ESTUDIOS DE ECONOMÍA APLICADA VOL. 24-1, 2006. PÁGS. 181-220

A decade of debate about the sources of growth in East Asia. How much do we know about why some countries grow faster than others?

FELIPE, JESUS.
Macroeconomics and Finance Research Division. Economics and Research Department
Asian Development Bank. Manila. Philippines
E-mail: jfelipe@adb.org

ABSTRACT

This survey paper has three objectives. First, it reviews what the profession learnt during the last decade about East Asia's growth. The publication of the growth accounting studies for East Asia of Alwyn Young and J-I Kim and Lawrence Lau, and Paul Krugman's popularization of the "zero total factor productivity growth" thesis, led to a very important debate within the profession. The paper demystifies this literature by pointing out some methodological problems. It is argued that the analysis of growth within the framework of the neoclassical model should be abandoned. Second, the paper discusses the more general question of how much do we truly know about why some countries grow faster than others. A review of the empirical literature leads to the conclusion that we known much less than we would like to. Finally, the paper reviews some of the current work that can provide very useful avenues to understand growth.

Keywords: Accounting Identity, Biased Technological Progress, East Asia, Growth Accounting, Institutions, Sources of Growth, Total Factor Productivity

Una década de debate sobre las fuentes del crecimiento en el Este Asiático. ¿Cuánto sabemos sobre por qué unos países crecen más rápido que otros?

RESUMEN

Este artículo de revisión tiene tres objetivos. En primer lugar, hace una revisión sobre lo que la profesión ha aprendido durante la última década sobre crecimiento en Asia. La publicación de los estudios sobre la contabilidad del crecimiento para el este asiático de Alwyn Young, J-I Kim y Lawrence Lau, así como la popularización que Paul Krugman hizo de éllos bajo la tesis "crecimiento cero de la producitvidad total de los factores" desembocó en un debate muy importante dentro de la profesión. El artículo demistifica esta literatura haciendo hincapié en sus problemas metodológicos. El argumento central es que el análisis del crecimiento dentro del esquema neoclásico es muy problemático. En segundo lugar, el artículo evalúa cuánto se sabe realmente sobre por qué unos países crecen más rápido que otros. Una revisión de la literatura empírica lleva a la conclusión de que sabemos bastante menos de lo que nos gustaría. Finalmente, el artículo resume una serie de líneas de trabajo recientes que pueden dar resultados interesantes.

Palabras Clave: Contabilidad del Crecimiento, Este Asiático, Fuentes del Crecimiento, Identidad Contable, Instituciones, Productividad Total de los Factores, Progreso Técnico Sesgado

This paper represents the views of the author and should not be interpreted as reflecting those of the Asian Development

JEL classification: 010, 047, 053

Artículo recibido en Octubre de 2005 y aceptado para su publicación en Febrero de 2006.
Artículo disponible en versión electrónica en la página www.revista-eea.net, ref.: e-24110.

A DECADE OF DEBATE ABOUT THE SOURCES OF GROWTH IN EAST ASIA. How much do we know about why some countries grow faster than others?

"In a sense, the total factor productivity debate is much ado about nothing"

Joseph Stiglitz (2001, p.512)

1. INTRODUCTION

Being a graduate of the University of Pennsylvania, it is pleasure to contribute a paper to this volume honoring the work of Professor Lawrence R. Klein. Professor Klein has always been interested in issues of growth, the topic I have chosen to write about. During the last decade in particular, he wrote about important issues regarding economic integration and growth in Asia.[1] This paper is a survey and has three objectives.[2] First, I review thoroughly the experience of the East Asian countries during the period of high growth (1965-1995 approximately), the so-called East Asian miracle, from the point of view of the debate of the sources of growth. Second, the paper delves into the more general question of how much do we truly know about why some countries grow faster than others? This question is related to that of what is the engine of economic growth?; and to that of how do we understand growth miracles such as the rapid economic transformation of the East Asian countries? Finally, the paper discusses some recent work in growth and development.

The rest of the paper is structured as follows. Sections 2 and 3 provide a summary and discussion of the debates on the sources of growth in East Asia. In doing this, this paper aims at demystifying the discussion by pointing out some methodological problems relating to the use of aggregate production functions for growth and development analyses, as is standard in neoclassical models. This is important for the

[1] See Klein (1990, 2004), Marwah and Klein (1995, 1996, 1998), Klein and Palanivel (2000), Klein and Özmucur (2002/2003).

[2] Like all surveys, this paper tries to be as comprehensive as possible. However, surely some readers will feel that I have omitted what in their view are relevant papers. In writing an article of this nature, there is always an element of unavoidable subjectivity, as one has to decide the paper's focus and, consequently, what to include and what to leave out. For example, I do not make *direct* reference to the endogenous growth models or to some important authors (e.g., Solow, Barro). However, both the endogenous growth models and some of these authors' works are discussed in my other papers cited in the references. See, in particular, Felipe and McCombie (2005a, 2005b, 2006).

developing countries since the key policy issue facing them remains how to close the gap with the developed countries. The countries of East Asia have done an excellent job at it and the four dragons have actually reached OECD income levels. The question is: did the countries of East Asia simply accumulate capital without generating efficiency gains as one sector of the profession claims? Is there anything to be learnt from them? Section 4 discusses how much wee know about why some countries grow faster than others from the point of view of the empirical record. Section 5 discusses some proposals for moving forward in the study of growth. Section 6 offers some concluding remarks.

2. THE ORIGINAL TOTAL FACTOR PRODUCTIVITY GROWTH DEBATE

The 1990s witnessed one of the most important debates in the history of growth and development.[3] This was the debate of the sources of growth in East Asia. The key aspect of this debate was that it was empirical and had very important policy implications. Moreover, policymakers and academics followed it and contributed at different levels. In the early 1990s, when the success of the East Asian countries was an open secret, it was of paramount importance for development economists and policy makers to understand how the East Asian countries had achieved such phenomenal growth rates for three decades, which led to large increases in the living standards of their populations.

One decade after the publication of Krugman's paper, it is important to review the state of this debate and evaluate how much the profession has learnt from it. Moreover, what is the status of the growth literature, in particular at the policy level? What are policy makers and international institutions preaching to the developing countries today? This is important because the literature on growth in East Asia during the last decade was influenced by Young's (1992, 1995) controversial findings. Many researchers use the neoclassical growth framework, and, as a consequence, most discussions about growth are still today framed in terms of factor accumulation versus productivity gains.

My sense of the state of affairs today is as follows: (i) the debate of the sources of growth in East Asia is largely history. This is a positive outcome. The same way that governments across East Asia were very concerned with TFP growth estimates one decade ago, today, these same governments are, unfortunately, concerned with where their country stands in dubious *competitiveness* rankings; and (ii) a number of papers have been published during the last few years still debating the issue. In my view, these can be classified into two groups. First, a group of authors has insisted upon the

[3] The literature on the sources of growth in East Asia is very old. See, for example, Chen (1979).

same old themes, both in terms of topics and in terms of methodology.[4] Some authors have even resorted to very fancy econometrics thinking that this would shed light.[5] Second, some other authors have done serious critical work at the methodological level, thus taking the debate to a higher level (Nelson and Pack 1999). The conclusion of these authors is that the decomposition of growth into the contributions of factor accumulation and technological progress is a questionable exercise.

The debate stared with the paper by Alwyn Young (1992) on Hong Kong and Singapore. Young compared the performance of these two economies in terms of a detailed growth accounting exercise covering the period 1965-1990, when GDP growth was very high. Young found that while productivity growth accounted for a sizeable share of overall growth in Hong Kong, it was nil in the case of Singapore. Growth in Singapore had been exclusively the result of capital accumulation. The reason, Young argued, was the negative effects of the industrial policies of the Singaporean government. Young (1995) extended his growth accounting analysis and included South Korea and Taiwan. Overall, he concluded that there was nothing miraculous about these countries' performance. Capital accumulation had been the essence of their growth strategy.

Young's (1992) paper was followed by that of Kim and Lau (1994), who used a different methodology (econometric estimation of the aggregate production function) and included the four East Asian NIEs together with the G-5 countries into the analysis. Kim and Lau's (1994) results were even more provocative than those of Young (1992, 1995) for these authors concluded that productivity growth had been virtually zero not only in Singapore, but also in the other three successful East Asian economies, namely, Hong Kong, South Korea and Taiwan.

Young conducted a very careful study on what is known in the literature as the analysis of the *sources of growth*, based on the single-output neoclassical growth model, comparing the performance of Singapore with that of Hong Kong during 1965-1990.This exercise has its origins in the neoclassical model of growth where output produced is assumed to be a function of the inputs used, labor and capital, and of technology. Starting from an aggregate production $Q_t = A_t F(K_t, L_t)$ function, where Q is output, K is the stock of capital, L is employment, and A is the level of technology or total factor productivity; and assuming that: (i) production is subject to constant returns to scale; (ii) the objective function of the firms in the economy is to maximize profits; and that (iii) factor markets are competitive; then output growth can be written and decomposed as follows:

$$q_t = TFPG_t + s_t^L \ell_t + s_t^K k_t \tag{1}$$

[4] See, for example, Senhadji (2000) or Hsieh (2002).
[5] See, for example, Iwata, Khan and Murao (2002).

where q_t is the growth rate of output, ℓ_t is the growth rate of labor, k_t is the growth rate of the capital stock, and s_t^L and s_t^K denote the shares of labor and capital in output, respectively. Finally, $TFPG_t$ denotes the growth rate of technological progress, which is referred to as *total factor productivity growth*, a residual category that captures all output growth not due to increases in factor inputs.

For empirical purposes, the usefulness of expression (1) is that it allows to estimate *TFPG* as:

$$TFPG_t = q_t - s_t^L \ell_t - s_t^K k_t \tag{2}$$

given data for the variables on the right-hand side. The ratios ($TFPG_t / q_t$), ($s_t^L \ell_t / q_t$), and ($s_t^K k_t / q_t$) are the contributions of the growth rates of technical progress, labor, and capital, respectively, to output growth. Performing these calculations is referred to as a *growth accounting exercise*.

Using this methodology, Young (1992) found the surprising result that while for Hong Kong $TFPG_t$ was sizeable, around a third of output growth, it was zero for Singapore.[6] How did Young justify his findings? He argued that freedom of markets in Hong Kong was at the back of the result. Singapore, on the other hand, had been victim of its industrial policies and state intervention. These results were further corroborated in more extensive studies (Young 1995). Again, *TFPG* for Singapore was zero. For Hong Kong, Korea and Taiwan, it had been positive, but not spectacular when put in an international context.

Kim and Lau (1994) used a different methodology consisting in the statistical estimation of the aggregate production function.[7] Kim and Lau concluded that *TFPG* had been zero not only in Singapore, but also in Hong Kong, South Korea and Taiwan. These authors also calculated the *level* of technical progress of the East Asian Tigers with respect to that the US and concluded that in 1960 it was only around one fifth. Kim and Lau (1994) also estimated the relative level of technical progress of these economies vis-à-vis the U.S. in 1990, and surprisingly concluded that it was still only around a quarter of that of the U.S.

---

[6] In broad terms, what happened to Singapore is as follows: q_t =7% per annum, ℓ_t =5% per annum, k_t =9% per annum, $s_t^L = s_t^K$ =0.5. These figures imply *TFPG*=0.07-(0.5×0.05)-(0.5×0.09)=0; ($s_t^K k_t / q_t$)=64%; ($s_t^L \ell_t / q_t$) =36%, i.e., 64% of growth is derived from capital accumulation, 36% from labor accumulation and no growth was the result of technological progress (i.e., $TFPG_t / q_t$ =0).

[7] This avoids the problem of imposing the seemingly restrictive assumptions of growth accounting. In fact, Kim and Lau (1994) tested those assumptions and rejected them.

These papers were known to many economists in academic circles and Young's (1992) paper was even featured in *The Economist*. It was in 1994 when the debate took a different dimension. Then MIT Professor Paul Krugman (1994) wrote a paper in *Foreign Affairs*, where he explained in layman's terms what the discussion was about. Few papers in the fields of growth and development have been as controversial as that of Paul Krugman: he argued that the East Asian Tigers' success during the previous three decades was no miracle, that it had been more the result of *perspiration* than of *inspiration*. Drawing upon Alwyn Young's (1992) and Kim and Lau's (1994) works, by this, Paul Krugman meant that growth in East Asia during 1965-1990 had been mostly the result of capital accumulation (perspiration), while efficiency or productivity gains (inspiration) had played a minimal role.[8] This led Paul Krugman to compare the East Asian countries and their growth model to the Soviet Union, and to the prediction that growth rates in the region would have to decline as a result of the effects of diminishing returns to capital.[9]

Krugman's paper set off a 'cyclone of protest' in academic journals (see Felipe's 1999 survey) and in the press (e.g., Felipe 1997). Singapore's Government even announced that it would set up the goal of achieving a 2 percent annual increase in total factor productivity (TFP) growth, the measure of productivity gains (technological progress) that Krugman referred to.

The problem with the low-TFP growth results was that conventional wisdom during the period of high growth of the East Asian economies was that much of their success had been largely due to technological catch up and productivity gains. What was the role, otherwise, of all the influx of FDI? How was it that foreign technology had not translated into productivity gains? But if productivity was not there, what was there to be learnt from the success of these countries?

After the publication of these papers there was a lively debate for a number of years on the *accuracy* of the estimates and on the validity of the *inferences* and implications for policy and development. These issues were summarized and discussed by Felipe (1999), who offered an extensive reviewed and discussion and warned researchers of what he termed the *Solowresidualization of the East Asian economies* in order to understand how they had grown, and appealed to the profession to abandon that research program, *unless* one had something truly novel to say.[10] The recalculation of TFP growth rates was an exercise that would not produce new insights.

---

[8] The other important debate, often linked to that of the sources of growth, was (and still is) that of the role of government versus pure market forces in propelling growth in the region.

[9] The East Asian financial crisis only a few years later seemed to prove him right, although Krugman explained that his arguments were unrelated to the factors that led to the crisis.

[10] The word "Solowresidualization" refers to the calculation of Solow residuals, or total factor productivity growth.

On the issue of the accuracy of the estimates, the problem with this literature was that in trying to prove Young and Kim and Lau wrong, as many authors tried to, journals and books were flooded with alternative estimates of *TFPG* using different data series, and slightly different periods, to the point that the discussion, in this author's view, became useless. One positive aspect of this controversy was, nevertheless, the questioning of some of the assumptions made by Young, such as the existence of competitive markets in the region, in the face of overwhelming evidence to the contrary. Governments intervene, for example, in wage setting, as in Singapore. Thus, Stiglitz, for example, recently argued as follows:

"Alwyn Young's (1992) often-cited study arguing that the freedom of markets in Hong Kong, China can explain the relatively rapid increase in its total factor productivity illustrates how the Solow technique can yield erroneous results. Not only is it the case that the measurement of total factor productivity increases can be unreliable [...] but the interpretation of the residual, what is left over after measuring inputs is highly ambiguous. Assume that one could feel confident that Hong Kong's residual was greater than that of Singapore. Is it because of better economic policies? Or is it because Hong Kong was the entrepôt for the mainland of China, and as the mainland's economy grew, so did the demand for Hong Kong's services? In this interpretation, Young's explanation of Hong Kong's higher TFP relative to Singapore is turned on its head: Hong Kong's success actually was a result of the growth of perhaps the least free-market regime of the region"

(Stiglitz 2001, p.512)

On the question of the inferences and implications of these results, and the lessons for other developing countries, those who argued that the role of *TFPG* was small did not deny that the East Asian countries had reduced the technology gap with the developed world (contrary to the results of Kim and Lau). What they argued was, first, that the technology gains of these countries were obtained from abroad, and that this was not miraculous; and secondly, that if all the East Asian countries did for thirty years was to accumulate capital, like the Soviet Union, there was not much to learn from them (the so-called *fundamentalist* view derived from the Young and Kim and Lau results).

On the other side of the debate, many other voices, especially in East Asia, argued, and continue arguing today, that the key to understanding the East Asian miracle resides in an understanding of how the countries in the region *assimilated* and incorporated foreign technology, and that the methodologies used by Young and Kim and Lau cannot bring it up. For example, Rashid has argued in the following terms:

"If the Koreans do not have the TFP of the USA in the fifties despite having copied them, what can we say about this method? If Japan shows significant TFP during the fifties and Korea is the country that most closely followed the Japanese path to development, how is it that Korea

does not show the same TFP? Since Singapore grew through heavy direct foreign investment, does the low TFP indicate a failure of foreign firms to use modern technology?"

(Rashid 2000, p.152).

3. THE STATE OF THE TOTAL FACTOR PRODUCTIVITY GROWTH DEBATE TODAY

In discussing the main results and conclusions of Young's and Kim and Lau's works, there are three options. The first one is to believe them and argue that, indeed, there was nothing miraculous in the way East Asia succeeded. The second one, as indicated above, is to come up with a different set of estimates to justify the opposite view. This has been done on countless occasions, but the truth is that any discussion about growth in the region still today starts from the Young-Kim-Lau results. Finally, a third option is to question not the numbers *per se*, but the methodology used. I believe this is the most useful way to understand the discussion with a view to moving forward. In fact, during the late 1990s, some authors shifted gears and began emphasizing that the analysis of the sources of growth embedded in the neoclassical growth model had serious methodological shortcomings.

For this purpose, it is useful to recall the theory that underlies growth accounting studies. As it was pointed out above, the exercise starts from the assumption that the technological possibilities of an entire economy can be represented by an aggregate production function. This, however, has been known for decades to be incorrect. Indeed, aggregate production functions most likely do not exist. Felipe and Fisher (2003, 2006) review and discuss the literature on aggregation (both the Cambridge debates and the aggregation problem) and remind the profession that the conditions under which an aggregate production function exists are so stringent that, for all practical purposes, one must conclude that they do not exist. On top of this, even disregarding the previous point, one has to assume that factor markets are competitive. Most authors do not even discuss it, and much less test it (e.g., Soludo and Kim 2003). It is simply assumed. These authors admit that "what you get in terms of the contributions of TFP depends largely on the 'choice' of the size of alpha (share of physical capital in the production function). Several growth-accounting exercises simply 'impose' the alpha across all developing countries due mainly to data problems. Attempts […] to directly estimate the alpha from national data is a bold beginning" Soludo and Kim (2003, p.67). And finally, one has to believe that growth results from two sources, factor accumulation and technological progress (broadly defined). This is not the key issue for certainly there is some truth to it. The problem is that one has to believe that growth can be *algebraically split* and apportioned.

To see what the algebraic splitting of growth means, consider what growth accounting does, according to Nelson (1981). Suppose one bakes a cake. One *combines* flour, yeast, water, sugar, etc. Then after the cake is baked, one makes the following claim: 30% of the size (or of the taste) is due to flour; another 5% is due to the water….and a residual 10% is due to the baker's cooking skills. This may seem silly. However, this is what growth accounting does. One thing is to ask: what would happen to the cake (economy) if one added a given amount of extra flour (capital)? Or one may speculate about what it would have happened to the cake (economy) if it had been baked (managed) by a more competent baker (Chairman of the Central Bank). But this is different from apportioning the overall result to the individual components. Growth cannot be split the way it is done in growth accounting exercises because it does not make sense (Kaldor 1957, Pasinetti 1959, Scott 1989). Growth is the result of the interaction of a myriad of factors. Moreover, one has to be careful in interpreting these decompositions, as factor accumulation and productivity growth are both endogenous. What this means is that finding that factor accumulation accounts for 75% of growth, for example, does not imply that growth would have been 75% as high in the absence of technical change. Indeed, in the absence of productivity change, the incentive to accumulate would have been much lower, and the resulting capital accumulation would have also been significantly lower. Or, stated in different terms: how is it possible to split the contributions of physical capital, labor and technology in the case of IT services? Aren't capital and technical progress the two sides of the coin? What is the meaning of separating this from the contribution of labor? Who runs the computer?

The power of Nelson's critique of standard growth accounting exercises is more powerful if one considers production functions that include human capital (e.g., Mankiw et al. 1992), that is, $Q_t = A_t F(K_t, L_t, H_t)$, where H denotes the stock of human capital, measured in terms of, for example, number of years of education of the labor force, or through some similar proxy. The role of human capital in this framework is to recognize that labor in different economies, or at different points in time in the same economy, may possess different levels of education and different skills. However, the inexplicable aspect of this production function is that labor (L) and human capital (H) appear as "separate factors of production." Indeed, it is very difficult to understand and comprehend what labor and human capital are and mean as separate entities.[11]

[11] In the opinion of this author, the shallowness and misunderstanding with which the role of labor in the production process is treated in the neoclassical literature is of monumental proportions. See Braverman (1998, especially chapter 1). Marx differentiated between the concepts of labor, an inalienable bodily and mental function property of the human individual, and labor power, the human capacity to perform work. The latter is a crucial concept in order to understand what

The view of this author is that one can list the possible sources of growth of an economy the way, for example, Olson (1996) does, i.e., as an organizational device, or as a tool to think about growth in a systematic way. However, another quite different thing is to try to apportion these sources to account for overall growth the way growth accounting exercised do.

In the rest of this section I discuss what I consider to be the most interesting work that has been published up to date.[12]

3.1 Biased Technological Progress and Growth Accounting: Nelson and Pack (1999) and Felipe and McCombie (2001)

Nelson and Pack (1999) were the first authors to provide a coherent attack of the fundamentalist view of growth in East Asia on methodological grounds. Nelson and Pack have proposed an *assimilationist* view of growth in East Asia, along the lines of, for example, Hobday (1995). Nelson and Pack (1999) emphasized the role of entrepreneurship, innovation, and learning, all of which were encouraged by the policy regimes of the East Asian countries. These authors suggested that investment in human and physical capital was necessary, but that it was only part of the assimilation process that propelled rapid East Asian growth. What distinguishes East Asian countries is their capacity to successfully assimilate new capital. These economies borrowed much of their technology from more advanced economies and put enormous

production is about (i.e., the transformation of some commodities into other commodities). When a worker is hired by a company, what she sells to her employer is not her actual labor, but her labor power, her ability to work. The (aggregate) neoclassical production function considers labor, measured in terms of the number or workers or number of hours; and human capital, something like the education/skills of these workers. It seems that the role played by labor power in the classical authoirs is assumed by human capital/knowledge in the neoclassical endogenous growth models. However, it is not clear what the purpose of the distintion between labor and human capital –as two separate factors, is; and how it relates to the fact that what matters for production is the human capacity to perform work. Moreover, the neoclassical production function considers steam, horse, water or human muscle as equivalent "factors of production." Labor power is something that characterizes humans. The active labor processes that reside in potential in the labor power of humans are, for practical purposes, infinite. The distinctive capacity of human labor power is its intelligent and purposive character. The point of this rather long footnote is to bring to the attention of the reader the idea that the production of a commodity is a substantially more complex process than that envisioned and encapsulated in the neoclassical production function, precisely because of the role of the commodity labor power.

[12] Certainly here I am biased (some readers may use stronger words), especially because I cite my own work. The criterion has been to search for papers that have tried to dig into the debate of the sources of growth by discussing the methodological problems of the techniques used (growth accounting and estimation of the aggregate production function). Resorting to fancy econometrics with large data sets (as a number of authors have done recently) does not meet this criterion.

efforts into absorbing it productively, thus continuously catching-up to international best practice during their economic development.

How did Nelson and Pack (1999) resolve the low *TFPG* paradox? The purpose of growth accounting is to separate the contribution of technological progress from that of factor accumulation. In doing this, Nelson and Pack (1999) argued, the factor shares that multiply the growth rates of capital and labor in equation (2), i.e.,s_t^L and s_t^K, should be those that would have occurred *if there had been no technical change*. However, the factor shares actually used in these exercises are the *observed* ones, taken from the National Income and Product Accounts –NIPA, which incorporate the effect of technical progress. If the latter is labor saving, purging this effect reduces the capital share. A lower capital share, which multiplies the growth of capital –the fast-growing factor, would subtract less from output, thus leading to a higher *TFPG*. Hence, the puzzle is solved.

The critique of Nelson and Pack (1999) arises from the observation that capital shares in the NIPA remained rather constant in the East Asian countries during the miracle period despite a substantial increase in the capital-labor ratio. How can this be explained? There are two alternative explanations (Nelson 1973). First, that the underlying elasticity of substitution of the aggregate technology is unity, and with a Cobb-Douglas production function, technical change is Hicks (and Harrod) neutral. Second, that the elasticity of substitution differed from unity and technical progress was biased to the extent that, in spite of a rapidly growing capital-labor ratio, factor shares remained constant. In other words: if the observed stability of the factor shares was due to an elasticity of substitution that is less than unity and labor saving technical change, the Nelson and Pack argument makes a substantial difference to the estimates of TFP growth.

It can be shown that in the neoclassical model with the production function $Q = F(A_L L, A_K K)$, where A_L and A_K represent factor-augmenting technical change, the growth of the share of capital is given by

$$\hat{s}_t^K = [(1-\overline{a})(1-\sigma)/\sigma)][(\lambda_L + \ell) - (\lambda_K + k)] \tag{3}$$

where $\overline{a} = (a_0 + a_T)/2$ is the average share of the initial (a_0) and final (a_T) periods, λ_L and λ_K are the corresponding growth rates of factor augmenting technical change, σ is the elasticity of substitution, k is the growth rate of the capital stock and ℓ is the growth rate of employment. And the degree of bias is given by $B = [(1-\sigma)/\sigma](\lambda_L - \lambda_K)$.

It has been noted above that the values of the factor shares did not change very much in East Asia over the last thirty years or so. As may be seen from equation (3) for the growth rates of the capital share, this may be due to an elasticity of substitution equal to unity and a Cobb-Douglas production function. Alternatively, it could have

occurred because the degree of bias of technical change was such that $\lambda_L - \lambda_K = k - \ell$. Suppose that there is rapid growth of the capital-labor ratio, as occurred in these economies. In the absence of technical change, capital's observed share will fall. In the case under consideration here, the rate of biased technical change was such that it kept the factor shares constant.

The conventional growth accounting approach is, therefore, subject to error, unless technical progress is Hicks-neutral, due of its use of current factor shares as weights in the terminal period. The value of the capital share in the terminal period is high only because of the impact of biased technical change. If capital's observed share in the terminal period is used to calculate $\overline{a}$, it will incorporate the effect of biased technical change to the extent that the latter has prevented the observed share from falling. This, in turn, will erroneously cause the contribution of the growth of the factor inputs to output growth to be overstated, with the result that the true contribution of total factor productivity growth is underestimated. To obviate this problem, Nelson and Pack (1999) argued that the preferable procedure for constructing $\overline{a}$ is to use the value of capital's share in the terminal period that would have occurred in the absence of technical change. Thus, one should use the *unobserved constant-technology factor shares*: capital's share in the terminal period will be lower, and as may be seen from equation (3) for $\hat{s}_K$, the growth of total factor productivity will be higher, the lower is the elasticity of substitution and the faster the rate of growth of the capital-labor ratio.

Felipe and McCombie (2001) elaborated upon the Nelson-Pack thesis, and devised a procedure to construct the unobserved constant technology factor shares by eliminating from the observed factor shares the effect of technical progress. They reached the conclusion that once this was done, and in some cases (for very low elasticities of substitution, around 0.2; remember that the Cobb-Douglas function implies an elasticity of unity), then it is true that the procedure makes a significant difference, and *TFPG* accounts for a larger share output growth. Table 1 summarizes Felipe and McCombie's results for Hong Kong, Taiwan, Korea and Singapore. The upper part of each bloc in the table shows the growth rates of output, labor and capital, as well as the initial capital share according to Young (1995). This part of the table also shows the standard growth rate of TFP, denoted *TFPG*.

The rest of the table shows the *TFPG* rates for different elasticties of substitution (σ) and for periods that range from 1 year to 30 years. They are denoted $tfp_t^{'}$, where t=1, 10, 20, 30. The results indicate that, indeed, total factor productivity growth increases as the elasticity of substitution decreases. When σ =0.2 (and the longer the time horizon), the Nelson and Pack (1999) argument makes a difference.[13]

[13] However, this did not solve entirely East Asia's problem of low TFPG rates. Indeed, when Felipe and McCombie (2001) applied the procedure to a group of advanced countries, TFPG also increased for this group, thus leaving things, in relative terms, unchanged.

Table 1
Growth Accounting Simulations for Singapore, Hong Kong, South Korea and Taiwan

Singapore: q = 0.087; ℓ = 0.057; k = 0.115; a_o = 0.497; a_T=0.494; *TFPG* = 0.0012

Hong Kong: q = 0.073; ℓ = 0.032; k = 0.080; a_o = 0.340; a_T=0.391; *TFPG* = 0.0234

	SINGAPORE				HONG KONG			
σ	tfp'_1	tfp'_{10}	tfp'_{20}	tfp'_{30}	tfp'_1	tfp'_{10}	tfp'_{20}	tfp'_{30}
0.2	0.0028	0.0165	0.0230	0.0255	0.0257	0.0328	0.0364	0.0380
0.6	0.0014	0.0040	0.0069	0.0097	0.0248	0.0263	0.0280	0.0294
0.8	0.0012	0.0022	0.0033	0.0044	0.0247	0.0253	0.0259	0.0265
1.0	0.0011	0.0011	0.0011	0.0011	0.0246	0.0246	0.0246	0.0246
1.2	0.0011	0.0004	-0.0002	-0.0008	0.0242	0.0242	0.0238	0.0233

South Korea: q = 0.103; ℓ = 0.064; k = 0.137; a_o = 0.31; a_T=0.261; *TFPG* = 0.0181

Taiwan: q = 0.094; ℓ= 0.049; k = 0.123; a_o = 0.261; a_T=0.251; *TFPG* = 0.0260

	SOUTH KOREA				TAIWAN			
σ	tfp'_1	tfp'_{10}	tfp'_{20}	tfp'_{30}	tfp'_1	tfp'_{10}	tfp'_{20}	tfp'_{30}
0.2	0.0185	0.0309	0.0349	0.0363	0.0277	0.0383	0.0416	0.0427
0.6	0.0167	0.0199	0.0231	0.0258	0.0260	0.0289	0.0317	0.0340
0.8	0.0165	0.0177	0.0191	0.0204	0.0258	0.0270	0.0282	0.0293
1.0	0.0163	0.0163	0.0163	0.0163	0.0256	0.0256	0.0256	0.0256
1.2	0.0162	0.0154	0.0144	0.0134	0.0256	0.0248	0.0238	0.0230

Notes: (i) q = Annual growth rate of output (1966-1990; Hong Kong 1966-1991); λ = Annual growth rate of employment (1966-1990; Hong Kong 1966-1991); k = Annual growth rate of stock of capital (1966-1990; Hong Kong 1966-1991); a_o = Average share of capital initial subperiod (1966-1970; Hong Kong 1966-1971); and a_T = Average share of capital final subperiod (Singapore, Taiwan 1966-1970; Hong Kong 1986-1991; South Korea 1985-1990); (ii): σ is the elasticity of substitution; (iii): $tfp=(q-\ell)-[1/2(a_0 + a_T)(k-\ell)]$; (iv): $tfp'_T = (q-\lambda)-\bar{a}^*_T (k-\lambda)$ is the annual rate of TFPG over a period of T years under the assumption of constant technology, where $\bar{a}^*_T$ is the value of the calculated constant-technology capital share.

Source: *Felipe and McCombie (2001)*

3.2 The Aggregate Production Function and the Accounting Identity: Felipe and McCombie (2003)

Felipe and McCombie (2003) have provided a different type of critique of the conventional literature. Their view of the *TFPG* discussion is rather *nihilistic*, and provides a sound rationale for Stiglitz's (2001) (also nihilistic) assessment mentioned at the beginning of the paper. Felipe and McCombie (2003) argue two main points. The first one is that standard growth accounting analyses assume that an aggregate production function exists. Indeed, the assumption is so critical that Nelson and Pack (1999, p.424), being aware of its importance, explicitly mentioned that they assumed

that an aggregate production function exists. The assumption is, as noted above, incorrect. This assumption is of crucial importance, for it is the *sine qua non* of the growth accounting exercises, and yet it has never been questioned in the debate of the sources of growth in East Asia, although it is easy to understand why this is the case. While the hypothesis of competitive markets, for example, can be relaxed without too much difficulty (it leads to a slightly different growth accounting equation), if the aggregate production function does not exist, the whole exercise, namely, growth accounting or the econometric estimation of the aggregate production function, becomes a pointless endeavor.

Felipe and McCombie's (2003) second argument is empirical, and it is a consequence of the one in the previous paragraph. They asked if there is any possible interpretation of the empirical results (growth accounting and estimation of production functions) that is compatible with the non-existence of an aggregate production function. They concluded that growth accounting exercises and the derivation of *TFPG* can be identically carried out from the accounting identity that relates output to the sum of the wage bill plus overall profits in the NIPA, without making any assumption. This identity is:

$$VA_t^n \equiv PQ_t \equiv W_t^n + \Pi_t^n \equiv w_t^n L_t + r_t^n K_t \tag{4}$$

where VA_t^n is nominal value added, Q is deflated value added, P is the output deflator, W^n is the nominal wage bill, and Π^n is total nominal profits (surplus in the NIPA terminology). The symbol $\equiv$ indicates that expression (4) is an identity. Moreover, the wage bill W^n can be written as the product of the average nominal wage rate (w^n) times employment (L); and likewise, total profits Π^n can be written as the product of the nominal average profit rate (r^n) times the constant-price value of the capital stock (K). It is important to stress that no assumption is needed in order to write equation (4), which holds always. Average wage and profit rates might or might not equal the corresponding marginal productivities; and likewise, equation (4) might or might not be derived from Euler's theorem, the validity of which depends on the existence of the aggregate production function.

Following the arguments in their paper (see also Felipe and Fisher 2006, this volume), it can be easily shown how the identity (4) can be transformed into $Q_t = A\,exp(\lambda t) L_t^{s^L} K_t^{s^K}$, where $s_t^L = W_t / Q_t$ and $s_t^K = \Pi_t / Q_t$ are the shares in output and $\lambda \equiv s^L \hat{w} + s^K \hat{r}$ ($\hat{w}$ and $\hat{r}$ are the growth rates of the wage and profit rates, respectively). It must be emphasized that this derivation involves only the transformation of an accounting identity. There is no reference to production functions, returns to scale, marginal productivities, competitive equilibrium conditions or any economic theory of production. On the principle of parsimony, this consideration renders the standard analyses very dubious because the alleged theory upon which they rest, namely, an

aggregate production function, together with the conditions for producer equilibrium, can never be rejected since the accounting identity never fails to verify it.

3.3. Summary

Some conclusions that emerge out of the previous analysis are as follows:

First, it seems that whether one can explain increases in East Asian incomes as a result of changes in inputs or *TFPG* turns on technical issues that most likely will not ever be sorted out and agreed upon. The myriad of results, together with the lack of agreement among scholars, makes this topic an area of contention without visible solution.

Second, it is difficult to accept conceptually what growth accounting exercises try to do, namely to artificially split the contributions of factor inputs and technical progress to output growth. Capital accumulation and technical progress are the two sides of a coin.

Third, this work has been questioned on methodological grounds. This makes the interpretation of standard growth accounting exercises a difficult task, and using the concept of total factor productivity growth for policy purposes is dangerous. The way the way economists approach the study of growth has to change by abandoning the framework of "accounting for the unexplained residual."

The view of this author is that it is impossible to understand the episode of phenomenal growth of the East Asian countries between the mid 1960s and the financial crisis of 1997-98 without bringing productivity gains into the picture. These were not the result of hard-core R&D, but of behind-the-frontier improvements. For example, Hobday (1995) described in detail how East Asian firms climbed the ladder by slowly learning:

"East Asian latecomers did not leapfrog from one vintage of technology to another. On the contrary, the evidence shows that firms engaged in a painstaking and cumulative process of technological learning: a hard slog rather than a leapfrog. The route to advanced electronics and information technology was through a long difficult learning process, driven by the manufacture of goods for export"

Hobday (1995, p.1188)

And Kim (1997) described Hyundai's efforts to produce a car after it had purchased the foreign equipment, hired expatriate consultants and signed licensing agreements with foreign firms as follows:

"Despite the training and consulting services of experts, Hyundai engineers repeated trials and errors for fourteen months before creating the first prototype. But the engine block broke into pieces at its first test. New prototype engines appeared almost every week, only to break in testing. No one on the team could figure out why the prototypes kept breaking down, casting serious doubts even among Hyundai management, on its capability to develop a competitive engine. The team had to scrap eleven more broken prototypes before one survived the

test. There were 2,888 engine design changes… Ninety seven test engines were made before Hyundai refined its natural aspiration and turbocharger engines… In addition, more than 200 transmissions and 150 test vehicles were created before Hyundai perfected them in 1992"
(Kim (1997, p.129).

For this reason, Meier's (2001) recent statement that:

"Because of the importance of total factor productivity […] future research will have to increase our understanding of the "unexplained residual factor" in aggregate production functions"
(Meier 2001, p.25).

is a bit puzzling. He goes on (Meier 2001) to say that:

"More generally, growth accounting still has to establish the interactions in the residual among technological progress, economies of scale and scope, tangible capital accumulation, human capital, knowledge capital, and institutional change"
(Meier 2001, p.25).

While I agree with Wacziarg (2002, p.917) that "We should continue to pursue the holy grail of accounting for unexplained growth", I believe that the use of the neoclassical framework (i.e., an aggregate production function, perhaps supplemented with some working hypotheses) to tackle them is a dead end.

To be more precise, equation (4) can be written in growth rates as

$$q_t \equiv s_t^L \hat{w}_t + s_t^K \hat{r}_t + s_t^L \ell_t + s_t^K k_t \tag{5}$$

This equation can be used as an organizational device. After all, it is certainly true that, as a matter of algebra, growth is the *result* of increases in the wage bill and increases in profits (appropriately weighted). What neoclassical economics does, and this is what is problematic, is to link this identity to the notion of a neoclassical aggregate production function, and then argue that what underlies the accounting identity is the production function (via Euler's theorem). Moreover, equation (5) indicates that growth and the dynamics of the functional distribution of income (i.e., the distribution of output between wages and profits) are intrinsically linked. Certainly these arguments do not imply that growth does not depend on factor accumulation and productivity. The point is that the notion of an aggregate production function is very problematic as a representation of this idea; and moreover, the accounting identity equation (4) in levels, and equation (5) in growth rates, already encapsulates the same idea.

4. THE DETERMINANTS OF ECONOMIC GROWTH: THE EMPIRICAL RECORD

I now turn to the more general question of how much do we really know about the true sources of growth and about why some countries grow faster than others. The answer to this question depends on who provides it. For example, Jones (1998) has argued that the first answer to the question of "why we are so rich and they are so poor" is provided by the Solow model and argues that the empirical evidence strongly supports this model's hypothesis, namely, that output per worker in steady state is determined by the rate of investment in physical capital and skills, by the growth rate of the labor force and by the productivity of these inputs (Jones 1998, p.161). Likewise, Jones argues that the engine of economic growth is invention (Jones 1998, p.162). And finally, he argues that the profession understands growth miracles such as those of East Asia as reflecting a movement of an economy within the world income distribution. Jones argues that differences in infrastructure explain largely differences in the wealth of nations. This is the key factor that led the East Asian economies to shift their steady-state relative incomes (Jones 1998, pp.162-163).

In the same vein, Gould (1993) has concluded that research does indicate that the following four factors affect growth: (i) Human knowledge; (ii) Political factors; (iii) International trade; and (iv) Equipment investment.

However, Prichett (2003) has warned that there are four widely accepted propositions (*beliefs*) by the profession which, however intuitive, might *not* be so. These are:

(i) education is a key to economic growth that that 'old' theories ignored. Indeed, development economists have known this for a long time. What is new is the finding that there is no strong link between investments in education and growth;

(ii) the role of physical investment in growth is well understood. The data seem to show clearly that output growth and capital growth are related. What is not clearly established, however, is the question of causality, that is, whether is capital growth that causes output growth, or whether the latter is driven by some other factor that also causes economic growth (e.g., technological change). A second empirical question, which Prichett refers to as a "puzzle', is that the growth of physical capital is uncorrelated with the investment share. This implies that there are some issues about the role of physical investment in growth that are not so simple and clear, like the role of bottlenecks (i.e., are key investments happening at the right time?), or the question of investment coordination (i.e., that a large and coordinated investment program benefits all investors, but investment by a single investor is not profitable);

(iii) growth can be usefully decomposed into 'accumulation' and 'productivity'. Prichett openly argues that this is "something that we 'know it ain't so' " (Prichett

2003, p.221). However, his arguments are different from those I discussed above, and which I believe are the reason why this artificial decomposition is not too useful. Prichett argues that there is a puzzle. This is that nearly all the estimates of total factor productivity for developing countries are too low. The reason is that if one includes education as part of the factor accumulation, around 40 percent of the developing countries have negative *TFPG* over a 30-year period. There is another large set of developing countries that have *TFPG* rates of less than 1 percent. The problem with these results is that we know that countries that are behind the frontier could learn from the countries that are ahead. Prichett argues that, most likely, these findings are the result of overstating the growth rate of the capital stock. Thus, Prichett, unlike me, believes that adjusting properly the capital stock will lead to correct estimates of total factor productivity growth and this way solve the puzzle; and

(iv) East Asia is a growth success to be emulated. This is a very interesting point for the conventional wisdom is that all developing countries would like to be like East Asia. However, Prichett argues that perhaps the rapid growth of East Asia was not so desirable; that it was "pathologically high" (Prichett 2003, p.225). The reason is that it was done at the expense of consumption. He argues: "I find it hard to believe that someone currently 50 years old would not give up a few luxuries now for having had a bit more food when they were 20 in 1969 when real per capita consumption was only $700" (Prichett 2003, p.224).

Indeed, as I discuss below, the empirical evidence on the fundamental growth questions is far from convincing. This is not to say that the factors mentioned above (and others) do not affect growth. I am convinced that they do contribute. The problem is that the methods used by economists and the evidence compiled are not persuasive enough. My view is that, in all humility, *we* (economists) have to admit that, after decades (even centuries) of theoretical and empirical work, we understand so little about the process of growth that the answer to why some countries are richer than others slips across our fingers. In the words of Coyle: "The emerging consensus is that economic development depends on a complicated kaleidoscope of policies and institutions" (Coyle 2002, p.157). What do we then tell the developing countries? More generally: where does development theory stand today? The answer would be something along the following lines: "In order to embark on the path of economic growth, a poor country needs to invest in physical and human capital. It needs to stamp out violence and corruption. The government needs to operate good policies, whatever they may be, but certainly at a minimum provide a stable macroeconomic framework" (Coyle 2002, p.157). One cannot help but wondering that because this recipe is so complicated, it is almost useless. As Kenny and Williams (2001) indicate, "almost all major variable types that have at one time or another been thought of as a major determinant of growth are present as chapters

in Arthur Lewis' *The Theory of Economic Growth*, first published in 1955 (Lewis 1965)" (Kenny and Williams 2001, p.5).[14]

The problem is akin to a puzzle called "development", the pieces of which we never manage to put together. There are three problems. First, despite that we know many of the pieces of this puzzle we do not know how to put them together and our growth theories can at best only explain a small portion of cross-country growth differences. Second, economists seem to be constantly discovering new "requirements" for a successful growth strategy and as time goes by, we realize that the puzzle has more pieces than we initially thought (e.g., globalization, competitiveness, institutions, democracy, corruption and, in general, governance, etc.); hence the problem of completing it becomes more and more challenging for we have to start thinking again about how all the pieces fit. Easterly (2001) is an excellent analysis of what he refers to as the alleged *panaceas* that have failed: high rates of physical capital investment, rapid human capital accumulation, low income inequality, low fertility, located far from the equator, low incidence of tropical diseases, access to the sea, favorable weather patterns, hands-off governments, trade-policy openness, capital market development, political freedom, economic freedom, ethnic homogeneity, British colonial origins, a common-law legal system, the protection of property rights and the rule of law, good governance, political stability, infrastructure, market-determined prices, foreign direct investment, and suitably conditioned foreign aid. After the Asian financial crisis of 1997-98, two new pieces or requirements were added to the list: (i) sound banking systems and financial institutions; and (ii) lack of corruption. To these, we have to add the role of political institutions, and perhaps even reshape the notion of development so as to include human capacities and freedom (Sen 1999).

Third, when we look at the success stories (e.g., Japan, Singapore, Ireland, US), we realize that they way they completed the puzzle was different. In other words: there are as many different paths to development as countries. Finally, we know that some factors cannot go alone, i.e., they require the presence of other complementary factors (e.g., use of computers requires literacy). This means that unless one has both pieces and they are placed the right way, the puzzle will not be completed.

For applied purposes, the most important question is that of the empirical record. How well do the models we use explain growth? As noted at the beginning of this section, this is a controversial question. Some authors have argued that the neoclassical model, still the most widely used paradigm, does a good job (Mankiw et al. 2002). I, on the other hand, share Kenny and Williams (2001) views: the record is very gloomy. While I believe that most models can provide useful insights at the theoretical level (i.e., they provide arguments and help construct stories), the reality is that when it comes to explaining growth, the record is not so good. Felipe and McCombie (2005a,

[14] I would also add Myrdal's Asian Drama (1968).

2005b, 2006) have explained why the neoclassical growth model fails to explain growth; or, to be more precise, why this model seems to explain it so well, at least at times. It is all a fallacy. I return to this issue below.

Kenny and Williams (2001) have analyzed the robustness of the most widely used variables in empirical work (mostly regression analysis), such as education, investment, expenditures on research and development, trade, and fiscal and monetary variables. The conclusion is that, in most cases, the findings are not robust: either a variable is not significant, or one can find all sorts of results (i.e., negative and positive relationship with growth). In he specific context of trade, Griffin (1999) shares the view that the empirical evidence is inconclusive: "A cross-section multiple regression analysis of 16 countries…failed to detect any relationship between the growth of exports (or changes over time in the share of exports in GDP) and the rate of growth of either GDP or the non-export components of GDP. The investment ratio was found to be significant in explaining aggregate growth but the growth of exports was not. Time series analysis was no more encouraging…[The] conclusion therefore is that the relationship between exports and economic growth is at best very weak" (Griffin 1999, p.95).

Kenny and Williams (2001) argue that much of the problem is related to the poor quality of the data used and to the methodology used: "the current search for the cause or causes of economic growth appears to be frequently informed by a commitment to producing objective, scientific, and universal knowledge of economic growth, and this is underpinned by the view that all economies are substantially similar" (Kenny and Williams 2001, p.4). And they add: "universal models of economic growth developed over the past 40 years are, in their particularities and recommendations, in frequent contradiction with one another" (Kenny and Williams 2001, p.4).

Certainly, as Kenny and Williams (2001) also indicate, the conclusion is not to say that we know "nothing" about the growth process. Indeed, the evidence collected after years of research indicates that institutions and/or structural factors matter in explaining growth rates. For example, structural variables that governments have trouble changing, such as religious beliefs, or geographic location, or the quality of land, play an important role in the long-term growth process. But these authors are very clear in their conclusions: "we do not think that there is any firm empirical basis for the confidence with which (any) development practitioners advocate particular policy prescriptions […] policy recommendations are sometimes nothing more than a mechanical output of the particular choices made by the model-builder" (Kenny and Williams 2001, p.15).

Wacziarg (2002), more optimistically, has noted that the quest for the determinants of growth need not be a failure. He argues that there is a way to explain how technological progress and factor accumulation explain growth, and this is by looking at the factors that facilitate them, namely, *structure* and *policies*. The structural features of an economy include characteristics that are beyond the direct control of policy makers. These include climate, country size and location, the religious composition

of the population, political institutions, infrastructure, income inequality, and market structure.[15] On the other hand, policies are under the immediate control for policy makers. These are, for example, the extent of black-market premiums, the share of government spending in GDP, fiscal deficits and public debt, inflation, and protectionist trade policies.

Since the early 1990s the availability of large data sets (mainly the Summer and Heston data set with variables expressed in purchasing power parity terms) allowed some researchers to start a new program on cross-country regression analysis, following the work of Mankiw et al. (1992). This work has been severely criticized (even by Solow himself. See Felipe and McCombie 2005a; Rodrik 2005). Wacziarg (2002, p.908), however, argues that: "even a skeptic of cross-country comparisons of economic growth would be struck by how much we have actually learned from these studies. We have learned enough to decisively reject misguided policies…." Indeed, a frequent defense of cross-country growth regressions is that despite all their problems they help update the researcher's priors about the impact of certain types of policies. Wacziarg continues: "even simple or partial correlations can restrict the range of possible causal statements that can be made, and nowhere is this more the case than in the comparative growth literature" (Wacziarg 2002, p.909). However, as argued by Rodrik (2005), this argument is incorrect. Growth regressions tend to show, for example, that the coefficient on import tariffs is typically negative. This is usually interpreted as meaning that protection is not beneficial to growth. However, "a negative partial correlation between growth and import tariffs is not only consistent with protection being growth-enhancing, it is actually an equilibrium consequence of trade protection being used in a socially optimal fashion" (Rodrik 2005, p.4).

My view (Felipe and McCombie 2005a, 2005b, 2006), however, is also pessimistic. The growth regressions that many economists use today derive from the steady-state solution of Solow's growth model, that is, $y_i = \left(\frac{s}{n_i + g + \delta} \right)^{\alpha/(1-\alpha)} A_i h_i$, where the level of income per capita (y) is a function of the savings rate (s), population growth rate (n), human capital (h) and the rate of technical progress (g). A denotes the level of technology and δ is the rate of depreciation. Felipe and McCombie, however, show that regressions of Solow's model can be derived from the income accounting identity that relates output to the sum of the wage bill plus total profits (see section 3.2 above).

To sum up, as indicated above, the view of this author is that we do not know much about growth, certainly substantially less than we believe. To be precise, while we *may*

[15] Political institutions, infrastructure and market structure are, to a large extent under the control of policy makers. Certainly the latter can influence these three factors.

have been able to identify corruption, for example, as a deterrent of growth, we have not been able to understand how to induce growth or take a country out of a poverty trap. The conclusion is that we are just beginning to understand theoretically and empirically the mechanisms of economic growth, and much work has yet to be done.

In a recent extensive discussion of the sources of growth in developing countries, using both growth accounting standard growth regression analysis, Soludo and Kim (2003) concluded that: "On balance, it would be fair to conclude that we know as much as we don't in terms of what determines the differences in cross-national growth performances" (Soludo and Kim 2003, p.66). Moreover, after concluding that their empirical results basically confirm one's educated guesses (i.e., that all the variables that form the core of the Washington consensus turn out to be important), they acknowledge that these results are not too useful to policy makers in developing regions. In their own words: "The sense of 'everything is important' one gets from the various regressions results adds little value to the policy-makers' tool kit. Sometimes, one cannot help asking whether the efforts put into these cross-country growth regressions and the controversies generated by them are justified by the results. Indeed, the sometimes conflicting evidence on the importance of some of the key variables, such as education and trade, can be confusing to the policy-maker" (Soludo and Kim 2003, p.66).

Probably, virtually all the factors that economists have indicated during the last 200 years to be determinants of growth are, one way or another, important and play a role. The problem is that we do not know with a fair degree of precision how each factor affects growth, how to put them all together, and whether they have to be put in place in a certain temporal order. Moreover, perhaps the question does not have a solution; that is, perhaps, empirical analysis, the way it is conducted today is not the way to go. A few regressions, whether cross-country or for individual countries, cannot match the richness and depth of Landes's (1998) work. The obsession with measurement will have to give way to other types of analyses.

5. MOVING FORWARD IN THE ANALYSIS OF GROWTH: WHERE ARE WE AND WHERE SHOULD WE GO?

"...what does it take for a follower country to undertake industrialization and emulate its predecessors? [...] an ability to leap the gap of knowledge and practice separating the backward economy from the advanced"

David Landes (1998, pp.273-274)

The conclusion that stems from the analysis above is that we do not know much about growth and that we do not have an answer to the practical question of *"how do we make growth happen?"* (Rodrik 2003a, p.26). Rodrik (2003a) argues that the

answer to this question runs at two levels. One is at the policy level, and the other one at the theoretical level. At the first level, Rodrik (2003a) provides the answer. He proposes a two-pronged growth strategy. The first one is an investment strategy aimed at stimulating growth in the short-run. He argues that investment "has to be interpreted broadly, as referring to all the activities that entrepreneurs undertake, such as expanding capacity, employing new technology, producing new products, searching for new markets, and so on" (Rodrik 2003a, p.17). The second part of the strategy, aimed at sustaining growth, is the process of institution building, both informal (e.g., moral codes, self-enforcing agreements) and formal (e.g., legal rules enforced through third parties).[16] To the question of *"where to start?"*, Rodrik acknowledges that beyond the very basics (e.g., suppose inflation is running at three digits) it is very difficult to know what the most sensible initial step is. It is here that developing countries need a dose of *creative interventions* and, I would add, of imagination and good luck.

At a different level, Rodrik (2004) list some general "design principles" which could have a high pay off. These include the following. First, public support and incentives should be provided only for activities, and for sectors. Moreover, the activities in question should be new ones, including products which are new to the local economy of new technologies for existing products. They should also have the potential to "crowd-in other, complementary investments or generate informational or technological spillovers" (Rodrik 2004, p.23). Second, to make sure that public support is not abused or wasted, clear benchmarks for success and failure must be adopted. Public support should not be indefinite. The usage of sunset clauses to face out support could help in this regard. Third, agencies which implement industrial policy must be competent, have good communications with the private sector and be monitored by the highest level of leadership possible.

How can we move forward with a useful and pragmatic research agenda on growth? This question does not have an easy answer. For one, economists have to stop working with the mindset that growth can only be explained in neoclassical terms and with neoclassical models (e.g., that it is supply determined and explained in terms of an aggregate production function). When this is achieved, growth accounting exercises will disappear. Of course, this does not mean that we should not use the term "sources of growth." This is perfectly correct as long as one does not fall into the problems discussed above.[17]

In the remaining of this section I discuss briefly five proposals that can prove very fruitful both from a theoretical point of view and from the policy standpoint.

---

[16] Rodrik (2003a, p.23) argues that "the relevant institutions must strike the right balance between disorder and dictatorship."

[17] Certainly this a sweeping statement with which many economists would not agree. For example, Aghion and Howitt (2005), in an excellent recent paper, argue that growth theory is in fact useful to think about growth policy, provided one uses the adequate growth paradigm. The authors advocate the Schumpeterian model and claim that the empirical evidence supports its main predictions.

The first one is a better understanding of how firms do their business, in particular the environment in which they operate. Second, the consensus today is moving in the direction that institutions may hold the key to growth. Third, historical analyses in the context of country studies, can take us a long way. Fourth, another useful line of research is the analysis of the constraints that countries face for long-run growth from the demand side, in particular the balance of payments. Finally, understanding and analyzing growth from the point of view of Classical economics can provide a useful starting point.

(i) The microeconomics of competition

Nelson (1998) has argued that the search for understanding how technological advances occur quickly leads to the need to understand what goes on at the firm level. To date, however, very little of our growing understanding of firms has percolated into growth theory." Thus, Nelson argues that further work is needed in three areas: (i) technology as a body of understanding and practice, and the processes involved in mastering and advancing technology; (ii) the nature of the organizations, principally business firms, that employ technology and produce output; and (iii) the nature and role of a wide variety of economic institutions that establish the environment within which firms operate.

Recent microeconomic work on the relationship between competition and increases in labor productivity shows that improvements in the latter at the firm level are mostly the result of institutional factors, particularly changes in work rules (Galdón-Sánchez and Schmitz 2003). The authors claim that one of the most accepted yet unconfirmed assumptions in economics is the notion that competition leads to increases in productivity. Everybody in the profession assumes it as given. But does the extent of competitive pressure industries face influence their productivity? To study this question, the authors took the unique approach of setting up something akin to a natural experiment. They examined the increased competitive pressure iron ore producers faced in the early 1980s following the collapse of world steel production. Competitive pressure is defined as the increase in the mine's probability of closure resulting from the steel collapse.

What did the authors find? They found that the observed productivity gains were driven by continuing mines, producing the same products and using the same technology as they had before the 1980s. In other words, there was a clear relationship between the increase in competitive pressure iron ore mines faced in the early 1980s and their subsequent labor productivity. The key to productivity gains was derived from the competitive pressure that was brought upon producers by a shrinking market for their product. Those mines that faced significant increases in competitive pressure had much greater productivity gains than those that faced little increase. Mine closings contributed little or nothing to the productivity gains. Likewise, changes in the type of

product produced contributed nothing to the gains. Introduction of new technologies also contributed little to the gains. What was, finally, the wellspring of productivity? The authors claim that it primarily flowed from changes in work rules that determine how labor is utilized at mines and the amount of effort required of individual workers. Changes in work rules led to more efficient utilization of workers.

Using case studies for 6-13 industries in 13 countries, Lewis (2004) has argued forcefully that the key to a country's growth lies in increasing productivity, which depends on fostering product market competition, so that firms can thrive and the market rewards the winners and punishes the losers. Lewis's thesis is that since overall productivity of a country is a weighted average of the firms' productivity, it becomes imperative to study firms in order to understand what occurs at the country level. The above is not to say that macroeconomic stability (i.e., positive real interest rates, sustainable budge deficits, low inflation, stable exchange rate) does not matter. Rather, the point is that a stable economy alone isn't enough to make countries prosper and grow. His main conclusions are:

(i) differences in competition in product markets are much more important than differences in labor and capital markets in explaining the causes of poor economic performance. Developing a level playing field for competition in a country is fundamental. Competition has to be *intense* and *fair*.

(ii) the importance of education as a cause of success (development) or failure (underdevelopment) has been overrated. Education is not the way out of the poverty trap; more education does not mean more growth. Lewis's important point is that regardless of the institutional educational level, workers around the world can be adequately trained on the job for high productivity. Lewis makes an important distinction between education (the means through which societies acquire political philosophies based on individual rights) and *worker's trainability* (capacity to understand how to use a given technology). Without denying the role of education in any society, it is the latter that matters for quick increases in productivity.

(iii) Capital, the way it is understood in standard economic models, is not the solution out of poverty either. Therefore, simply sending capital to developing countries will not do much. The role of capital in developing countries is to *increase the capacity for growth*, but probably it does not directly and automatically leads to increases in labor productivity. It is worth stressing that the problem of low labor productivity in most poor countries is not just the result of a low or stagnant capital-labor ratio. This is because, in the short-term, labor productivity could be significantly increased without any major increase in capital by simply eliminating distortions in the economy (i.e., by improving the rules and regulations governing competition) and by improving the way labor is organized to operate the existing equipment. On the other hand, it is true, as Lewis (2004,

p.250) indicates, that becoming a rich country without any additional capital is virtually impossible. In this sense, the role of capital in economic development is to increase capacity for growth.

(iv) developing countries' elites tend to be responsible for big government. In these countries, the elites license business activities, control international and financial material goods flows, promote unaffordable social welfare systems, and favor government-owned businesses.

(ii) The role of institutions

"Institutions and culture first; money next; but from the beginning and increasingly, the payoff was to knowledge"

David Landes (1998, p.276)

The role of institutions in development has received increasing attention in recent years. Some economists have argued that they key to understanding why some countries remain poor is that they lack the set of institutions that are necessary to propel and sustain growth. Unfortunately, however, the consensus as *what* institutions matter for growth is less clear. While for some authors these institutions are the ones that secure property rights (e.g., Acemoglu, Johnson and Robinson 2002, p.9), for other authors the form that property rights should take is not so clear (Rodrik et al. 2002, p.21).

As far back as the 1960s, Myrdal, in the preface of his *Asian Drama*, pointed out: "It is not an altogether pretentious metaphor when I describe my endeavor to apply an *institutional approach* in this study as an attempt to analyze the development problems of South Asia in the manner that Adam Smith studied England's development problems two hundred years ago. Smith, of course, never dealt with economic problems as purely "economic", and the same can be said in general of the whole classical school, including toward the end Karl Marx" (Myrdal 1968. p.x).[18]

Olson (1996) has argued and provided compelling evidence that the large differences in capita income across countries cannot be explained in terms of differences in the scarcity of productive factors (e.g., land, natural resources, human capital, or equipment that embodies the latest technology). The only plausible explanation of these differences lies in the differences in the quality of countries' institutions, understood in a broad sense as the rules of the game and the economic policies that a society has developed and that determine *how* things are done. Moreover, economic performance is determined mostly

[18] Acemoglu et al. (2002) provide empirical evidence that suggests that institutions played an important role in the process of economic growth and in the surge of industrialization among the former poor colonies, and via this channel, account for a significant fraction of current income differences.

by the *structure of incentives*. From this perspective, the poorer countries do not have a structure of incentives that puts them close to their potential. The reason is that such structures do not emerge automatically as a consequence of individual rationality. Indeed, "the structure of incentives depends not only on what economic policies are chosen in each period, but also on the long-run or institutional arrangements: on the legal system that enforce contracts and protect property rights and on policy structures, constitutional provisions, and the extent of special-interest lobbies and cartels" (Olson 1996, p.6).

What kind of institutions and economic policies generate better economic performance? Olson argues that these are those that promote the efficient cooperation of millions of specialized workers and other inputs, institutions that enforce contracts impartially, and institutions that make property rights secure over the long-run. What is interesting about Olson's (1996) argument that he points out that it is mainly *national borders* that make the boundaries of different structures of incentives.[19]

In this line, Stern et al. (2005) have recently proposed a strategy for development based on the idea that development is fundamentally about change –changing institutions, changing governance, and changing behavior. This strategy embodies the idea of an active state complementary to markets. It has two pillars: (i) creating a climate that encourages investment and growth. This pillar focuses on the challenges facing firms. To this purpose, the authors indicate that investment climate surveys can be a very useful tool for identifying areas that should be priorities for increasing firm productivity; and (ii) advancing empowerment of poor people to participate in that growth. This pillar is about the challenges facing individuals. This pillar focuses on ensuring that poor people can participate in the growth process and are empowered with the capacity to shape their lives.

De Soto's (1989, 2000) work on institutions has made a big impact on the minds of many policy makers in developing countries. de Soto (1989) focuses on the actions the state takes that hinder entrepreneurship and growth. Chapter 5, in particular, "The Costs and Importance of the Law", is an excellent discussion of the importance of the rule of law and the mechanisms that poor people in developing countries have developed to cope with the absence of a *good law*, i.e., a law that guarantees and promotes economic efficiency (bad laws are those that impede or disrupt efficiency). There are two main costs of "formality" that are considered, the costs of entering the formal sector, and the costs of remaining in it. On the other hand, the costs of remaining in the informal sector are the costs of illegality (e.g., the costs of avoiding penalties; the costs of net transfers; and the costs of evading taxes and the labor laws). [20]

---

[19] Living in the Philippines, I have always been amazed by the simple fact that one can get into an airplane in Manila and three hours later land in Singapore. How is it possible that one boarded an airplane in a rundown and chaotic airport and landed in one of the best airports in the world? Why such a difference?

[20] It must be mentioned that de Soto's (1989) analysis of the informal sector has been questioned by Rossini and Thomas (1990), in particular some of the statistics presented.

De Soto (2000) focuses, on the other hand, on actions states fail to take to promote entrepreneurship and growth. The author argues that the major stumbling block that keeps most of the world from benefiting from capitalism is its inability to produce capital. Capital is the force that raises the productivity of labor and creates the wealth of nations, the lifeblood of the capitalist system, the foundation of progress, and the one thing that the poor countries of the world cannot seem to produce for themselves. This is the *mystery of capital*. Capital has two meanings. First, in terms of the physical dimension of assets. And second, in terms of the *potential* to generate surplus value. It is this aspect of capital that is crucial for development, and it is the one that holds the key in de Soto's thesis. Capital is the key to development because of the potential it holds to deploy new production. Since this potential is an abstract feature, it requires a *conversion process* from physical assets in the form of "dead capital" into the potential to deploy new production and into the force that raises the productivity of labor and creates the wealth of nations. Thus, the wealth of a nation depends on its ability to use it. De Soto (2000) argues that there is an institution that holds the key in this process, namely, the system of property rights, which has a capital-generating function. This implies that the conversion process takes place through the legal infrastructure and the system of property rights.

What is the problem that developing countries face in de Soto's view? That they have not developed the system of property rights that allows and facilitates the transformation of dead capital into potential capital.[21] It is not that capital does not exist in developing countries.[22] People in these countries have houses but no titles; crops but no deeds; businesses but no statutes of incorporation. It is the unavailability of these essential representations that explains why these people have not been able to produce sufficient capital to make their domestic capitalism work.

Solving this problem requires an understanding of why some countries, by representing assets with titles, are able to see and draw capital out of them. This transformation process, of which ownership is simply the tip of the iceberg, is an implicit legal infrastructure hidden deep within the property system of the developed nations, i.e., what creates capital is an implicit process buried in the intricacies of the formal property system. It is an intricate man-made process that can transform assets and

[21] Woodruff (2001) is very critical of de Soto's (2000) arguments. First, he indicates that capital markets function poorly in developing countries for reasons other than property title. Unlocking capital will require more than just recognizing existing informal property rights. At a minimum, a set of complementary reforms –for example, of bankruptcy laws and banking regulations- will be required. Second, he questions de Soto's estimates of the value of informal land simply because de Soto is not clear at all about how he and his team came with the figures provided in the book. The value of dead capital in the Philippines is estimated at US $132.9 billion. This is disaggregated into US $72.1 billion in urban areas (of this, $66.4 billion is concentrated in metro Manila); and US $60.8 billion in rural areas.

[22] And certainly, developing countries do not lack entrepreneurship, talent and enthusiasm à la Schumpeter. These are not scarce resources in developing countries

labor into capital. The problem that developing countries face is not that do not have an adequate legal system. It is that this legal system is chaotic and not conducive to the transformation process. Thus, it is imperative that developing countries update and simplify their legal systems so that they can play the capital-generating role that they have in developed countries.[23] This modern system protects ownership and secures transactions, which encourages citizens to respect titles, honor contracts and obey the law. That is, it avoids corruption. Moreover, often the problem goes beyond the fact that the legal system is inadequate for the purpose of realizing the existing potential capital. The legal systems of developing countries do not acknowledge that property can go beyond ownership. This means that in many developing countries the system functions purely as an ownership inventory of deeds and maps standing in for assets, without allowing for the additional mechanisms required to create a network through which people can recombine their assets into more valuable goods and services.

(iii) The importance of individual country studies and historical analyses

Recent work by Dani Rodrik and his associates has provided a promising line of work that is worth exploring. Individual country studies combined with historical analyses emphasizing the role of *institutional quality* can also shed light on the *how* and *why* questions of development (Rodrik 2003b).[24] By "institutional quality" it is meant that in developed countries, investors feel secure about that their property rights; the rule of law prevails; private incentives are aligned with social objectives; monetary and fiscal policies are solidly grounded; risks are mediated through social insurance, and citizens have recourse to civil liberties and political representation.

Rodrik (2003b) is based on the view that growth theory and the cross-country studies of growth undertaken during the last decade have left important questions unanswered. Moreover, the growth models that we work with do not explain the variety of experiences around the globe. It is the puzzle problem, namely, we have an idea of what the pieces are, but we do not know how to put them together. For

[23] It needs to be pointed out that not all economists would agree with de Soto's call for reforming the legal system as a means of strengthening property rights in developing countries. Rodrik (2003a) argues that while the goal of strengthening property rights regimes is laudable, administrative and political constraints in developing countries can often be such as to require institutional innovations "that [depart] significantly from Western norms" Rodrik 2003a, p.7). A case in point put forward by Rodrik is that of the TVEs in China. The formal ownership of TVEs lay not in private hands but in the local governments. As a result, the latter, had an incentive in the growth of TVEs as these would generate direct revenues. Given the conditions prevailing in China at the time, it is possible that property rights were more secure with local government ownership oof TVEs than under a private property legal regime.

[24] Rodrik (2001, 2003a, 2004), Rodrik et al. (2002), Hausman et al. (2004a, 2004b) are related work worth consulting.

this reason, the collection of essays, in the form of case studies, edited by Rodrik contrasts a rich variety of country experiences. In the different chapters, the authors dig into questions such as why India's growth accelerated before liberalizing reforms in the early 1990s?; why did Indonesia do fairly well despite massive corruption?; or why did the PRC do so well with a set of partial reforms? The value of detailed case studies is to illustrate that for any simple rule there is an exception.

Rodrik (2003b) argues that it is best to think about accumulation and productivity change (the neoclassical sources of growth) simply as *proximate* determinants of growth. On the other hand, he argues that the *deeper* determinants of growth are geography, integration (trade) and institutions.[25] Geography relates to the advantages and disadvantages and disadvantages posed by a country's physical location. Integration relates to market size, and the benefits and costs of participating in international trade in goods, services, and possibly labor. Institutions refer to the quality of formal and informal socio-political arrangements –ranging from the legal system to broader political institutions. The difficult question is, of course, how the five variables under the two sets of determinants of growth interact.

Three main conclusions can be drawn from Rodrik's (2003b) volume: (i) growth processes can start with limited reform and institutional effort, However, sustained growth requires ever more competent and complex institutions; (ii) politics as well as social structures matter. Country experiences reflect complex interactions between economic, political, and social factors; and (iii) as a consequence of the previous point, no simple policy recipes for growth exist. Policy experiments are a must. One could ask about the value of these essays for the policymaker. The view of this author is that the mere reading of these essays can be very rewarding and no doubt a great deal can be learnt. But no policy maker should expect to find the Holy Grail here. The reason is simple: it does not exist.

(iv) Growth and Demand Constraints

A potentially useful line of research is the analysis of the constraints that countries face for long-run growth from the demand side, in particular the balance of payments (McCombie and Thirlwall 1994, 1999; Thirlwall 1998). The dominant theoretical paradigm today for modeling growth is the neoclassical model (which underlies growth accounting exercises). In this model, resource availability and the supply of factor

[25] Recent work by Parker (2000) tries to establish a relationship between physics-based physiology and macroeconomics. His argument focuses on the equatorial paradox, the phenomenon that a country's latitude explains up to 70% of cross-country variances in per capita income. Parker argues that income, savings, investment, technology, entrepreneurship, production, and outputs per worker are influenced by some fundamental principles of physics and physiology.

inputs are the dominant explanations of growth rate differences across countries, and heavy emphasis is placed on investment and technical progress.

However, some authors, following the Harrodian and Keynesian traditions, have argued that countries' most important (i.e., binding) constraints to growth are on the demand side. In Keynesian theory, it is demand that drives the economic system to which supply adapts. Growth is not simply a question of current supply or resource availability because resources may be unemployed or underutilized (Thirlwall 1998, pp. 180-187). This does not imply, however, that supply constraints do not exist and/or that the supply side is not important, in particular in the developing countrie. What happens is that in many cases they are not binding. In developing countries labor is an abundant factor, while capital, the theoretically scarce factor, can be brought into the country (i.e., imported). What these countries need is to foster the *ability* to export in order to pay for full-employment imports (i.e., the value of imports that would occur when resources are fully utilized). This is what determines the level of employment and growth in the long run (McCombie and Thirlwall 1994). In this framework, income adjusts to bringing about equilibrium in the external sector. The implication is that if a country is below its growth of productive potential (i.e., the supply constraints are not binding), then its growth rate will be determined by the growth of demand. Thus, growth rates across countries must differ *because* the growth of demand differs among countries.

But *why does demand grow at different rates in different countries?* McCombie and Thirlwall (1994, 1999) argue that the most probable reason is that governments are inhibited from pursuing demand management policies by a single overriding factor, namely, the balance of payments (BOP) constraint. In the long run countries need to have a balanced current account, and in a growing economy this implies that the rate of growth of the value of exports equals the rate of growth of the value of imports. The term BOP constraint means that a country's performance in external markets, and the response of the world financial markets to this performance, constrains the growth of the economy to a rate below that which the rate of unemployment and capacity utilization would warrant.

How does the BOP constraint operate? If a country gets into BOP difficulties as it tries to expand demand before the short-term capacity growth rate is reached, demand must be reduced and supply is never fully utilized. When this occurs, investment is depressed, technological progress slows down (as evidence suggests that this is partly determined by the rate of growth), and a country's goods compared with foreign goods become less desirable, thus worsening the BOP further. On the other hand, if a country is able to expand demand up to the level of existing productive capacity, without BOP difficulties arising, the pressure of demand upon capacity may well raise the capacity growth rate. This creates a virtuous circle in the opposite direction to the one described above. How can this be achieved? There are several instruments: one is the encouragement of investment, which would augment the capital stock and bring

with it technological progress. Also, the supply of labor may increase by the entry into the workforce of people previously outside or from abroad. A third mechanism is by moving factors of production from low productivity to high productivity sectors. Finally, the ability to import more may increase the country's capacity by making domestic resources more productive.[26]

As argued above, according to the balance-of-payments constrained growth model, the reason why countries grow at different rates lies in differences in the rate of growth of demand, and the major constraint on the rate of growth of demand in most countries is the BOP. But *why does the BOP equilibrium growth rate differ across countries?* In the context of this model, this is tantamount to asking why countries should differ in the values of their income elasticities of demand for exports and imports. The answer lies, first, in the types of goods exported: are they the ones for which world demand is rapidly growing, such as manufactures or financial services, compared with, say, primary commodities? And second, are the *characteristics* of the types of products within each category of good or service such that they will give a firm in a country a competitive edge over their competitors' goods?[27] In other words, disparities between countries in the income elasticities of demand for exports and imports largely reflect differences in non-price competitiveness, broadly defined. *The message for a country whose export growth rate is relatively slow and with a relatively high import elasticity is that the goods it produces are relatively unattractive both at home and abroad.*

McCombie and Thirlwall (1994, 1999) have shown that the BOP equilibrium growth rate (y_B) is given by the simple rule $y_B = \frac{\varepsilon}{\pi} z$, known as *Thirlwall's law*, where z is the growth rate of world income, ε is the income elasticity of demand for exports and π is the income elasticity of demand for imports.[28,] This model implies that a country's BOP equilibrium growth rate is determined by the rate of growth of world income (z) multiplied by the ratio of income elasticities of demand for exports (ε) and imports (π). The authors interpret the model in the sense that it is the ratio

[26] The above is, incidentally, the essence of the export-led growth mechanism. The expansion of exports can raise the overall growth rate of the country without the BOP deteriorating simultaneously and lead to the virtuous circle. It must be pointed out, however, that the same rate of export growth in different countries will not necessarily permit the same rate of growth of output. This is because the import requirements associated with a particular growth rate will differ among countries. Consequently, some countries will have to constrain the growth of demand sooner than others for BOP equilibrium.

[27] Thailand, for example, has begun making wine out of exotic fruits such as mangosteen and lemongrass, products in which Thailand has a comparative advantage and which, if commercialized adequately, could have a high-income elasticity of demand for exports.

[28] Se McCombie and Thirlwall (1994, 1999) for details about the derivation of this results and the assumptions involved.

of income elasticities (ε / π) that *determines*, in a causal sense, the relative growth rate of a particular country (y_B / z) .This model emphasizes the joint negative effects of excessive openness to imports, as reflected in a high-income elasticity of import demand (π), and the positive effects of exports via a high-income elasticity of export demand (ε) or rapid world income growth (z). Moreover, the model provides a rationale why exports are so critical in the growth process; this is that they relieve the BOP constraint given by the import requirements of rapid growth.

(v) A Return to Classical Economics

Finally, a return to the ideas of the Classical Economists –Smith, Ricardo, Malthus, Marx- emphasizing the dynamics of profitability as the key to accumulation and growth, can prove very fruitful (Salvadori 2003). From a historical perspective, the first economists to be directly concerned wit issues of growth and development were the classical economists, i.e., Adam Smith, Thomas Malthus, David Ricardo and Karl Marx. These economists were mostly concerned with the analysis and implications of long-run growth, its causes and consequences. Their work concerned the forces that drive an economy to accumulate and grow. Capital accumulation, in particular the reinvestment of the surplus, was the engine of economic growth and henceforth, of the wealth of nations. For this reason, those interested in the study of the developing economies have, one way or another, to understand the message of the classical economists in order to find an appropriate framework to study the problem of growth in poor countries.[29]

Economic growth was the central theme in Classical political economy.[30] Put schematically, in the 'Classical' growth models, a given real wage rate determines, together with the technological conditions, the rate of profits and thus, through the savings-investment mechanism, the rate of growth. For the Classical economists, accumulation and productive investment of a part of the social product was the main driving force behind economic growth. In a market economy, this takes the form of the reinvestment of profits, which were assumed to be largely saved and invested. Moreover, the share of profits in income also determined the share of investment in output, and the rate of accumulation. Business practice alone should suffice to shed

[29] See, for example, the comparative analysis of China and India carried out by Fan and Felipe (2005).

[30] It must be noted that classical growth theory, like neoclassical, was supply-oriented and assumed full employment (e.g., Ricardian model of comparative advantage). The reader might argue that I am contradicting myself since in the previous subsection I advocated to look into the importance of demand constraints. The aspect I want to emphasize of the Classicals is the income distribution (institutions) – profitability - growth connection.

light on the significance of profits for capital accumulation and output growth. We would expect that because the pursuit of profits by business enterprise is paramount, the growth of output must be closely related to the dynamics of the profit rate. For these authors, there was a key connection between income distribution and growth, such that their growth theories took income distribution as determined by institutional factors prior to the economic system. This is an aspect not considered by the recent work on institutions discussed above.

A key aspect of Classical theory is the explanation of growth through a theory based upon the class structure (workers, capitalists and landowners) of the capitalist economy. The behavior of the three classes is governed by their attempt to get as much as possible from the resources they own. In terms of behavior, while workers and landowners substantially consume all their income, capitalists save and invest essentially the entire amount of profit. However, while workers purchase mainly subsistence goods, landowners buy mostly luxury goods. Mentioning this is important because the allocation of income in the Classical models is not a function of the preferences (like in the neoclassical models) but of the social groups to which those who receive the income belong. Paradoxically, there is very little evidence of the dynamics of the functional distribution of income and growth in the Asian countries. For evidence on the Philippines, see Felipe and Sipin (2004).

Another important aspect of these models is that, while Classical economists accepted the view that savings equal investment (more precisely, that savings are transformed into investment), the mechanism that makes this happen is not the interest rate (like in the neoclassical models). Rather, for Smith and Ricardo, the conditions in the labor market determine the wage rate, which in turn determines the rate of population growth and the profit rate. It is the latter that determines the interest rate.

A third aspect of these models is that crises are an inherent feature of the capitalist market system. On the one hand, sectoral demand and supply may not match; on the other hand, aggregate demand may not equal aggregate supply. These imbalances give rise to different types of crises. These are clearly described by Sylos-Labini (1984). At the bottom of a cycle, the real wage rate is held down by a large 'reserve army of unemployed workers. Under these circumstances, capitalists can accumulate freely. However, as output expands, unemployment decreases and the real wage rate probably rises. While this may last for some time, capitalists search for new labor-saving technologies and invest to build up the capital stock. In the process of labor substitution, the growth rate of employment begins to decrease, and cycle starts again. How do cyclical collapses arise? These can be triggered by different mechanisms, such as excessive funds tied up in machinery, sectoral imbalances, and lack of purchasing power on the part of capitalists to sustain investment; or on the part of workers to purchase the output that new investment produces.

6. CONCLUSIONS

This paper has offered a review of different aspects of the broad question of *how much do we really know about why some countries grow faster than others?* Perhaps the most important conclusion of this survey is that the economics profession does not have satisfactory answers to this fundamental question and to the related question of *what is the engine of economic growth?* Three additional conclusions are as follows:

(i) First, the paper has demystified the one-decade old debate about the sources of growth in East Asia. It has argued that the neoclassical growth model, which is the basis for the analysis of the sources of growth, is not a satisfactory starting point for understanding growth and development questions. Overall, we do not have a convincing answer to the question of how do we understand the East Asian growth miracle? At most, we have a number of competing hypotheses which are very difficult to verify empirically.

(ii) Second, the paper has addressed the broader question of how much we know about growth from an empirical point of view. The answer is that the empirical evidence gathered during the last 15 years does not answer the relevant growth questions. The reason is, probably, that it *can't*. A few regressions whose theory is not so clear and with dubious data for many countries for about 30 years cannot tell us how to solve the development puzzle.

(iii) Third, the paper has discussed some of the recent work on the role of institutions in growth and development. Many economists today believe that institutions hold the key to development and to explain growth differences across countries.

Finally, the paper has discussed some recent work and ideas that can prove useful in the search for answers to the questions of *what makes growth happen* and *why some countries grow faster than others*. In particular, three proposals have been discussed: (i) the profession has to go more micro. This is because firms are the creators of wealth in a market economy. In particular, we have to understand how competition leads to higher productivity; (ii) we need more country studies based on historical analyses that incorporate the role of institutions; and (iii) Classical economics can provide the theoretical foundations to study growth and development questions.

BIBLIOGRAPHY

ACEMOGLU, D., JOHNSON, S. AND ROBINSON, J.A. (2002) Reversal of Fortune: Geography and Institutions in the making of the modern world income distribution. *The Quarterly Journal of Economics*, November, 1231-1294

AGHION, P. AND HOWITT, P. (2005) Appropriate Growth Policy: A Unifying Framework. Manuscript. 2005 Joseph Schumpeter Lecture, delivered to the 20th Annual Congress of the European Economic Association, Amsterdam, August 25, 2005.

BRAVERMAN, H. (1998) *Labor and Monopoly Capital*. New York: Monthly Review Press. 25th Anniversary Edition.

CHEN, EDWARD K.Y. (1979) *Hyper-Growth in Asian Economies.* New York: Holmes & Meier Publishers, Inc.

COHEN, A. AND HARCOURT, G. (2003) Whatever Happened to the Capital Controversies?. *Journal of Economic Perspectives,* 17 (1),199-214.

COYLE, D. (2002) *Sex, Drugs & Economics*. New York: Texere.

DE SOTO, H. (1989) *The Other Path*. Basic Books.

DE SOTO, H. (2000) *The Mystery of Capital*. Black Swan.

EASTERLY, WILLIAM (2001) *The Elusive Quest for Growth*. The MIT Press.

FAN, X. AND FELIPE, J. (2005) The Diverging Patterns of Profitability, Investment and Growth of China and India, 1980-2003. Centre for Applied Macroeconomic Analysis (CAMA), Australian National University, Working Paper 22/2005. Available at http://cama.anu.edu.au/Working%20Papers/Papers/Fan_Felipe_222005.pdf

FELIPE, J. (1997) Why Krugman is Wrong. The Asian Wall Street Journal, 18th March, 1997.

FELIPE, J. (1999) Total Factor Productivity Growth in Asia: A Critical Survey. *Journal of Development Studies*, 35, 1-41.

FELIPE, J. AND FISHER, F. (2003) Aggregation in Production Functions: What Applied Economists Should Know. *Metroeconomica*, 54(2-3), 208-62.

FELIPE, J. AND FISHER, F. (2006) Aggregate Production Functions, Neoclassical Growth Models and the Aggregation Problem. *Estudios de Economia Aplicada*, 24(1), 127-163.

FELIPE, J. AND McCOMBIE, J.S.L. (2001) Biased Technical Change, Growth Accounting and the Conundrum of the East Asian Miracle. *Journal of Comparative Economics*, 29, 542-65.

FELIPE, J. AND McCOMBIE, J.S.L.(2003) Some Methodological Problems with the Neoclassical Analysis of the East Asian Miracle. *Cambridge Journal of Economics*, 54(5), 695-721.

FELIPE, J. AND McCOMBIE, J.S.L. (2005a) Why are Some Countries Richer than Others? A Sceptical View of Mankiw-Romer-Weil's Test of the Neoclassical Growth Model. *Metroeconomica,* 56 (3), 360-392.

FELIPE, J. AND McCOMBIE, J.S.L. (2005b) Is a Theory of Total factor Productivity Really Needed? *Metroeconomica*. Forthcoming.

FELIPE, J. AND MCCOMBIE, J.S.L. (2006) The Tyranny of the Accounting Identity: Growth Accounting Revisited. *International Review of Applied Economics*. Forthcoming.

FELIPE, J. AND SIPIN, G. (2004) Competitiveness, Income Distribution and Growth in the Philippines: What does the Long-Run Evidence Show? *ERD Working Paper Series*, 53. Manila: Economics And Research Department, Asian Development Bank.

GALDÓN-SÁNCHEZ, J. AND SCHMITZ, J. (2003) Competitive Pressure and Labor Productivity: World Iron Ore Markets in the 1980s. *Federal Reserve Bank of Minneapolis Quarterly Review*, 27(2), 9-23.

GRIFFIN, KEITH (1999, SECOND EDITION) Alternative Strategies for Economic Development. Palgrave Macmillan in association with the OECD Development Center

HAUSMAN, R., PRICHETT, L. AND RODRIK, D. (2004a) Growth Accelerations. *NBER Working Paper 10566*.

HAUSMAN, R., RODRIK, D. AND VELASCO, A. (2004b) Growth Diagnostics. John F. Kennedy School of Government, Harvard University. Mimeo.

HOBDAY, M. (1995) East Asian latecomer Firms: Learning the Technology of Electronics. *World Development*, 23(7), 1171-93.

HSIEH, CHANG-TAI (2002) What Explains the Industrial Revolution in East Asia? Evidence from Factor Markets. *American Economic Review*, 92, 502-526.

IWATA, S., KHAN, M. AND MURAO, H. (2002) Sources of Economic Growth. *IMF Working Paper 02/13*. International Monetary Fund, Washington, DC.

JONES, CHARLES I. (1998) *Economic Growth*. New York, London: W.W. Norton.

KALDOR, N. (1957) A Model of Economic Growth. *The Economic Journal*, 67(268), 591-624.

KENNY, C. AND WILLIAMS, D. (2001) What Do We Know about Economic Growth? Or, Why Don't We Know Very Much? *World Development*, 29, 1-22.

KIM, L. (1997) *From Imitation to Innovation: Dynamics of Korea's Technological Learning*. Boston, MA: Harvard Business School Press.

KIM, J-I. AND LAU, L. (1994) The Sources of Economic Growth of the East Asian Newly Industrialized Countries. *Journal of the Japanese and International Economies*, 8, 235-71.

KLEIN, L.R. (1990) Can Export-Led Growth continue indefinitely? An Asia-Pacific Perspectives. *Journal of Asian Economics*, 1 (1), 1-12.

KLEIN, L.R. (2004) China and India: Two Asian Economic Giants, Two Different Systems. *Applied Econometrics and International Development*, Vol.4-1: pp.7-19.

KLEIN, L.R. AND ÖZMUCUR, S. (2002/2003). The Estimation of China's Economic Growth Rate." *Journal of Economic and Social Measurements*, 28: pp.187-202.

KLEIN, L.R. AND PALANIVEL, T. (2002). Economic Reforms and Growth Prospects in India. Manuscript.

KRUGMAN, P. (1994) The Myth of Asia's Miracle. *Foreign Affairs*, November/December, 62-78.

LANDES, D. (1998) *The Wealth and Poverty of Nations*. London: Abacus.

LEWIS, A. (1965) *The Theory of Economic Growth*. New York: Harper and Row.

MANKIW, G., ROMER, D. AND WEIL, D. (1992) A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics*, 107(2), 407-37.

MARWAH, K. AND KLEIN, L.R. (1995) The Possibility of Nesting South Asia in Asia-Pacific Economic Integration. *Journal of Asian Economics*, 6(1), 1-27.

MARWAH, K. AND KLEIN, L.R. (1996) What are some prospects for India's joining the Asian growth process?. *Research in Asian Economic Studies*, 7 (B), 419-39.

MARWAH, K. AND KLEIN, L.R. (1998) Capital Inflows into Emerging India. *Research in Asian Economic Studies*, 8, 245-63.

McCOMBIE, J.S.L. AND THIRLWALL, A. P. (1994). *Economic Growth and the Balance of Payments Constraint*. St. Martin's Press.

McCOMBIE, J.S.L. AND THIRLWALL, A. P. (1999) Growth in an International Context, In Johan Deprez and John T. Harvey (eds.), *Foundations of International Economics. Post Keynesian Perspectives*, 35-90 Routledge.

MEIER, G. (2001) The Old Generation of Development Economists and the New. In Gerald M. Meier and Joseph E. Stiglitz (eds.): *Frontiers of Development Economics*, 13-50. Oxford University Press.

MYRDAL, G. (1968) *Asian Drama: An Inquiry into the Poverty of Nations*. New York: Pantheon.

NELSON, R. (1973) Recent Exercises in Growth Accounting: New Understanding or Dead End" *American Economic Review,* 63(3), 462-68.

NELSON, R. (1981) Research on Productivity Growth and Productivity Differences: Dead Ends and New Departures. *Journal of Economic Literature*, 19, 1029-64.

NELSON, R. (1998) The agenda for growth theory: a different point of view. *Cambridge Journal of Economics*, 22, 497-520.

NELSON, R. AND PACK, H. (1999) The Asian Growth Miracle and Modern Growth Theory. *Economic Journal*, 109, 416-36.

NELSON, R. AND WINTER, S. (2002) Evolutionary Theorizing in Economics, *Journal of Economic Perspectives*, 16, 23-046.

OLSON, M. (1996) Big Bills Left on the Sidewalk: Why Some Nations are Rich, and Others Poor. *Journal of Economic Perspectives*, 10(2), 3-24.

PASINETTI, L. (1959) On Concepts and Measures of Changes in Productivity. *The Review of Economics and Statistics*, 41, 270-86.

PRITCHETT, L. (2003) A Conclusion to Cross-National Growth Research: A Foreword 'To the Countries Themselves'. In Gary McMahon and Lyn Squire (eds.): *Explaining Growth*, 213-43. Palgrave Macmilan.

RASHID, S. (2000) *Economic Policy for Growth. Economic Policy is Human Development*. Kluwer Academic Press.

RODRIK, D. (2001) "Development Strategies for the 21st Century." In Boris Pleskovic and Nicholas Stern (eds.): *Annual World Bank Conference on Development Economics 2000*, 85-108. Oxford: The World Bank and Oxford University Press.

RODRIK, D. (2003a) *Growth Strategies*. Harvard University. Mimeo.

RODRIK, D. (2003b) *In Search of Prosperity: Analytical Narratives on Economic Growth*. Princeton: Princeton University Press.

RODRIK, D. (2004) *Industrial Policy for the Twenty-First century*. Harvard University. Mimeo.

RODRIK, D. (2005) *Why We Learn Nothing from Regressing Economic Growth on Policies*. Harvard University. Manuscript.

RODRIK, D., SUBRAMANIAN, A. AND TREBBI, F. (2002) Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development. *NBER Working Paper* No.9305.

SCOTT, M. (1989) *A New View of Economic Growth*. Oxford: Clarendon Press.

SEN, A. (1999) *Development as Freedom*. New York: Anchor Books.

SENHADJI, A. (2000) Sources of Economic Growth: An Extensive Growth Accounting Exercise. *IMF Staff Papers*, 47, 129-57.

SOLUDO, C. AND KIM, J. (2003) Sources of Aggregate Growth in Developing Regions: Still More Questions than Answers? In Gary McMahon and Lyn Squire (eds.): *Explaining Growth*, 32-76. Palgrave Macmilan.

STERN, N., DETHIER, JEAN-JACQUES, AND ROGERS, F. H. (2005) A Strategy for Development. In Nicholas Stern, Jean-Jacques Dethier and F. Halsey Rogers (eds.): *Growth and Development. Making Development Happen*, pp.127-163. The MIT Press.

STIGLITZ, J. (2001) From Miracle to Crisis to Recovery: Lessons from Four Decades of East Asian Experience. In Joseph E. Stiglitz and Shahid Yusuf (eds.): *Rethinking the East Asian Miracle,* 509-26. Oxford University Press.

THIRLWALL, A.P. (1998) The Balance of Payments and Growth: From Mercantilism to Keynes to Harrod and Beyond, In Rampa, Giorgio, Luciano Stella, and A.P. Thirlwall (eds.), *Economic Dynamics, Trade and Growth*, 179-207. New York: St. Martin's Press.

WACZIARG, R. (2002) Review of Easterly's *The Elusive Quest for Growth*. *Journal of Economic Literature*, 40, 907-18.

YOUNG, A. (1992) A Tale of Two Cities: Factor Accumulation and Technical Change in Hong Kong Singapore. *National Bureau of Economic Research Macroeconomics Annual 1992,* 13-63.

YOUNG, A. (1995) The Tyranny of the Numbers: Confronting the Statistical Realities of the East Asian Growth Experience. *Quarterly Journal of Economics*, 110, 641-80.