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Why has the Philippines remained a poor country?: some perspectives from growth economics

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Why has the living standard of the Philippines relative to that of the United States not risen unlike its Asian neighbors? Applying a simple neoclassical model and some empirical methods of analysis employed in growth economics on data on national income accounts and the workforce from the Penn World Table (version 6.1) and years of schooling from Barro and Lee [2000], this paper submits three interconnected answers: The country has been stuck in a low-growth trajectory. It is headed for a low steady-state level of output per worker, which explains its slow pace of long-term growth. Most significantly, its total-factor productivity, at 20.9 percent of that of the United States, is horrendously low, which explains its low convergence point. Improving its total-factor productivity is thus the key to solving the country's low living standard.

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1. Introduction

At the turn of the 19th century, Las Islas Filipinas appeared bright with promise as a nation-in-waiting, a nation aborning. True, the 1896 revolution against Spain had not been a sterling campaign: At the Tejeros convention, members of the Magdaló faction of the Katipunan had conspired against the

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The appendix tables reporting data on all countries are available in the UPSE Discussion paper with the same title. UPSE DP2007-01 may be downloaded from www.econ.upd.edu.ph.

well-meaning and perhaps naive Andres Bonifacio to get Gen. Emilio Aguinaldo elected president of the revolutionary government; to add insult to injury, the Supremo's fitness to be secretary of the Interior had been questioned due to his lack of education; and he and his brother had subsequently been arrested and executed for treason and sedition on orders of the General. For his part, Aguinaldo had proved to be a leader who valued loyalty more than competence, which demoralized his officer corps and caused indiscipline among the ranks. In the meantime, the Spanish forces, reinforced by matériel and personnel from the home country, had rallied to drive the Filipino militia out of Cavite. And so the revolution had ended in an uneasy peace with the signing of the Pact of Biyak-na-Bato. Still, the two-decade long propaganda movement (1872-1892), which had been ignited by the martyrdom of the Filipino priests—Mariano Gomez, Jose Burgos, and Jacinto Zamora—and had reached its zenith with the publication of the two novels of Jose Rizal, had, in due course, given birth to a Filipino identity and consciousness that, by 1898, aspired for nothing less than national independence. Thus, throughout the first half of the 20th century—through the American colonial period and the Japanese occupation—and earlier than many other colonies, the archipelago had been inspired, occupied, and sustained by the singular idea of nationhood.

In stark contrast, the Philippines that was delivered into the 21st century had a darker hue, a more somber outlook—sullied by episodes of crises of the last 50 years: the import and foreign exchange controls starting in the 1950s had induced rent-seeking and spurred uncompetitive import-substituting industrialization among oligarchic families through the 1960s; the Martial Law period of the 1970s had rent the moral fabric of the nation; the politically tumultuous and unstable years of the 1980s had been sporadically pockmarked by failed coup attempts; the severe shortage of electric power-generating capacity of the early 1990s and the Asian financial crisis of the late 1990s had caused painful dislocations and economic downturns; and the politically and socially divisive impeachment campaigns against Presidents Joseph Estrada and Gloria Macapagal-Arroyo in the first years of the 2000s still cast long and interweaving shadows on the affairs of the nation at this writing.

The soul-searching, plaintive question, then, that Pinoy-philes have been asking is: Why has this happened to a nation so full of promise, to a people who believed themselves to be so particularly blessed? In a search for answers, this paper, instead of delving into economic history, takes an altogether different tack. It sets out to obtain a fresh look at the Philippine economy by adopting the comparative approach and long-term lens of the relatively new discipline of growth economics, using its models and tools of analysis. In addition, it interprets the data in the light of recent perspectives of modern development economics.

Arguably, this new approach confers some advantages that complement traditional historical treatments and the more customary short- and medium-term economic analyses. First, the comparative perspective of growth economics affords learning from the experiences of other countries. Second, applying the parsimony of Occam's razor, the long-term focus of growth economics concentrates the analysis on the time-persistent factors. Third, the interpretation of results is informed by a more enlightened and sober understanding of the development process. According to this new perspective, development is not by any means an inevitable process but only a possibility: as a country may grow, it may just as likely stagnate. Moreover, development is understood not so much as a process of factor accumulation (i.e., of amassing more capital), but of organizational change that enables a country to solve coordination problems that hamper efficiency and equity. And the Washington Consensus notwithstanding, it is readily acknowledged that there are no surefire formulas for success: some policies may work for some countries, others may work for some time periods, but no set of policies work for all countries or over all time periods. In lieu of the emphasis on policies (e.g., macroeconomic management), social institutions (as circumscribed by culture and history as well as geographic, climatic, and environmental conditions) are considered the deep determinants of economic growth and development.

Accordingly, the rest of the essay is organized as follows: in the next section, the choice of the (operational) variable(s) of interest is explained at some length. Section 3 then presents two snapshots of the distribution of country living standards—in 1960 and 2000—to set the backdrop of the analysis in terms of world developments. Engaging the paper's main question, the fourth section addresses why the Philippines has remained relatively poor going into the 21st century. It submits three interconnected answers: first, the country has been stuck in a low-growth trajectory; second, it is headed for a low steady-state level of output per worker, which also explains its slow pace of long-term growth; and third, its total-factor productivity (i.e., the efficiency with which inputs are combined to produce output) is horrendously low. In the fifth section, the deeper question—why the Philippines has the wrong attributes for long-term growth—is explored. The hypothesis is provided: poor social infrastructure stemming from Filipino culture and history. The sixth and final section reflects briefly on whether there is still hope for the future, given the chains of history and our flaws as a people.

2. The variable(s) of interest

Following many studies in growth economics (e.g., Hall and Jones [1996, 1997, 1999]; Jones [1997, 2002]; Klenow and Rodríguez-Clare [1997]), this paper uses as its variable of interest either the level or the growth rate of the relative living standard, measured as the ratio of a country's gross domestic product (GDP) per worker relative to that of the United States—a choice that bears some explanation.

GDP per worker, rather than the more standard per capita GDP, is taken as the indicator of average (national) welfare to address a downward bias against developing countries inherent in the latter variable. The argument, advanced in Jones [1997], is that since nonmarket production, which is usually of considerable size in developing countries, is not included in the measurement of GDP, using the working-age rather than the entire population as the denominator of the welfare measure roughly corrects for the undervaluation of aggregate output in poor economies.

For analytical convenience, the paper's focus is on relative rather than absolute living standards, so that the GDP per worker of each country is expressed as a fraction of the GDP per worker of a reference country. This is to set the analysis in the context of what is referred to in the literature as the (conditional) convergence hypothesis. First proposed by Gerschenkron [1952] and Abramovitz [1986], the (conditional) convergence hypothesis maintains that (under certain conditions—in particular, that economies tend to the same steady-state rate of growth) there is catch-up growth, i.e., "backward" countries grow faster than their wealthier counterparts, which enables them to close the gap in living standards. As formulated in growth models, the phenomenon can be broken down into a growth process and the terminal point to which growth tends: (a) the principle of transition dynamics, which states that an economy's growth rate is faster, the farther below it is from its steady-state level (of GDP per worker); and (b) the steady-state level toward which a country's output per worker is converging—in particular whether or not it is the high living standard of the developed countries (at which both output and the workforce are growing at the rate of the technological progress).

Fortuitously, using the relative living standard indicator also has the benefit of scaling down the range of values of the variable to be more or less in the unit interval, as long as the reference country is persistently among the wealthiest in the distribution. The magnitudes are then easily interpreted as percentages of the reference country living standard.

The United States is used as the reference country for three reasons. First, the growth rate of the United States has been stable since the 1870s, which suggests that the United States is close to its steady-state growth rate. Second, the United States has been consistently among the richest countries in the world. Indeed, it has ranked as the third-wealthiest country, if not higher, since 1960. Third, the United States is arguably very near, if not actually on, the technological frontier. As pointed out in Jones [1997, 2000], these three reasons imply that using the United States as the reference country does not distort the world distribution of relative living standards and its evolution.

3. The world distribution of relative living standards, 1960 and 2000

Figure 1 presents the kernel densities[1] of relative living standards in 1960 and 2000, using GDP per worker data from the Penn World Table (version 6.1) of Heston, Summers, and Aten [2002].[2] Three features of the graphs deserve comment. First, the density functions of both years are widely dispersed, with the range of values spanning almost the entire length of the unit interval. This implies that the huge gap in living standards between rich and poor countries persists even after 40 years. Second, the densities are skewed to the right, which means that in 1960 as in 2000 there were proportionately more poor than rich countries. Third, the density for 2000 has a lower peak on the left and a small hump on the right. This indicates that the proportion of poor countries has declined in 2000, and that some countries that were poor in 1960 have gradually approached the US living standard.

This last point is an encouraging development. A problem with Figure 1, however, is that the successes (and failures) in growth performance between 1960 and 2000 cannot be easily and systematically identified. Addressing this issue, Figure 2 plots the countries' 2000 relative living standards against their 1960 values. Countries represented on points above (below) the 45-degree line can then be identified as winners (losers), having improved on (deteriorated from) their 1960 rankings.

Unfortunately for the Philippines, its point on the scatter diagram falls just below the 45-degree line, suggesting that it is one of the underperforming countries, because its GDP per worker did not grow as fast as the technological frontier (as represented by the growth rate of the US GDP per worker).

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[1] A kernel density is a smoothed histogram in the sense that the class range, which is represented by the width of a bar, has been narrowed to a point. The relative frequency of each point (in the range of the continuous random variable) is estimated by running a kernel function (of a given window- or bandwidth) through the entire range, such that a higher weight is assigned to a particular observation in the sample, the closer its value is to the point whose relative frequency is being estimated.

[2] This means that GDP is expressed in 1996 US dollars using purchasing power parity exchange rates, which has the effect of raising the value of developing country outputs, since prices for nontradable goods and services tend to be lower in poor countries.

Figure 1. World distribution of relative living standards, 1960 and 2000

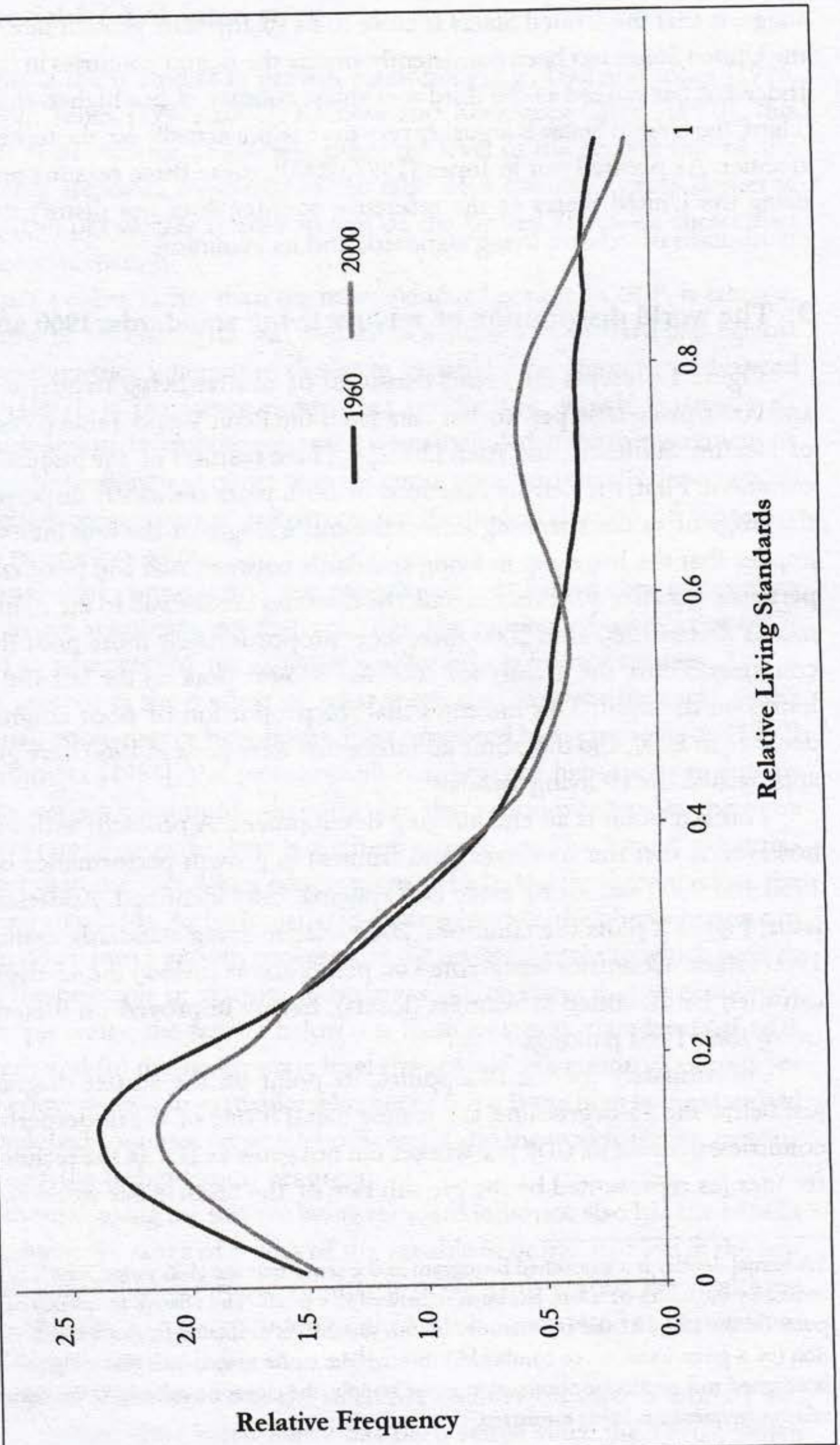
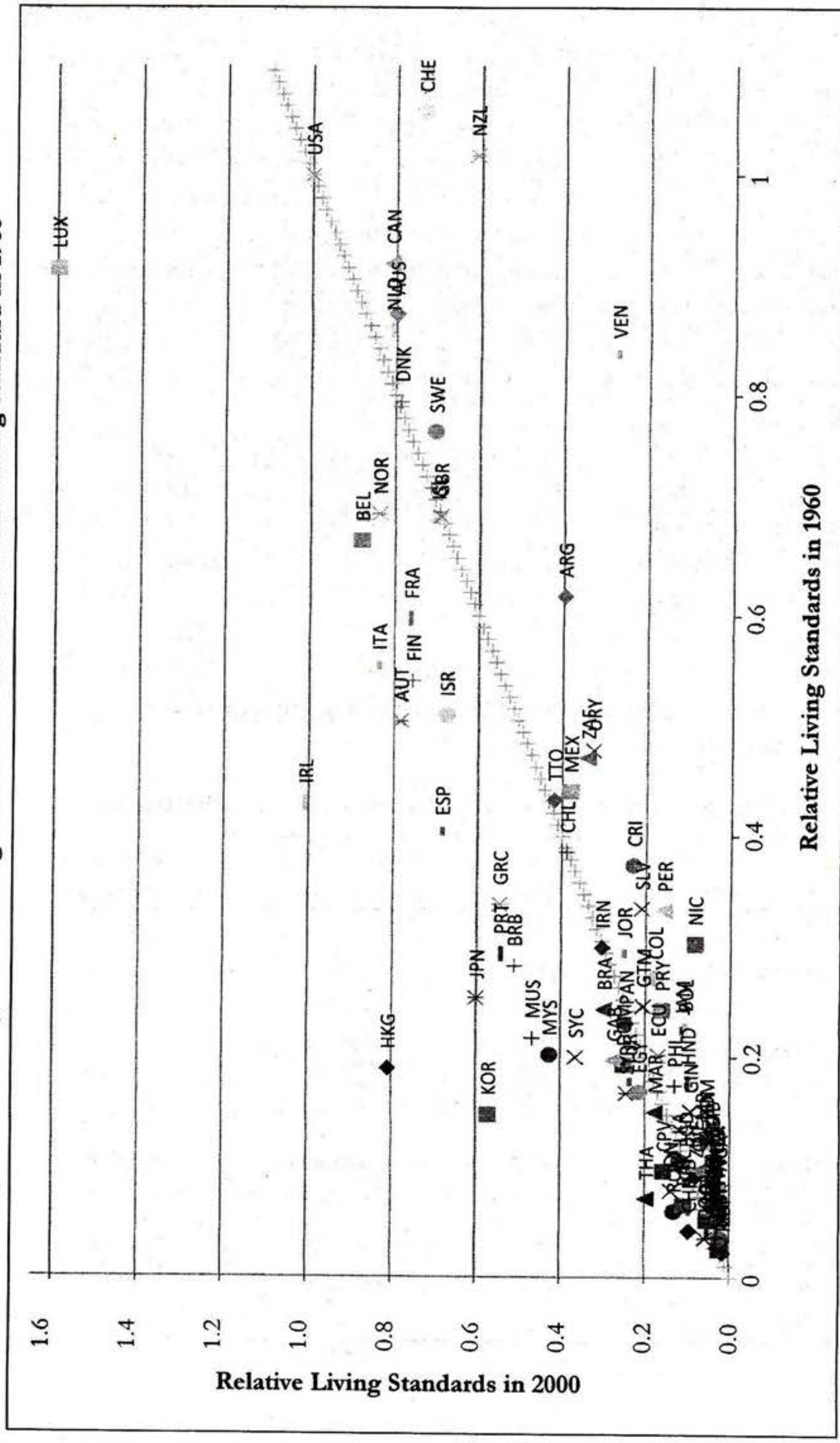


Figure 2. Country relative living standard in 2000 vs. its relative living standard in 1960



Drawing from the analysis of Pritchett [1997], an inference that Jones [2002:73] makes about the evolving world distribution of relative living standards is that countries whose relative living standards exceed 0.10 (i.e., they are not in the bottom 30 percent of the distribution in 1997) will converge to a high living standard in the far future, whereas countries with relative living standards below 0.10 are more likely to see their GDPs headed toward low-level steady states—a convergence-club phenomenon that Quah [1996] describes as "twin peakedness". If true, the implications for the Philippines are serious, since it is almost at the border of the two sets of countries. If it gets its act together, it may yet join the high performers; if not, it will plod on as a relatively poor country far into the future (its performance between 1960 and 2000 being suggestive).

An important point that may be drawn from Figures 1 and 2, which has already been mentioned, is that economic growth is not an inexorable process. Over time, a country's relative living standard may improve or worsen. Table 1 provides examples of growth miracles and growth disasters in the period 1960-2000. Some of the growth miracles are countries in East and Southeast Asia, such as Hong Kong, South Korea, Malaysia, and Thailand. Amazingly, Hong Kong's living standard went from 18.9 percent of the US living standard in 1960 to 80.9 percent in 2000, and South Korea's improved from 14.8 percent to 57.1 percent.

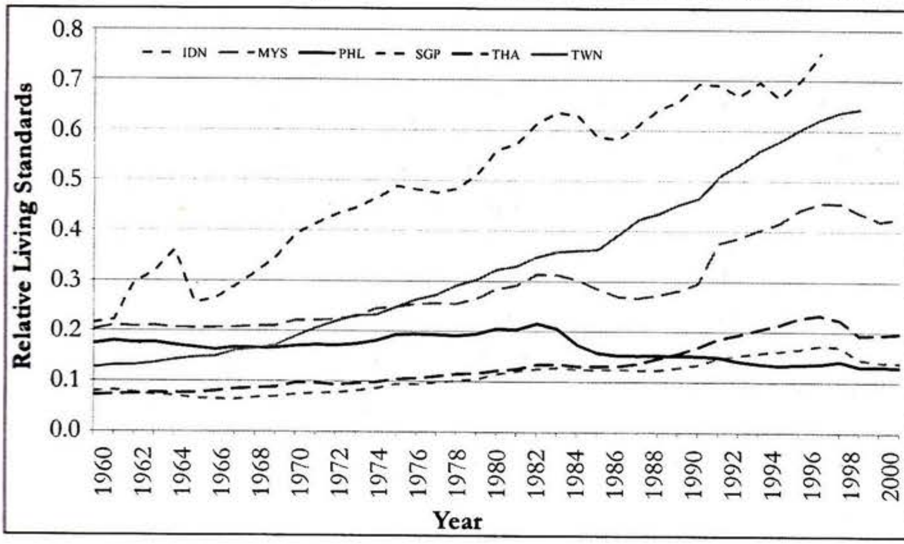
Table 1. Some growth miracles and some growth disasters

Country	*Code*	*Relative Living Standard 1960*	*Relative Living Standard 2000*
Growth Miracles			
Hong Kong	HKG	0.18933	0.80846
Korea, Republic of	KOR	0.14753	0.57099
Thailand	THA	0.07193	0.19681
Malaysia	MYS	0.20239	0.42622
Growth Disasters			
Niger	NER	0.09088	0.02825
Venezuela	VEN	0.83462	0.27510
Zambia	ZMB	0.10983	0.04045
Argentina	ARG	0.61815	0.39776
Philippines	PHL	0.17432	0.12976

As impressive as the feats of the growth miracles were, however, just as tragic were the meltdowns of the growth disasters. A case in point is Venezuela. One of the richest countries in the world in 1960 with 83.5 percent of the US living standard, Venezuela's living standard by 2000 had declined to only 27.5 percent of that of the United States. Another is Zambia, whose living standard worsened from 11.0 percent of the US living standard in 1960 to 4.1 percent in 2000.

In the case of the Philippines, the living standard declined from 17.4 percent of the US level in 1960 to 13.0 percent in 2000, making the country a minor growth failure, particularly when viewed in the wake of its high-performing neighbors. This point stands out in greater relief when the relative living standards of the ASEAN-5 (Indonesia, Malaysia, Philippines, Singapore, and Thailand) and Taiwan are tracked between 1960 and 2000 (Figure 3). In 1960 the Philippines ranked a close third, after Singapore and Malaysia, but by 2000 was dead last—with the 2000 relative living standard even lower than its 1960 level, the country having failed to grow faster than the technological frontier. Even more telling is the indication that the decline started in the early 1980s and has not been reversed ever since, through successive terms of democratically elected administrations.

Figure 3. Relative living standards of ASEAN-5 and Taiwan, 1960-2000



A possible reason for this deterioration over the last 15 years or so may be inferred from Easterly [2002].[3] What Sah [2005] calls "diffused and demographically widespread corruption" may have become more prevalent in the post-Marcos era, as the dismantling of the dictatorship's monopoly on extortion may have given way to a tragedy-of-the-commons outcome. As pointed out in Ong [2003], the difference in corruption during and after Marcos's time was that, from being the purview of a favored few—viz., the relatives and cronies of the First Family—it became a side activity that any minor government functionary could engage in. If this was indeed the case, the deadweight losses of corruption might have increased manyfold after the mid-1980s, which in turn might be a primary cause of the poor long-term growth performance of the Philippine economy since then.

4. Why has the Philippines remained relatively poor?

The corruption hypothesis notwithstanding, it remains to be asked why the Philippines has not made significant strides in improving its relative living standard, unlike its high-flying neighbors.[4] This section draws from stylized facts, analytical models, and empirical methods of growth economics to formulate some answers.

4.1. Living standards and growth rates

An important stylized fact in growth economics is that tremendous improvements in living standards can be achieved by persistent growth over long periods of time. In Table 2, which shows the 1960 and 2000 relative living standards of some countries as well as the implied average annual growth rates over 40 years, this power of continuous compounding is illustrated by the tale of two countries, Hong Kong and South Korea. In 1960, the difference in relative living standards between the two was 4.1 percentage points (18.9 percent for Hong Kong versus 14.8 percent for South Korea). But growing at 3.6 percent per year above the US GDP per worker growth rate versus South Korea's 3.4 percent—a difference of a mere 0.2 percentage points—Hong Kong by 2000 had achieved a living standard that was 80.9 percent of that of the United States and 23.8 percentage points above South Korea's 57.1 percent.

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[3] Suggestively, Easterly [2002] begins his chapter on corruption with the following quote from Mark Twain: "There is no native criminal class in America, except for Congress."

[4] After all, both Hong Kong and Singapore had notorious histories of corruption as well, but managed to overcome them with strong political will, dogged determination, and able and credible leadership.

Table 2. Relative living standards, 1960 and 2000, and average annual growth rates of selected countries

Country	*Code*	*Relative Living Standard 1960*	*Relative Living Standard 2000*	*Average Annual Growth Rate*
Hong Kong	HKG	0.18933	0.80846	3.63
Korea, Republic of	KOR	0.14753	0.57099	3.38
Thailand	THA	0.07193	0.19681	2.52
Malaysia	MYS	0.20239	0.42622	1.86
Philippines	PHL	0.17432	0.12976	-0.74

This tale notwithstanding, South Korea's performance glows in comparison to the Philippines'. Between 1960 and 2000, the Philippines grew at 0.7 percentage points below the growth rate of the technological frontier. No wonder then that its 2000 living standard, at 13.0 percent of that of the United States, was even lower than in 1960 (17.4 percent).

Thus, one answer to why the Philippines remained poor between 1960 and 2000 is that the country was stuck in a low-growth trajectory.

4.2. *The growth trajectory, transition dynamics, and the neoclassical growth model*

But this further asks the question: Why was the Philippines stuck in a low-growth trajectory? One way to tackle this issue is to draw on the predictions of the neoclassical growth models.

4.2.1. *A simple neoclassical growth model*

Following Hall and Jones [1996 and 1999] and Jones [2002], a simple version (classified in Barro and Sala-i-Martin [2004] as a neoclassical growth model with an exogenous saving rate) may be briefly described as follows. Consider a country with the following labor-augmenting Cobb-Douglas production function,

$$Y = K^{\alpha} \left(AH \right)^{1-\alpha}, \tag{1}$$

where Y is output, K and H are physical and human capital, respectively, A is technology or total-factor productivity, and $0 < \alpha < 1$ is the output share of physical capital.

Let raw labor, L, assumed to be homogeneous within the economy, be transformed into the human-capital-augmented variety by

$$H = L \exp\left[\varphi(S) \right]. \tag{2}$$

Note in (2) that $\exp\left[\varphi(S)\right]$ gives the effective units of human capital of a worker who has had S years of schooling relative to one who has not gone to school (under the assumption that $\varphi(0)=0$) and that $\varphi'(S)$ is the return to schooling in a Mincerian wage equation.

Let technology and (raw) labor grow exponentially at exogenous rates, g and n, respectively, and let the physical capital accumulation equation be given by

$$\dot{K} = s_K Y - \delta K, \tag{3}$$

where $\dot{K} \equiv dK/dt$, s_K is the saving rate or the fraction of output set aside for physical capital investments, and δ is the depreciation rate.

Then, it can be shown that the steady-state value of output per worker, $y^*(t) \equiv Y^*(t)/L^*(t)$, is given by

$$y^*(t) = \left(\frac{s_K}{n+g+\delta}\right)^{\alpha/1-\alpha} hA(t), \tag{4}$$

where $h \equiv H/L = \exp\left[\varphi(S)\right]$. Thus, the steady-state value of output per worker (or a country's living standard) is higher, the higher are the saving rate, s_K, the effective units of human capital per worker, h, and the level of technology or total-factor productivity, A, and the lower is the population growth rate, n.

In addition, the growth rate of output per worker while the economy is moving toward its steady-state level can be derived as

$$\frac{\dot{y}(t)}{y(t)} = \alpha\left[s_K \tilde{k}(t)^{\alpha-1} - (n+\delta)\right] + (1-\alpha)g, \tag{5}$$

where $\tilde{k}(t) \equiv K(t)/\left[L(t)A(t)h(t)\right]$. The graph of (5) can be used to illustrate the principle of transition dynamics that an economy's growth rate is positively related to its distance to its steady state, i.e., the farther output per worker is from its steady-state level, the faster the economy will grow.

4.2.2. Data sources, results and simulations, and implications for the Philippines

Drawing national income accounts and population data from the Penn World Table (version 6.1) and educational attainment data from Barro and Lee [2000], Table 3 reports, for selected countries, some of the variable-determinants of $y^*(t)$ in (4). These include two alternative measures of real national saving rates over 1960-2000, s_{K1} and s_{K2}, worker population growth rates between 1960 and 2000, n, and the average years of schooling of the population 25 years and older in 1999, S. The saving measures are averages over all years between 1960 and 2000 for which annual values are available. Their tth-period components are defined as $s_{K1t} \equiv 100-(\theta_{Ct}+\theta_{Gt})$, where θ_C and θ_G are the real GDP shares of private and government consumption expenditures, respectively, and $s_{K2t} \equiv \theta_{It}$, where θ_I is the share of investment in real GDP.[5]

Table 3. Average real national saving rates, average real investment rates, population growth rates, average years of schooling of adult population, and relative steady states of living standards

Country	*Code*	s_{K1}	s_{K2}	n	S	y^*/y^*_{US}
Hong Kong	HKG	29.335	25.835	1.864	9.470	96.340
Korea, Republic of	KOR	26.831	27.341	2.205	10.460	104.225
Malaysia	MYS	26.821	20.133	2.733	7.880	72.886
Thailand	THA	24.666	29.436	2.276	6.100	75.252
Argentina	ARG	18.153	17.571	1.682	8.490	75.024
Venezuela	VEN	39.687	16.217	3.284	5.610	50.725
Niger	NER	2.903	6.992	2.672	0.820	19.010
Zambia	ZMB	-20.035	18.658	2.768	5.430	54.695
Philippines	PHL	11.743	14.663	2.698	7.620	60.687

From the table, it may be gleaned that the Philippines has a very low saving rate (by either measure—11.7 percent and 14.7 percent) relative to its living standard. In other words, the country allocates only a small fraction of current output for factor accumulation. Moreover, the table shows that the Philippines has a relatively high working-age population growth rate (2.7 percent) compared to other countries in Southeast Asia, with the exception of Malaysia, which is coming from a low base and whose population policy is to encourage immigration.[6]

As for the years of schooling of the adult population, the table suggests that educational attainment of the Filipino workforce (7.6 years) compares favorably with that of the Thais (6.1 years). The problem, however, may be in the training of the younger workers. The anecdotal evidence is that the quality of education in the Philippines has been declining due to lack of resources. Sadly, the Philippines has never allocated 3 percent or more of GDP for the budget of the Department of Education. In contrast, its neighbors have never allocated 3 percent or less of GDP for the basic education budget.[7] Moreover,

[5] In other words, s_{K2t} is nothing more than the investment rate.

[6] I am grateful to Prof. Ernesto Pernia of the UP School of Economics for this observation.

[7] While the Philippines has a relatively larger private school sector than its neighbors, basic education is still predominantly publicly provided. And the point remains that publicly provided basic education is severely underfunded in the Philippines.

mathematics and science have never been the strong suits of the basic education curriculum in the Philippines.[8] And mathematics, science, and engineering are not very popular programs at the tertiary level.[9]

Thus the implications for the Philippines of the simple growth model are doubly tragic. They suggest that (a) the Philippines has been on a low-growth trajectory apparently because it is near its steady-state level of output per worker and (b) the country is near its steady-state level because it is headed toward a low-level steady state that is far below the convergence point of the advanced economies—all because the country has not allocated much of current output for saving and investments and its population has been growing more rapidly than can be given high quality training by its education system and can be productively absorbed by its economy.

To provide some order of magnitude to these qualitative predictions, the last column of Table 3 presents estimates of the relative steady-state living standards to which the countries are headed over the very long run, given their records in the last 40 years of the 20th century. Specifically, for each country i, the relative steady-state living standard is calculated as

$$\frac{y_i^*}{y_{US}^*} = \left(\frac{\hat{s}_{K2_i}}{\hat{x}_i}\right)^{\alpha/1-\alpha} \hat{A}_i \hat{h}_i, \tag{6}$$

where $x_i \equiv n_i + g_i + \delta_i$ and a "hat" ($\hat{}$) over a variable denotes that it is a ratio with respect to the corresponding variable for the United States. Following

[8] Indeed, the Monroe Survey [1925] found that Filipino students had no aptitude for science at all and that they had good arithmetic (i.e., computational) but not analytical (i.e., math problem solving) skills. The deficiency in the former was attributed to the poor science curriculum prescribed by the Department of Education at that time, and in the latter to poor reading comprehension in English.

[9] Growth models that endogenize technological innovation (e.g., Romer [1990]) as the engine of growth contain the implication that the nearer an economy is to the technological frontier, the more important university degrees in mathematics, science, and engineering matter, because then growth depends on new ideas, inventions, and innovations. (Increasingly, this is the case that applies to Singapore, South Korea, and Taiwan.) On the other hand, growth models that explore technology transfer for developing economies (e.g., Easterly et al. [1994]) suggest that the farther away an economy is from the technological frontier, the more basic education in mathematics and science matters, because then growth depends on the ability of the workforce to understand and work with the technology being transferred. Thus, for the Philippines, the goal of the education sector ought to be to produce large numbers of high school graduates who are math- and science-savvy rather than fluent in English per se. And the choice of media of instruction (or the entire schooling experience for that matter) ought to be driven by considerations of what languages and dialects (or learning methods, curriculum content, progression procedures, etc.) are best able to enhance proficiency in science and math.

Hall and Jones [1999], $\ln h_i \equiv \varphi(S_i)$ is specified to be piecewise linear, as suggested by the Psacharopoulos's [1994] survey of returns to schooling, with the following rates of return: 13.4 percent for the first four years of schooling (which corresponds to the average returns for sub-Saharan Africa), 10.1 percent for the next four years of schooling (which is the average for the world as a whole), and 6.8 percent for schooling in excess of eight years (which corresponds to the rate of return for OECD [Organisation for Economic Co-operation and Development] countries). For all countries *i*, it is assumed that $g_i = 0.02, \delta_i = 0.06, A_i = 1$.[10]

Looking at Table 3, Filipinos can heave a huge sigh of relief. It turns out that their country is not headed toward the steady-state relative incomes of the poorest nations, such as Niger (19.0 percent), for example. The bad news, however, is that (even assuming that the country's productivity or level of technology were equal to that of the United States) the terminal point of the Philippine economy is merely 60.7 percent of the US steady-state living standard, which is significantly lower than those of Malaysia (72.9 percent) and Thailand (75.3 percent), and is closer to Zambia's (54.7 percent).

What are the implications of y_i^* / y_{US}^* on the growth rates of relative living standards over time? Recall that (5) may be used to address this issue, if estimates of country capital stocks can be generated. To do so, this paper follows the perpetual inventory method of Hall and Jones [1999]. Specifically, the capital stock estimate in year *t* is derived as $K_t = I_{t-1} + (1-\delta)K_{t-1}$, where *I* is the value of investments. The initial value of the capital stock, say, for a country for which 1960 is the first year in which investment data are available is estimated by setting $K_{1960} = I_{1960}/(g+\delta)$, where $g = \ln(I_{1970}/I_{1960})/10$ is the average geometric growth rate of the investment series over its first ten years. Since this initial value estimate is likely to be wrong, a long series is required for its effect to be washed out. For this reason, the sample of countries is restricted to those with investment data from at least 1980. But the series of some go as far back as 1950. Whatever is the case, all the available data are utilized in constructing the capital stock series.

For reasonable growth rates to be obtained from (5), however, the values of the (explanatory) variables, which come from a variety of data sources, have

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[10] The 2 percent growth rate of technology is based on the very long-run growth rate of US output per capita, and the 6 percent depreciation rate is adopted from Hall and Jones [1999]. The assumption that there are no technological or productivity differences between countries turns the exercise into a counterfactual simulation on the question, How large are country differences in relative steady-state outputs per worker if they are allowed to be different only in saving rates, (worker) population growth rates, and effective units of human capital? In particular, the no-technological-difference assumption has the effect of pushing out the relative steady-state living standards of countries roughly to the edge of the technological frontier (where the US economy presumably is).

to be calibrated. The following adjustments were made. First, to implement the assumption that the US economy is very close to, if not actually on, its steady-state level of output per worker, estimates of the countries' initial capital stocks per worker were multiplied by 8.9, as doing so meant that

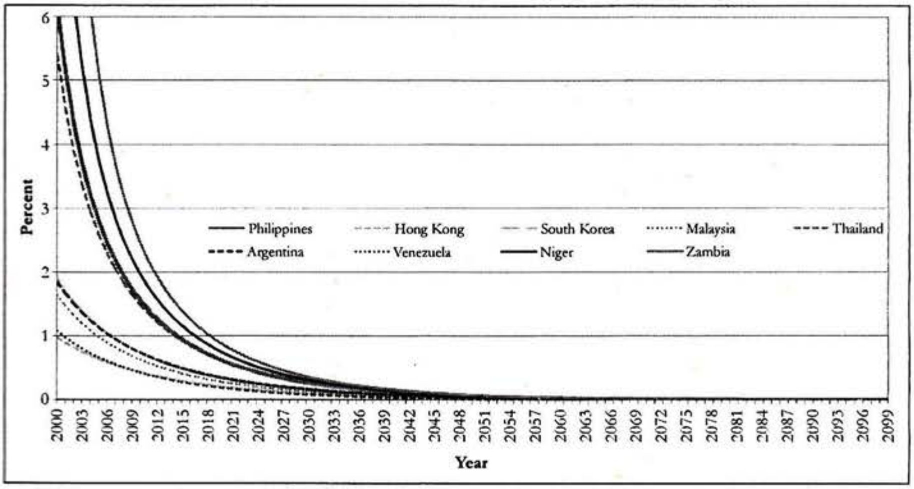
$$\frac{\dot{\tilde{k}}_{US}(2000)}{\tilde{k}_{US}(2000)} = s_{KUS}\tilde{k}_{US}(2000)^{\alpha-1} - (n_{US} + g + \delta) = 0.0006 \simeq 0,$$

under conditions adopted earlier that $g = 0.02$ and $\delta = 0.06$. Second, to maintain the assumption in this subsection that there are no productivity differences between countries, the value of $A_i(2000)$ in $\tilde{y}_i(2000) \equiv y_i(2000)/[A_i(2000)h_i(2000)]$ and $\tilde{k}_i(2000) \equiv k_i(2000)/[A_i(2000)h_i(2000)]$ was set equal to $A_{US} = \{y_{US}(2000)/[h_{US}(2000)]^{1/3}\}^{3/2} = 13{,}620.963$ (in US dollars at 1996 purchasing power parity exchange rates).

Thus, Figure 4 plots, for selected countries, the predicted growth rates of their outputs per worker above those of the United States, $[\dot{y}_i(t)/y_i(t)] - [\dot{y}_{US}(t)/y_{US}(t)]$, from 2000 to 2100 under the assumptions that (a) initial conditions as of 1960-2000 do not change in the next 100 years and (b) there are no country differences in total-factor productivity or levels of technology. Two remarks are warranted on the results. First, the configuration of the growth rates is roughly consistent with the prediction of transition dynamics under the conditional convergence hypothesis. Countries whose living standards in 2000 are more or less equivalent and that are apparently headed for more or less the same steady-state levels of output per worker, such as Niger and Zambia, Argentina and Venezuela, Hong Kong and South Korea, and Malaysia and Thailand,[11] tend to have growth rates that are close to each other. Within each category, however, a country that is headed toward the higher steady-state level is predicted to exhibit higher growth rates, thus Zambia over Niger, Argentina over Venezuela, South Korea over Hong Kong, and Thailand over Malaysia. Second, the configuration of the growth rates reflects the distortive effect of the no-productivity-difference assumption, which is implemented as all countries having the same level of technology or productivity as the United States. The effect of this assumption is to push the steady-state levels of output per worker of the relatively less productive countries farther out than those of their relatively more efficient counterparts. Thus, because South Korea's and Thailand's steady-state targets come out higher than those of Hong Kong and Malaysia, respectively, the former pair are also predicted to have the higher growth rates.

[11] The Philippines somehow defies this easy categorization as it has a lower living standard than Thailand and Malaysia, and is headed toward a lower steady-state level of output per worker.

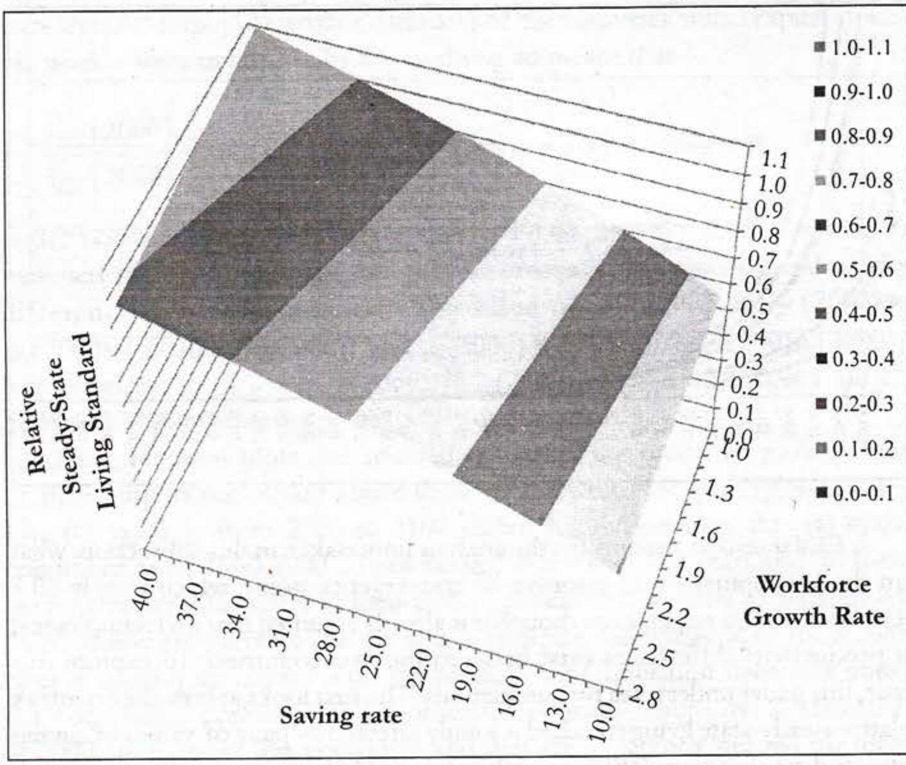
Figure 4. Relative growth rates in transitions to steady-state outputs per worker (Assuming no Productivity Differences)



A final question remains for the analysis undertaken in this subsection: what can the Philippines do to improve its convergence point, which is only 60.7 percent of the US target, even though it is already assumed that no technological or productivity differences exist between the two countries? To explore this issue, this paper undertakes two simulations. The first looks at how the country's relative steady-state living standard is jointly affected by pairs of values of saving rates and worker population growth rates, holding years of schooling fixed. The second examines how the country's relative steady-state living standard responds to different value combinations of worker population growth rates and years of schooling, keeping constant the saving rate.

Figure 5 presents the results of the first simulation, where the saving rate is set to range from (Bangladesh's and Bolivia's) 10 percent to (Singapore's) 40 percent and the worker population growth rate is specified to be from (Switzerland's and Uruguay's) 1 percent to (the Republic of Congo's and the Gambia's) 3 percent. The graph shows that if the Philippine investment rate were to improve by a mere 5 percentage points and its worker population growth rate to decline by 0.8 percentage points (so that s_{KPHL} = 19 percent, which would still be lower than Malaysia's 20.1 percent, and n_{PHL} = 2 percent, which would still be higher than Hong Kong's 1.9 percent), its relative steady-state living standard would jump to 70-80 percent of that of the United States. And were the country's investment rate and worker population growth rate only equal to Thailand's 30 percent and Hong Kong's 1.8 percent, respectively, its economy's convergence point would be more or less that of the United States.

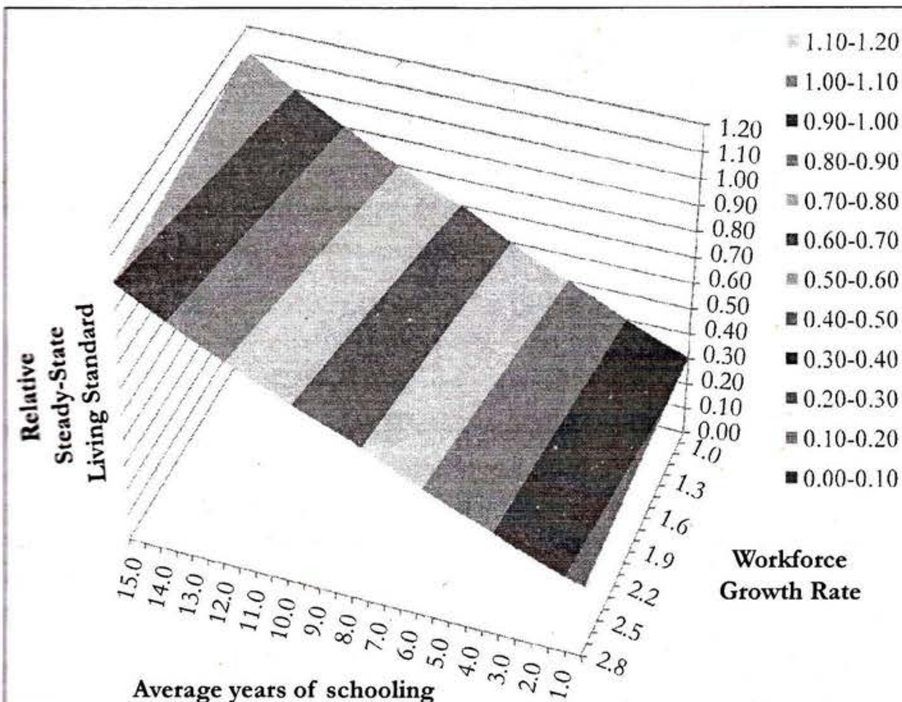
Figure 5. The relative steady-state living standard of the Philippines as affected by the saving rate and the workforce growth rate



As for Figure 6, which exhibits the results of the second simulation, the results suggest that were the educational attainment of the country's adult population to increase to 11-12 years (i.e., the equivalent of a high school graduate in most countries) and its workforce growth rate to decline to 2 percent, the economy's convergence point would be 80-90 percent of the US steady-state living standard.

Obviously, however, these policy targets are easier set than achieved. Moreover, in view of scarce resources, the marginal social benefits of a higher steady-state level of output per worker have to be weighed against the marginal social costs of formulating and implementing policy changes intended to increase the investment rate, decrease the worker population growth rate, and lengthen the years of schooling of the adult population. In these calculations, the time factor cannot be forgotten. Increases in saving rates, to the extent that they are permanent, can have an immediate impact on the steady-state output per worker; alas, not so decelerations in the population growth rate and longer stays in school, which have to wait until birth cohorts reach the working ages to have an effect on the economy's convergence point. But there can also be synergies: Higher saving rates may lead to lower population growth rates to the extent that parents view children as their "security blankets" in their elderly years. Lower population growth rates may, in turn, make it easier to raise years of schooling, since with fewer children and the same amount of education resources, each child can have a bigger slice of the education pie. And as many studies have documented, educated individuals tend to have fewer children and higher saving rates.

Figure 6. The relative steady-state living standard of the Philippines as affected by adult years of schooling and the workforce growth rate



4.3. Level decomposition of the relative living standard

A problem with the predictions and simulation exercises undertaken in the previous subsection is that the results are distorted by the assumption that there are no productivity or technological differences between countries.[12] And as was pointed out, the consequence is that the steady-state outputs per worker of the relatively inefficient or technologically backward countries are pushed out farther than their relatively efficient or technologically advanced counterparts,

[12] A more positive interpretation is that the results of the previous section present what the state of the world would be were all countries as productive or as technologically advanced as the United States.

thus favoring the former set of countries with apparently brighter futures. To address this deficiency, this subsection generates estimates of $\hat{A}_i$ by undertaking the level decomposition of relative living standards of Hall and Jones [1999] for the year 2000. The exercise breaks down the ratio of a country's GDP per worker to that of the United States into the relative contributions of physical and human capital and of total-factor productivity. Estimates of $\hat{A}_i$ can then be used to adjust the predictions and simulations of the previous subsection. To the extent that they are positively correlated with output per worker and given the interpretation that total-factor productivity is a measure of how efficiently an economy is able to combine factor inputs to produce output, the $\hat{A}_i s$, however, may by themselves be taken as yet another factor explaining the countries' growth performance prior to 2000.

4.3.1. *The aggregate production function as the underlying framework of levels accounting*

Assume that the simple growth model of the previous subsection holds for a sample of countries indexed by i. Then the aggregate production function of each may be expressed in terms of output per worker, $y \equiv Y/L$, as

$$y_i = \left(\frac{K_i}{Y_i}\right)^{\alpha/1-\alpha} h_i A_i. \tag{7}$$

The basis of the levels accounting exercise, (7) states that output per worker may be expressed as the product of the contribution of physical capital intensity, $(K/Y)^{\alpha/(1-\alpha)}$, the human capital stock per worker, h, and technology or total-factor productivity, A. Hall and Jones [1999] and Klenow and Rodriguez-Clare [1997] observe that (7) is a better specification than the alternative that expresses y in terms of the capital-labor ratio, because it allows A to get the credit for changes in K and H that are induced by exogenous changes in A.

4.3.2. *Data sources, assumptions on parameter values, variable estimates, results and simulations, and implications for the Philippines*

The data needed to implement the levels accounting exercise are virtually identical to those of the neoclassical growth model and the growth rate simulations. Hence, the variables have the same data sources: the Penn World Table (version 6.1) for the national income accounts and the workforce and Barro and Lee [2000] for schooling. For consistency with earlier sections, the same assumptions on parameter values are adopted, and the same variable estimates are used. Hence, $\ln h_i \equiv \varphi(S_i)$ and estimates of $\varphi(S)$ and the capital stock are unchanged.

Table 4 reports the productivity calculations for selected countries, which decompose output per worker into three multiplicative terms, viz., the contributions of the capital-output ratio, human capital per worker, and total-factor productivity. Again, as in earlier sections the variables are expressed as ratios to US values. From the table it can be gleaned that in 2000 the living standard of the Philippines was only 13.0 percent that of the United States. Two other ways of interpreting this statistic provide a better sense of the income gap between the two countries. It can be said that the living standard of the United States in 2000 was 7.7 times higher than that of the Philippines, or that the average worker in the United States earned in 47.5 days what the average worker in the Philippines earned in a year.

Table 4. Levels accounting: ratios to US values, selected countries

			Contribution from		
Country	Code	Y/L	$(K/Y)^{\alpha/(1-\alpha)}$	h	A
Hong Kong	HKG	0.80846	1.04633	0.82775	0.93344
Korea, Republic of	KOR	0.57099	1.14104	0.88540	0.56519
Malaysia	MYS	0.42622	0.97212	0.73999	0.59251
Thailand	THA	0.19681	1.17433	0.61823	0.27109
Argentina	ARG	0.39776	0.94922	0.77439	0.54112
Venezuela	VEN	0.27510	0.96959	0.58838	0.48223
Niger	NER	0.02825	0.55872	0.32657	0.15481
Zambia	ZMB	0.04045	0.89616	0.57778	0.07813
Philippines	PHL	0.12976	0.85957	0.72081	0.20943

For the Philippines, the contribution of the capital-output ratio to output per worker turns out to be 86.0 percent of that of the United States—a rather high estimate, which derives from the fact that the contribution of the capital-output ratio is its square root: $\alpha/(1-\alpha)=(1/3)/(1-1/3)=1/2$. In other words, even if the difference in capital-output ratios of the two countries may be quite large, the effect on output per worker is attenuated because it is the square root of the explanatory variable, not its magnitude per se, that is the contribution to the living standard.

Similarly, the effectiveness of Filipino human capital—at 72.1 percent of the United States'—may be an overestimate, because the declining quality of education is not reflected in the years of schooling data on which the estimate is based.

In any case, the upshot is that the low standard of living of the Philippines is mainly accounted for by $\hat{A}_{PHL}$ which is estimated to be only 20.9 percent of that of the United States. A simple counterfactual calculation suggests that if the Philippines' total-factor productivity were only equal to that of the United States, the country's living standard in 2000 would have been 62.0 percent of that of the United States (or about the level of South Korea or Japan, and, as may be recalled from the previous subsection, nearly the same proportion as the Philippines' steady-state living standard is relative to that of the United States (60.7 percent)).

That improving the country's total-factor productivity is the key to raising its standard of living (rather than policies on the saving rate, population growth rate, schooling, or physical capital accumulation per se) is supported by the scatter diagram shown in Figure 7, which reveals a strong positive correlation between $\hat{A}_i$ and the relative living standard for countries in the sample. Thus the results of the level decomposition exercise add to the earlier findings. In addition to a low saving rate and a high population growth rate, the Philippines has a dismally low total-factor productivity, which has held back its growth performance.

How do estimates of $\hat{A}_i$ affect the predictions and simulations of the growth model of Section 4.2? Table 5 presents the relative steady-state living standards that are adjusted for total-factor productivity differences. Shockingly for the Philippines, its result suggests that if the country's total-factor productivity does not improve, its economy is headed toward a steady-state level of output per worker that is only 12.7 percent of that of the United States, which is even lower than its relative living standard in 2000.

As for the transition-dynamic growth rates, Figure 8 shows what their time paths would be if the values of country total-factor productivities are adjusted such that $A_i = \hat{A}_i A_{US}$. As may be inferred from the chart, the adjustments reduce the growth rates of all countries, since the $\hat{A}_i s$, are all less than unity. But some countries are adversely affected more than others. The least perturbed, Hong Kong is predicted to exhibit growth rates that are significantly higher than even Zambia's and Niger's; the most afflicted, the Philippines and Venezuela are predicted to find themselves on the negative side of growth because the low levels of their total-factor productivities scale up the values of their capital-technology ratios, $\tilde{k}$, to such an extent that the resources allocated by their economies for capital inputs do not suffice to keep the capital-technology ratio constant, i.e., $s_K \tilde{k}^\alpha < (n + g + \delta)\tilde{k}$.

Figure 7. Relative living standards and relative total factor productivities, 2000

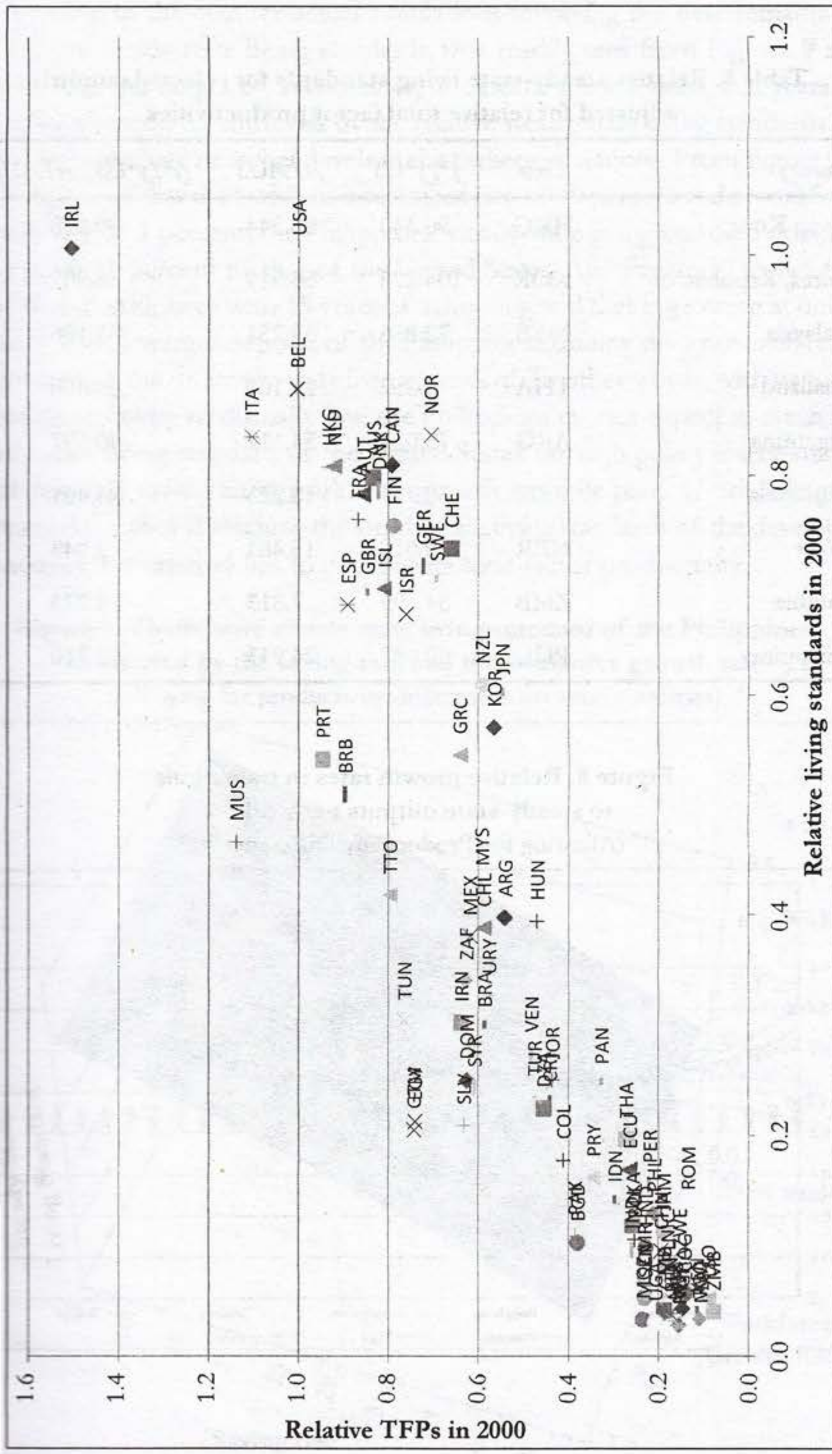
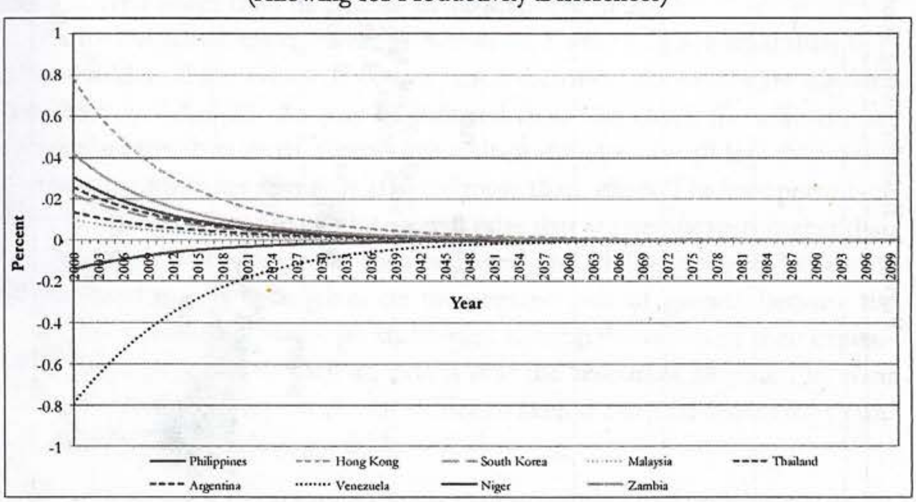


Table 5. Relative steady-state living standards for selected countries adjusted for relative total factor productivities

Country	*Code*	*y*/y*US*	*A/AUS*	*(y*/y*US)(A/AUS)*
Hong Kong	HKG	96.340	93.344	89.928
Korea, Republic of	KOR	104.225	56.519	58.907
Malaysia	MYS	72.886	59.251	43.186
Thailand	THA	75.252	27.109	20.400
Argentina	ARG	75.024	54.112	40.597
Venezuela	VEN	50.725	48.223	24.461
Niger	NER	19.010	15.481	2.943
Zambia	ZMB	54.695	7.813	4.273
Philippines	PHL	60.687	20.943	12.710

Figure 8. Relative growth rates in transitions to steady-state outputs per worker
(Allowing for Productivity Differences)



Turning to the counterfactual simulations involving the determinants of the relative steady-state living standards, one readily sees from Figures 9 and 10 that over the ranges of saving rates, workforce growth rates, and years of schooling considered, the levels of the relative steady-state living standards are no longer anywhere near their levels in the earlier simulations. From Figure 9, it may be gleaned that even with an investment rate of 40 percent and a workforce growth rate of 1 percent, the Philippines' steady-state living standard does not even reach 50 percent of that of the United States. And Figure 10 shows that even with a workforce with 15 years of schooling and that is growing at only 1 percent, the convergence point of the Philippine economy does not even reach 30 percent of the US steady-state living standard. In other words, with its total-factor productivity so dismally low, the Philippines cannot expect to reach the steady-state living standard of the United States through policy interventions involving only saving rates, workforce growth rates, or years of schooling; to have a realistic shot at reaching the steady-state living standards of the developed economies, the country has to improve its total-factor productivity.

Figure 9. The relative steady-state living standard of the Philippines as affected by the saving rate and the workforce growth rate
(Allowing for productivity differences between countries)

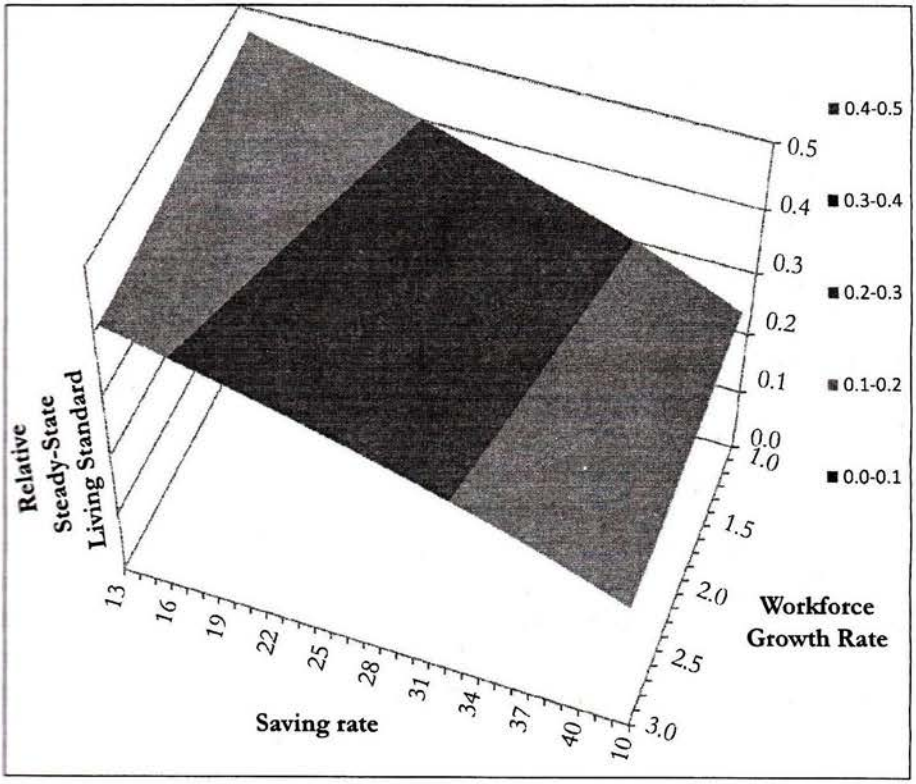
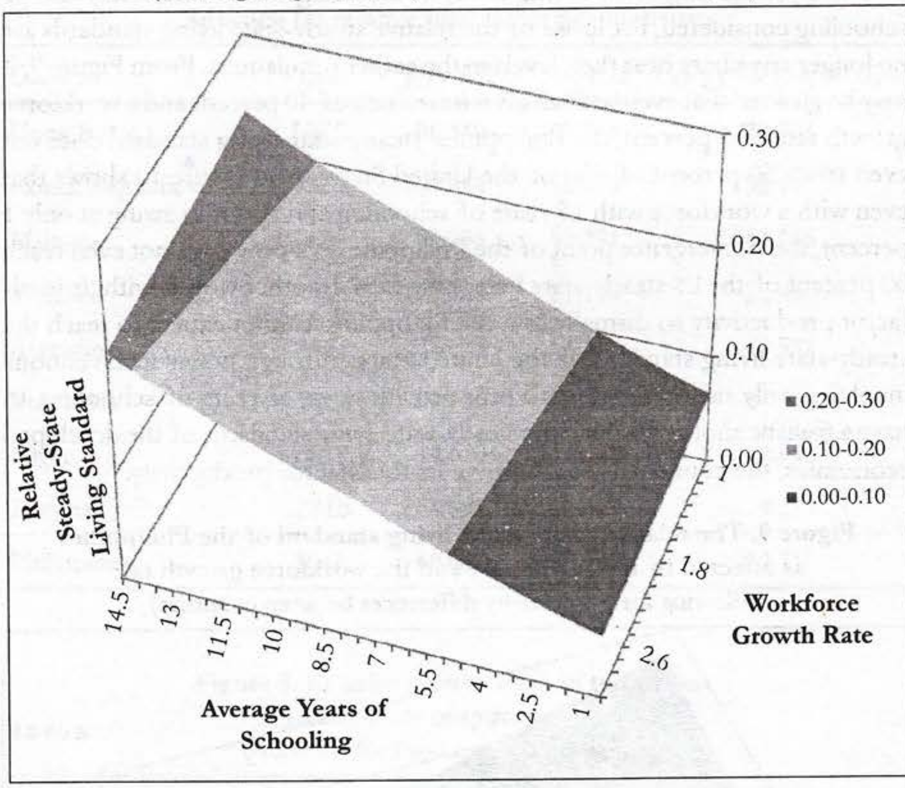


Figure 10. The relative steady-state living standard of the Philippines as affected by adult years of schooling and the workforce growth rate
(allowing for productivity differences between countries)



5. Why does the Philippines have the wrong attributes for long-term growth?

For Hall and Jones [1996, 1997, 1999], the answer to the Philippines' growth conundrum (and its extremely low total factor productivity) lies in what they call social infrastructure, which they define as the set of social norms, laws, and government policies, and the (formal and informal) institutions that enforce them. As Hall and Jones point out, this is because a country's social infrastructure is what sets the economic environment within which its citizens accumulate skills and businesses accumulate capital, both of which are needed to create additional value. Thus, good social infrastructure is the bedrock of an economic environment that is supportive of productive activities, that encourages capital accumulation and skill acquisition, and that promotes inventions and technology transfer, which in turn lead to a high standard of living. In contrast, bad social infrastructure is the smog enshrouding an economic environment that allows resources to be diverted away from productive uses—through thievery, squatting, protection rackets, expropriation or confiscation, and corruption.

The reason why bad social infrastructure is detrimental for the economy is that productive activities are vulnerable to predation. If farmland is fair game for expropriation, for instance, then land grabbing becomes an attractive alternative to farming. Given the incentive structure, some people become land grabbers who do not contribute to producing output. Even more pernicious, because it gives rise to a vicious cycle, the success of land grabbers gives them and others who are similarly inclined added incentive to invest in honing their skills to become even more effective at land grabbing.[13] The poor farmers then have to waste time fending off land grabbers, and devote less time to farming. They also become discouraged and very protective of their narrow self-interests (and less willing to make compromises with other sectors and uninterested in other social and political issues), thus weakening the social cohesiveness of the nation.

In contrast, with good social infrastructure, productive members of the economy are able to reap the full benefits of their investments and their hard work. A virtuous cycle is created as they invest even more to enhance their productivity. Moreover, when social control of diversion is especially effective, private resources do not have to be expended to deal with diversion. There is no longer any need for people to hire security guards or to put up high fences; the threat of punishment—costless to society—is enough to deter diversionary activities, unless the threat is called (for which reason the dare must be vigorously punished to make the threat all the more credible).

The quality of a country's social infrastructure, however, depends in turn on culture and history, as conditioned by geographic, climatic, and environmental factors. In his sweeping review of human history, Diamond [1998] points out that continental differences in these conditions over the last 10,000 years were important determinants of the current configuration of rich and poor countries. The reason is that geographic, climatic, and environmental factors controlled the variety and the density of plant and animal species that were available for domestication, which in turn determined whether a sustained surplus in food production—a necessary element for the development of complex societies—could be achieved. In addition, the same factors circumscribed the early directions and rates of migrations and of technological diffusions. These occurred more in Eurasia along the east-west axis, because the geographic obstacles were easier to surmount and, being on the same latitude, fewer

[13] North [1990] observes that in Victorian England, when piracy became an attractive occupation, pirates honed their skills to become even better at their craft.

adaptive modifications were needed for crop and livestock production as well as for technological applications. The same set of factors even caused the decline of civilizations. A case in point is the Fertile Crescent of ancient times, which had the misfortune of being located in an ecologically fragile territory. Initially covered with forest, the region gradually became a desert as land was cleared for agriculture, timber was harvested for construction, and grassland was overgrazed by goats—in the face of the area's low rainfall. The regrowth of vegetation could not occur fast enough; the powerful kingdoms disappeared.

On the other hand, for countries with a colonial past, the quality of social infrastructure may have been significantly influenced by the motive of the colonizing country. Hall and Jones [1999] point out that in sparsely populated areas with the same climatic conditions as Western Europe (such as the United States, Canada, Australia, New Zealand, and Argentina), settler communities were more likely to be established, into which the (high-quality) social infrastructure of the mother country was transplanted. In contrast, Acemoglu et al. [2002] draw the connection that, where the colonial masters did not settle (because they had high mortality rates) and extractive institutions were established, countries that emerged had weak social infrastructure, as evidenced by poor enforcement of property rights, endemic corruption, state capture by political elites, and highly unstable political processes. In other words, the flawed institutions left historical vestiges that continued to constrain economic performance long after the countries had gained independence. Acemoglu and his coauthors document that, in the post-World War II era, these countries were more likely to have volatile economies and to experience economic crises.

6. Hope for the future

Is there hope for the future? Recall that, from the inference made by Jones [2002] on the very long-run evolution of the world distribution of living standards, the Philippines is just above the demarcation line of countries headed for different futures. If it gets its act together—and this is a big if—the country may yet join the high performers that are tending toward high steady-state levels of output per worker. But to do so, it must exhibit a high growth rate (faster than that of the technological frontier) over a long period of time (as Hong Kong, Singapore, South Korea, and Taiwan have done), by persistently pushing out the steady-state level of output per worker to which it is headed, less by achieving a higher saving rate, a lower population growth rate, and a higher quality workforce, although these will help because of synergistic effects, than by significantly improving its total-factor productivity. Growth and modern development economics tell us, however, that this is not so easily done, because it involves improving the quality of the country's social infrastructure by taking on the vestiges of our history and culture that are growth-constraining, such as flawed leadership that values loyalty more than competence, an entrenched political and business oligarchy that unashamedly promotes and jealously protects its narrow self-interests, and an incentive structure that is nepotistic rather than meritocratic and that rewards thievery and corruption more than honest, hard work. In particular, three absolutely essential and indispensable elements for social transformation are as follows: (a) an effective, efficient, and high-quality education system; (b) a vigilant civil society that demands high accountability from the government; and (c) a competent, corruption-intolerant government administration of firm purpose committed to reform and transformation.

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