to estimate the probabilities that countries improve their position in the world distribution and to forecast the evolution of this distribution over time. He concludes that in the long run, the distribution will remain bimodal, although the lower mode will include a lot fewer countries than the upper mode.

Although Quah's papers triggered a large body of research, his conclusion does not appear to be very robust. Jones (1997) and Kremer, Onatski, and Stock (2001) show that a lot of these results depend crucially on whether the data set includes oil-producing countries. For example, the exclusion of Trinidad and Tobago or Venezuela from the sample changes the prediction of a bimodal steady-state distribution to a unimodal distribution: because these two countries were once relatively rich but have now become poor, excluding them from the sample substantially lowers the probability that a country will move down in the distribution.

The second line of criticism comes from researchers who claim that the unit of analysis should not be a country. Countries are useful units for testing theories because many of the policies or institutions considered by the theories are countrywide. But if the question is whether poor people's standard of living improves more rapidly than rich people's, then the correct unit may be a person rather than a country. In this sense, the evolution of per capita income in China is more important than the evolution of per capita income in Lesotho, because China has a lot more people. In fact, China has almost twice as many citizens as all African countries combined, even though Africa has around 35 independent states. A better measure of the evolution of personal inequality, therefore, is the population-weighted variance of the log of per capita income (as opposed to the simple variance of the log of per capita income, which gives the same weight to all countries, regardless of population). The striking result is that the weighted variance does not increase monotonically over time. As shown by Schultz (1998) and Dowrick and Akmal (2001), the weighted variance increases for most of the 1960s and 1970s, but it peaks in 1978. After that, the weighted variance declines, rooted in the fact that China, with 20 percent of the world's population, has experienced large increases in per capita income. This effect was reinforced in the 1990s when India (with another billion inhabitants) started its process of rapid growth.

Population-weighted variance analysis assumes that each person within a country has the same level of income, while some countries have more people than others.[7] This obviously ignores the fact that inequality within countries may increase over time. In particular, it has been claimed that inequality within China and India increased tremendously after 1980, which may more than offset the process of convergence of the per capita income of these two countries to that of the United States.

1.4 Cross-Country Growth Regressions

Another important line of research in the empirical literature follows Barro (1991) in using cross-country regressions to find the empirical determinants of the growth rate of an economy:[8]

$$\gamma_{i,t,t+T} = \beta \, \mathbf{X}_{it} + \omega_{it} \,, \tag{3}$$

where $\mathbf{X}_{it}$ is a vector of variables thought to reflect determinants of long-term growth. In the context of the theory that predicts equation 1, if one of the variables in the vector **X** reflects the initial level of income, then the rest of the variables can be thought of as proxies for the steady-state, $\ln y_i^*$.

The cross-country regression literature is enormous. A large number of papers claim to have found one or more variables that are partially correlated with the growth rate: from human capital to investment in research and development (R&D), to policy variables such as inflation or the fiscal deficit, to the degree of openness, to financial variables, to measures of political instability. In fact, the number of variables claimed to be correlated with growth is so large that it raises the question of which of these variables are actually robust.[9]

Some important lessons from this literature include the following:

—There is no simple determinant of growth.

—The initial level of income is the most important and robust variable (so conditional convergence is the most robust empirical fact in the data).

7. The unweighted analysis assumes that each person has the same income and that all countries have the same population.

8. For surveys of the literature, see Durlauf and Quah (1999); Temple (1999).

9. See the work of Levine and Renelt (1992) and, more recently, Sala-i-Martin, Doppelhoffer and Miller (2001) for some analysis of robustness in cross-country growth regressions.

—The size of the government does not appear to matter much, whereas the quality of government does. (For example, governments that produce hyperinflation, distortions in foreign exchange markets, extreme deficits, or inefficient bureaucracies are detrimental to an economy.)

—The relation between most measures of human capital and growth is weak, although some measures of health (such as life expectancy) are robustly correlated with growth.

—Institutions (such as free markets, property rights, and the rule of law) are important for growth.

—More open economies tend to grow faster.

2. Technology, Increasing Returns, and Imperfect Competition

If one important set of contributions of the economic growth literature is empirical, another is theoretical: the endogenization of technological progress. The main physical characteristic of technology is that it is a nonrival good. This means that the same formula, the same blueprint may be used by many people simultaneously. This concept should be distinguished from that of nonexcludability. A good is excludable if its use can be prevented.

Romer (1993) provides a simple matrix that helps clarify the issues. The first column in the matrix shows rival goods, while the second displays nonrival goods. The three rows are ordered by the degree of excludability: goods in the upper rows are more excludable than goods in the lower rows.[10] In the upper left corner, for example, cookies are categorized as both rival and excludable. They are rival goods because when someone eats a cookie, no one else can eat it at the same time. They are excludable because the owner of the cookies can prevent anyone else from using them unless they pay for them.

	Rival	*Nonrival*
More excludable	Cookies	Cable television signal
Intermediate excludable		Software
Less excludable	Fish in the sea	Pythagorean theorem

10. The concept of rivalry is a discrete or 0–1 concept (goods can either be used by more than one user or they cannot). The concept of excludability is more continuous.

The bottom row of column one lists fish in the sea. The fish are rival because if someone catches a fish, no one else can catch it. The fish are nonexcludable, however, because it is virtually impossible to prevent people from going out to the sea to catch fish. The goods in this box (rival and nonexcludable) are said to be subject to the tragedy of the commons. This term comes from medieval times, when the land surrounding cities was common land used for pasture; this meant that everyone could take their cows to pasture in the fields. The grass that a person's cow ate could not be eaten by other cows, so it was rival. Yet the law of the land allowed everyone's cows to pasture, so the grass was nonexcludable. The result was, of course, that the city overexploited the land and everyone ended up without grass, which was a tragedy. Hence the name.

These two types of goods are important, but they are not the goods that I want to discuss here. The second column—nonrival goods—is the relevant one. In the top box, a cable television signal, such as HBO, is nonrival in the sense that many people can watch HBO simultaneously. It is excludable, however, because the owners can prevent anyone from seeing HBO if they don't pay the monthly fee. In the bottom box, basic knowledge is represented by the Pythagorean theorem: many people can use it at the same time so it is a nonrival piece of knowledge, but the formula is also nonexcludable since it is impossible for anyone to prevent its use.

The middle box contains technological goods that are nonrival and partially excludable. This category includes goods such as computer software. Many people can use Microsoft Word at the same time, so the codes that make this popular program are clearly nonrival. In principle, people cannot use the program unless they pay a fee to Microsoft, but in practice, people frequently install a copy of the program that a friend or relative bought, and it is very hard to prevent this from happening. It is thus not fully excludable. This is why it occupies an intermediate position.

Whether a good is more or less excludable depends not only on its physical nature, but also on the legal system. The economic historian and Nobel Prize winner, Douglas North, argued that the industrial revolution occurred in England in the 1760s precisely because it was then and there that the institutions to protect intellectual property rights were created. Intellectual property rights are a way to move technological goods up the excludability ladder in column 2. The existence of such institutions that make goods excludable allow inventors to charge for and profit from their inventions, which provides incentives to do research.

2.1 Modeling Technological Progress

The old neoclassical literature points out that the long-run growth rate of the economy is determined by the growth rate of technology. The problem is that it is impossible to model technological progress within a neoclassical framework in which perfectly competitive price-taking firms have access to production functions with constant returns to scale in capital and labor. The argument goes as follows. Since technology is nonrival, a firm should be able to double its size by simply replicating itself—creating a new plant with exactly the same inputs. The firm would need to double capital and labor, but it could use the same technology in both places. This means that the concept of constant returns to scale should apply to capital and labor only. That is,

$$F(\lambda K, \lambda L, A) = \lambda F(K, L, A), \tag{4}$$

where A is the level of technology, K is capital, and L is labor.

Euler's theorem says that

$$Y_t = K F_K + L F_L . \tag{5}$$

Perfectly competitive neoclassical firms pay rental prices that are equal to marginal products. Thus,

$$Y_t = R_t K_t + w_t L_t . \tag{6}$$

In other words, once the firm has paid for its inputs, the total output is exhausted. The firm therefore cannot devote resources to improving technology. It follows that if technological progress exists, it must be exogenous to the model in the sense that R&D cannot be induced and financed by neoclassical firms.

Since technology is nonrival, it must be produced only once (because once it is produced, many people can use it over and over). This suggests that a large fixed cost (the R&D cost) is associated with its production, which leads to the notion of increasing returns. The average cost of producing technology is always larger than the marginal cost. Under perfect price competition (a competition that leads to the equalization of prices with marginal costs), the producers of technology who pay the fixed R&D costs will always lose money. The implication is that no firm will engage in research in a perfectly competitive environment. Put another way, endogenously modeling technological progress requires abandoning the perfectly competitive, Pareto-optimal world that is the foundation of neoclassical theory and allowing for imperfect competition.[11] Therein lies another contribution of the literature: unlike the neoclassical researchers of the 1960s, today's economists deal with models that are not Pareto optimal.

Romer (1990) introduced these concepts in a Dixit and Stiglitz (1977) model in which innovation took the form of new varieties of products. Aghion and Howitt (1992, 1998) extended the theory to a Schumpeterian framework in which firms devote R&D resources to improving the quality of existing products. The quality ladder framework differs from the product variety framework in that the improvement of the quality of a product tends to make the previous generation of products obsolete. This leads to the Schumpeterian notion of creative destruction, by which firms create new ideas in order to destroy the profits of the firms that had the old ideas (Schumpeter, [1942] 1975).

The new growth models of technological progress have clarified some important issues when it comes to R&D policies, perhaps the most important being that despite market failures (caused by imperfect competition, externalities, and increasing returns), it is not at all obvious whether the government should intervene, what this potential intervention should look like, and, in particular, whether it should involve R&D subsidies. This is important given the widespread popular notion that countries tend to underinvest in technology and that the government should do something about it. The R&D models highlight a number of distortions, but subsidizing R&D is not necessarily the best way to deal with them. For example, the one distortion that is common across models is that arising from imperfect competition: prices tend to be above marginal cost and the quantity of ideas generated tend to be below optimal. The optimal policy to offset this distortion, however, is not an R&D subsidy, but rather a subsidy for the purchase of the overpriced goods.

A second distortion may arise from the externalities within the structure of R&D costs. If the invention of a new product affects the cost of invention of the new generation of products, then there is a role for market intervention. The problem is that it is not clear whether a new invention will increase or decrease the cost of future inventions: while it can persuasively be argued that the cost of R&D declines with

11. The path-breaking paper by Romer (1986) uses an alternative trick to get around the problem: it assumes that firms do not engage in purposefully financed R&D. Instead, knowledge is generated as a side product of investment. This line of research, however, was quickly abandoned.

the number of things that have already been invented (following Newton's idea of shoulders of giants), it can also be argued that easy inventions are pursued first, such that R&D costs increase with the number of inventions. If the cost declines, then firms doing R&D tend not to internalize all the benefits of their inventions (in particular, they do not take into account the fact that future researchers will benefit by the decline in R&D costs), so they tend to underinvest in R&D. In this case, the correct policy is an R&D subsidy. If the costs increase with the number of inventions, however, then current researchers exert a negative externality on future researchers and they tend to overinvest. The required policy becomes an R&D tax rather than an R&D subsidy.

The Schumpeterian approach brings in additional distortions, because current researchers tend to exert a negative effect on past researchers through the process of creative destruction. These effects tend to call for taxes on R&D (rather than subsidies), as current researchers tend to perform too much, not too little, R&D. Finally, government intervention is not required at all if the firm doing current research is the technological leader. For example, Intel owns the Pentium II and performs research to create the Pentium III and then the Pentium IV, thereby destroying the profits generated by its past investments. When the new inventor is also the technological leader, the inventor will tend to internalize the losses of current research on past researchers, so no government intervention is called for.

Although the new generation of growth models is based on strong departures from the old Pareto-optimal neoclassical world, the models do not necessarily call for strong government intervention, and when they do, the recommended intervention may not coincide with the popular view that R&D needs to be subsidized.

2.2 Markets for Vaccines

An influential idea that has come out of the economic growth literature is Michael Kremer's recommendation to create a market for vaccines to help solve the new African pandemics of AIDS and malaria (Kremer, 2000). Kremer emphasizes that financing public research is not the best way to provide incentives for R&D related to diseases that mainly affect the poor. Rather, the best solution is to create a fund with public money (donated by rich governments and rich private philanthropists). This fund would not be used to finance research directly, but to purchase vaccines from the inventor. The price paid would be above marginal cost, which would provide incentives for pharmaceutical companies to devote resources to investigating and developing vaccines against malaria and AIDS, which is something they do not currently do.

3. Merging Economic Literatures

Another important contribution of the new economic growth literature is that it has exerted some influence on other economic literatures and, in turn, has benefited from them. One of the most prominent examples of this symbiosis is the discipline's interaction with the new development literature, which traditionally was largely institutional and centered around economic planning. Growth economists who used to rely almost exclusively on Pareto-optimal, complete-market, perfectly competitive neoclassical models now systematically abandon their traditional paradigms, and they discuss the role of institutions without thinking they are doing second-rate research. At the same time, development economists have learned the value of incorporating general equilibrium and macroeconomic features into their traditional models.

This kind of cross-discipline interaction with growth economics can also be observed in other fields such as economic geography (see Krugman, 1991; Matsuyama, 1991; Fujita, Krugman, and Venables, 1999), macroeconomics and trade theory (Grossman and Helpman, 1991), industrial organization (Aghion and Howitt, 1992, 1998; Peretto, 1998), public finance (Barro, 1990; Barro and Sala-i-Martin, 1998), econometrics (Quah, 1993; Durlauf and Quah, 1999; Sala-i-Martin, Doppelhoffer, and Miller, 2001), and economic history and demography (Kremer, 1993; Hansen and Prescott, 1998; Jones, 1999; Lucas, 1999; Galor and Weil, 1998).[12]

4. Institutions

Another important lesson to be learned from the new economic growth literature is that institutions are important empirically, and they can be modeled. By institutions, I mean various aspects of law

12. Following the influential paper by Kremer (1993), a number of researchers attempt to model the history of the world over the last million years with a single model that explains the millennia-long periods of stagnation, the industrial revolution and the subsequent increase in the rate of economic growth, and the demographic transition that led families to become smaller, which allowed them to increase their per capita income. This literature has made use of long-term data (and I mean really long-term data, dating back to 1 million B.C.). The insights from these historical analyses are perhaps another interesting contribution of the growth literature.

enforcement (property rights, the rule of law, legal systems, peace), the functioning of markets (market structures, competition policy, openness to foreign markets, capital and technology), political institutions (democracy, political freedom, political disruption, political stability), the health system (as previously mentioned, life expectancy is one of the variables most robustly correlated with growth), financial institutions (an efficient banking system, a good stock market), government institutions (the size of the bureaucracy, the extent of red tape, government corruption), and inequality and social conflicts,[13] .

Institutions affect the efficiency of an economy much in the same way as technology does: an economy with bad institutions is more inefficient, in the sense that it takes more inputs to produce the same amount of output. In addition, bad institutions lower incentives to invest (in physical and human capital as well as technology) and to work and produce. Despite their similar effects on the economy, however, the promotion or introduction of good institutions differs substantially from the promotion of new technologies. In fact, it is hard to develop new and better technologies in an economy that does not have the right institutions.

Although the new economic growth literature has quantified the importance of having the right institutions, it is still in the early stages when it comes to understanding how to promote them in practice. For example, the empirical level-of-income literature mentioned above demonstrates that the institutions left behind in liberated colonies directly affect the level of income enjoyed by the country one half century later: colonies in which the colonizers introduced institutions that helped them live a better life in the colony tend to have more income today than colonies in which the colonizers introduced predatory institutions. This seems to be a robust empirical phenomenon. The lessons for the future are not clear, however. Is it possible to undo the harm done by the colonial predators? If so, what sort of actions would be effective, and how should they be implemented? Although these important questions are currently being addressed in the literature, the answers are still unclear.

Indeed, the process of incorporating institutions into growth theories is itself still in the early stages. Empirically, however, it is becoming increasingly clear that institutions are an important determinant of growth.[14]

13. The relation between inequality and growth has been widely studied. See Aghion, Caroli, and Garcia-Peñalosa (1999); Barro (1999a); Perotti (1996).

14. Excellent examples include the recent of work of Hall and Jones (1999); Acemoglu, Johnson, and Robinson (2000); McArthur and Sachs (2001).

5. Conclusions

The recent economic growth literature has produced a number of important insights at both the theoretical and empirical levels. This paper has analyzed some of the most salient. Although this might seem as pessimistic, let me close with a confession of ignorance. Economists have learned a lot about growth in the last few years, but we still do not seem to understand why Africa turned out to have such a dismal growth performance. The welfare of an entire continent—with close to 700 million citizens—has deteriorated dramatically since independence, and the main reason is that the countries in which these people live have failed to grow. Understanding the underlying reasons for this gargantuan failure is the most important question the economics profession faces as we enter the new century.

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