

PART 1

INTRODUCTION

1. Trade and Growth: The Role of Trade in the Catch-Up Process

## **TRADE AND GROWTH: THE ROLE OF TRADE IN THE CATCH-UP PROCESS**

In order to understand the catch-up process, one may first have to delve into the basic nature of the mechanism of sustained high growth in a successfully developing economy. We may contend that the initiation of catch-up implies a reduction in the rate of time preference. We may further contend that the successful maintenance of high savings propensity depends on the ability of a country to sustain high rates of return on investment, and that export-oriented growth through international price-quality competition is indeed conducive to achieving this objective.

### 1. INTRODUCTION

In the old fashioned neoclassical growth models, such as those of Solow (1956) and Cass (1965), initial endowments of capital have no bearing on the long-run per capita income levels among different countries. If the technological and preference parameters and the exogenously determined level of disembodied technical progress were similar across countries, all would converge on a constant value. On the other hand, in the recent endogenous perpetual balanced growth models such as those of Romer (1990), Lucas (1988) and Barro (1990), per capita income levels depend on the initial human capital endowments and hence are claimed to explain, if not the catch-up phenomenon, at least the persistent diversity in income levels among different countries, albeit with some flavor of fatalism. An economy beginning with a low human capital endowment will be destined to remain permanently below an economy with a higher initial endowment even if the long-run rate of capital accumulation were the same in both. Lucas (1993) makes a country's rate of human capital growth to be influenced by the level of human capital elsewhere, such as the average level of the entire world or of a subset of countries that the country maintains close contacts with. Lucas suggests that over subsets of countries where factor and final goods mobility is high, convergence in the level of human capital stock may be observed, which provides a possible formal explanation for the catch-up phenomenon. As a by-product of each model's assumptions concerning the existence of

externalities (stemming from the engine of growth), monopoly pricing, or public goods, government intervention in the form of tax-subsidy or of supplying public goods will be socially optimal. In a sense, it is the same old wine in a fancy new wine-skin. Economists have long been talking about government interventions associated with market failures as well as the necessary initial conditions for high sustained growth.

“Explaining” the catch-up process, rather than simply formalizing its possibility, might be a real challenge. Many economists have argued that an underdeveloped economy has a stronger growth potential than an advanced economy because it can install the most up-to-date capital equipments and adopt the latest (disembodied) production and organizational technologies. That is, a late-comer has the possibility to make large technological leaps that may quickly reduce the existing productivity gap. At the same time, they emphasize the distinction between the potential for catch-up and the factors enabling the realization of potential. It is often believed that the existence of a correct political leadership and a strong government constitute the absolutely necessary conditions for an underdeveloped economy to commence the process of catching-up to be an advanced economy. The correct political leadership may imply the one that can bolster secularism by nationalism, keep making strategic decisions on incentive systems and conflict resolutions (that include market intervention in the form of tax-subsidy and of supplying public goods), promote egalitarianism that tolerates unequal rewards proportionate to individual productivity and efforts, and direct a nation’s energy and talent toward modernization and growth by maintaining an effective consensus. In the absence of such a correct political leadership, a poor country will remain poor. Not surprisingly, in the informal theorizing on the basic forces of development, the role of government could have been examined in a much broader context than in the formal theorizing on the cause of growth (see Abramowitz, 1991).

Many economists, however, believe that an adequate degree of social capability—in levels of education, in organizing and managing large-scale enterprises, and in organizing and providing financial intermediation through capital market institutions, etc.—is also a necessary precondition for an underdeveloped economy to initiate the process of catch-up. The so-called social capability that is introduced in the informal theorizing on development may be understood as a more broadly conceptualized version of human capital that is introduced in the formal growth models. If a country’s social capability is adequate to make a start, since social capability anticipates the needs of technology and responds to its changing requirements, the rate of catch-up can even be accelerated by ever strengthening social capability, i.e.,

by the interactive and cumulative character of the advance of social capability (see Abramovitz, 1986). The message is simple. The existence of a correct political leadership (or correct government intervention) is not enough. Poor countries with inadequate social capability (or human capital) have to somehow build up social capability first before contemplating their catch-up. Building up social capability is the starting point for molding one's own destiny and the beginning of the catch-up process. In Romer's model (1986, 1990), for instance, innovations are the engine of growth, but innovative research activity is determined by the economy's endowment of human capital. Hence it is suggested that the socially optimal rate of growth can be achieved by subsidizing the accumulation of human capital.

The arguments surrounding "necessary preconditions" for anything, however, are likely to be counterproductive. In Korea, for example, as of 1960, school enrollment as a percentage of corresponding age groups amounted to 86 percent for elementary school, 33 percent for junior high school, 20 percent for senior high school, and 6.4 percent for colleges & universities. The illiteracy rate among people above 15 years old amounted to 24.4 percent in 1960. (Data prepared by the Central Education Institute.) There appeared a strong political leadership. A priori, however, it must have been difficult to say whether the education level in Korea in 1960 represented an adequate social capability or not. In retrospect, of course, we may say that the level of education in Korea at that time was more than adequate for it to commence the catch-up process in the form of an export-oriented growth strategy.

A country may begin the catch-up process with labor-intensive manufacturing that can be effectively conducted on a modest scale. The capacity to organize and administer large-scale enterprises may simply be the fruit of experience. In an endogenous growth model such as Romer's (1986), the opening-up to trade will increase the long-run growth rate of every economy to the extent that it allows the world-wide utilization of a larger pool of human resources in inventive activities that are characterized with scale economies. The supply of human capital for use in research may respond positively to increases in the size of the market. One may therefore argue that the outward-looking growth allowed Korea a more extensive utilization of available human resources for innovative activity. The endogenous growth models, however, can not handle the dynamic interaction between trade and internal domestic organization that determines the utilization rate of available human resources. Nor can they handle the interactive and cumulative character of the advance of an economy in general. The existing endogenous growth models do not address the transition

dynamics along the way from a poor country's balanced growth path to a rich country's balanced growth path. The explanation of catch-up still seems to belong to informal theorizing.

This paper addresses a possible explanation of the catch-up process. Section 2 delineates the mechanism of high growth, and Section 3 reexamines the vehicles for catch-up expounded by Hamilton and List. After examining the so-called NICs phenomenon of outward-looking export-oriented growth, we give concluding remarks in Section 4.

## 2. THE MECHANISM OF HIGH GROWTH

In a simple steady state framework, we may postulate diminishing returns on capital that is applied to a unit of labor. We may further postulate that interest rate equals a given rate of intertemporal time preference ( $\rho$ ) of a country.<sup>1</sup> In a steady state, interest rate also equals the marginal rate of return on capital. The lower the discount rate of time, the larger will be the equilibrium capital stock per labor unit. Per capita income, however, increases less than proportionately with an increase in per capita capital stock. Therefore, the necessity to maintain a constant rate of increase in the aggregate capital stock of the economy that is equal to the given constant growth rate of labor ( $n$ ) implies that, the lower the rate of time preference, the higher will be the aggregate (steady-state) savings propensity of the economy.

Our theoretical framework may be described as follows in a steady-state postulation:

$$y(k) = w(k) + r(k)k$$

<sup>1</sup>A country may be represented by a rational individual faced with the choice of a consumption schedule which is optimal with respect to the individual's constant rate of time preference (i.e., the rate of time discount). Each individual consumer decides the allocation of his income between consumption and savings, and is permitted to hold his assets only in the form of real capital for which the rate of return varies with the amount held. The income stream he expects to receive depends upon the amount of accumulated savings in the form of real capital (capital formation), and he is primarily concerned with attaining the time path of consumption which is most preferred in terms of his rate of time discount. The schedule of (diminishing) marginal product of capital can be viewed as a demand schedule for productive capital, while the (constant) time preference schedule can be viewed as a (horizontal) supply schedule of capital on the part of households. See Uzawa (1968) and Epstein and Hynes (1983).

where  $y$  is the per capita income flow,  $w(k)$  the wage rate,  $r(k)$  the rental rate that equals the steady-state interest rate,  $k$  the per capita (non-depreciating) capital stock, and  $r'(k) < 0$ . In a steady-state,

$$r(k) = \rho$$

Furthermore, we should have

$$nk = s(\cdot)y$$

where  $s(\cdot)$  represents the average savings propensity. Steady-state equilibrium in a capital market occurs at the steady-state capital stock and the rental rate of capital that equals the given rate of time discount. A decrease in  $\rho$  induces an accumulation of per capita capital stock and the consequent lower marginal rate of return on capital,  $r(k)$ . The (per capita) income flow increases, but less than proportionately to the increase in (per capita) capital stock. Hence a decrease in  $\rho$  should imply an increase in  $s$ .

In the above conceptual framework, an initiation of the catch-up process implies a reduction in the rate of time preference (i.e., an increase in patience) and the associated rise in aggregate savings propensity. This may be achieved either by the coercion of a dictator, by the persuasion of societal leadership, or by an external shock. The success in maintaining a low rate of time preference (and hence a high rate of savings propensity) may, however, depend on the ability to maintain a high rate of return on the extra capital stock that is supplied by the extra savings of the people of the society. That is, the sharper the diminishing rate of return on capital per unit of labor, the more likely is the loss of credibility of the political leadership and the more likely is the society to return to the high rate of time discount (and hence low saving) economy. The people may have to see a tangible return on the sacrifice of current consumption without too much delay (see Figure 1).

We may now contend that either a successful maintenance of high savings

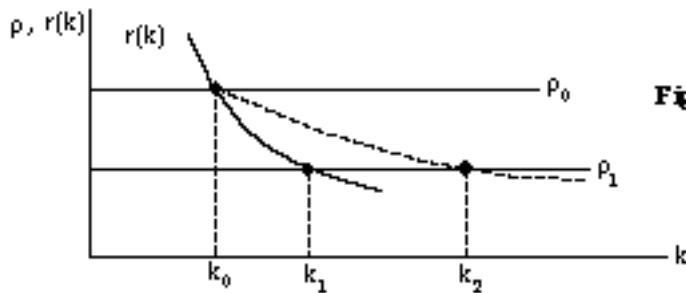


Figure 1.

propensity or a steady increase in savings propensity crucially depends on the ability of the country to sustain high rates of return on investment, i.e., the ability to prevent a rapid fall in the rate of return on investments.<sup>2</sup> If an ample supply of some public goods or human capital formation is crucial for this object, the government may have to give the first priority to tax-expenditure activities for providing public goods or education. If the transient externality aspect à la Hamilton-List is important, the government may have to devote itself to the promotion of infant industries through tax-subsidy measures. If full employment (based on comparative advantage) and dynamic learning effect are important, the government may be better off promoting export expansion (of the infant industries) and international price-quality competition on the world market.

In the old fashioned neoclassical growth models, an exogenous increase in the rate of saving can not raise the rate of growth permanently and the latter will eventually converge to a constant (rate of growth in population). The country, however, experiences higher growth rates for a [long] while and ends up with higher per capita income levels at the eventual steady state. In the Romer (1990) type endogenous perpetual balanced growth model incorporating scale economies, however, an increase in patience reduces the interest rate and hence increases the rates of innovation and growth. In the production technology side of Romer's model,

$$g = H_A = H - r \quad \text{or} \quad r = (H - g)$$

where  $g$  is the common growth rate for all balanced growth variables,  $H$  a productivity parameter in research,  $H$  the given stock of human capital,  $H_A$  the human capital allocated to research activities,  $\delta$  a constant that depends on the familiar Cobb-Douglas parameters  $\alpha$  and  $\beta$ , and  $r$  the interest rate.<sup>3</sup> On the other hand, in the preference side of the model,

$$g = (r - \delta) / \theta \quad \text{or} \quad r = \delta + \theta g$$

<sup>2</sup>With perfect capital mobility, investment rate in a country has no connection with its own savings rate. Higher rate of return on investment, however, will increase the inflow of foreign savings.

<sup>3</sup>Equilibrium in the production sector implies the negative relation between  $r$  and  $g$ . A decrease in  $r$  increases the demand for capital goods that are rented (and reduces the discount rate), and thereby increases the value of patents. It causes a shift in human capital into the production of new designs that quickens the creation of technology and thereby raises the growth rate (see Rivera-Batiz and Romer, 1991).

where  $\sigma$  is the inverse of the intertemporal elasticity of substitution.<sup>4</sup> As a result, we obtain

$$g = (H - \sigma) / (\sigma + 1).$$

The return to allocating human capital in research is a stream of net revenue that a *design* (a new technology) generates in the future. If the

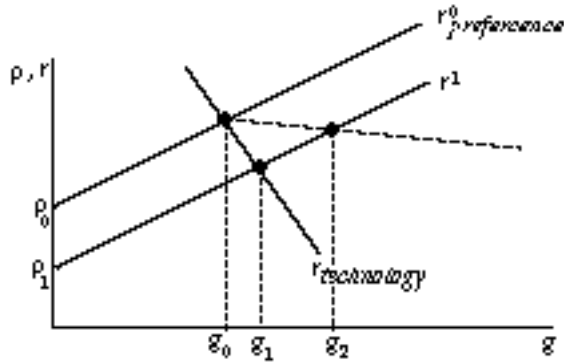


Figure 2.

interest rate is lower, the present discounted value of the stream of net value will be higher. More human capital will be allocated to research, and the rate of growth will be higher (see Figure 2). Though returns diminish as more physical capital is applied to a unit of labor, that effect can be offset by the flow of new technology (new design).<sup>5</sup>

Furthermore, investment in human capital formation can always spur R & D (or knowledge), and the R & D can raise the return on investment. Outward-looking export-oriented growth strategy may permanently raise the rate of growth by stimulating human capital formation, (scientific progress and innovation) on the one hand, and a further reduction in the rate of time discount on the other (see Hong, 1988). Romer (1990) suggests that, in the

<sup>4</sup>When consumption is growing more rapidly, current consumption is more valuable compared with future consumption, so the marginal rate of substitution between present and future consumption is higher. Consumers would therefore be willing to borrow at higher  $r$ .

<sup>5</sup>It captures the features of modern high-technology industries that require high fixed costs due to initial R & D expenditures and also dynamic scale economies from learning-by-doing as well as external scale economies in the form of knowledge spillovers (embodied in the historical H stock).



absence of feasible policies that can remove the divergence between the social and private returns to research caused by externalities and scale economies, a second-best policy would be to subsidize the accumulation of total human capital. Human capital is assumed to be the input that is used most intensively (in fact, the only input) in research activity.

The country may increase the flow of savings first by lowering  $r$ . Then the country may try to sustain high rates of return on savings (and investment) by increasing  $H$  or raising  $r$ . Tax-subsidy measures and export-oriented growth strategy might be conducive to achieving these objectives as well as to further lowering  $r$ .<sup>6</sup>

Lucas (1993) interprets Solow's technology variable as a country-specific stock of human capital:

where  $y_i$  represents country  $i$ 's domestic product,  $A$  the common technology intercept,  $K$  the common technology capital,  $H$  the common technology human capital, and  $u_i$  the

$$y_i = A(K/H)^{\alpha} u_i h_i$$

world supply of effective human capital devoted to goods production,  $u_i = u$  the fraction of time people spend producing physical capital,  $h_i$  the human capital of country  $i$ , and  $dk_i(t)/dt = s_i y_i(t)$ ,  $s_i = s$  being the savings rate (a decision variable).<sup>7</sup>

Should we postulate that the growth of human capital depends on the amount of quality-adjusted time devoted to its production in each country,  $u_i = u$ ? The long run growth rate of physical capital and every country's output is equal to the rate of human capital growth,  $(1 - u)$ . Each country's income

$$\frac{dh_i(t)}{dt} = (1 - u)h_i(t).$$

level will be proportional to its initial human capital, not only in the long run but all along the equilibrium path.<sup>8</sup>

We can, however, postulate that a country's rate of human capital growth is influenced by the level of human capital elsewhere in the world,

<sup>6</sup>With perfect capital mobility, the country may first try to increase the rate of return on investment that will induce a larger inflow of foreign savings.

<sup>7</sup> $K$  is allocated across countries so as to equate the marginal product in each country to a common world rate of return  $r [= A(K/H)^{\alpha-1}]$ .

<sup>8</sup>The long run growth rate of both capital and production per worker is also  $(1 - u)$ , the rate of human capital growth and the ratio of physical to human capital

where Lucas makes  $Z(t) = H(t)/\mu$ , i.e., the world average human capital

$$\frac{dh_i(t)}{dt} = (1 - u)h_i(t)^{1-\alpha} Z(t)$$

level. Then a country's relative human capital  $z_i = h_i/Z$  converges to one. An economy with a human capital stock lower than the world average will grow faster than an above average economy. If  $\alpha = 1$ , growth of human capital in any country depends on "local efforts" together with worldwide knowledge, independent of the local human capital level. Lucas suggests that over subsets of countries where factor and final goods mobility is high, convergence may really be observed.

In order to explain the catch-up process, however, one may first have to delve into the basic nature of the mechanism of sustained high growth in a successfully developing economy; that is, have to delve into the commencement of the catch-up process, the engine of sustained growth, the dynamic interaction between trade and motivating forces, and the interactive and cumulative character of the catch-up process. At the same time, we may take a more open-minded view that there may be neither absolutely necessary nor sufficient conditions (or preconditions) for catch-up.

The enormous potential in the energy and intelligence of human beings can be nullified and wasted by institutionalizing a system that would severely repress man's latent energies, or a system (or legal regime) that would let each individual energy offset another, or a system that would channel individual energies into the least productive activities. Therefore, for an economy to achieve sustained high growth, it may have to institutionalize a system that can, first, maximize the energy and effort of each individual member of the society, second, minimize the rate of return on rent-seeking and other non-productive activities and thereby channel the individual energies into the economic activities that are most productive for the society as a whole, third, maintain an autogenous (self-generated) dynamism and, fourth, minimize the unnecessary frictions among the members of the society.

For a given total supply of entrepreneurs, Baumol (1990) contends that "the productive contribution of the society's entrepreneurial activities varies much more because of their allocation between productive activities such as innovation and largely unproductive activities such as rent seeking or organized crime, and also contends that this allocation is heavily influenced

converging to a constant.

by the relative payoffs [profits] society offers to such activities.” Baumol believes that government policy can influence the allocation of entrepreneurship more effectively than it can influence its supply.

We may argue that the economic success of Korea during the past 30 years has been due to the government’s ability: (1) to identify the most productive form of economic activities for the nation’s economy, i.e., international specialization in labor-intensive manufacturing; (2) to institutionalize an export-promotion system that maximized the energy and effort of each individual member of society, and channel these mobilized energies into what had been clearly identified as the most productive and most dynamic activities, i.e., the export activities; (3) to maintain the autogenous dynamism of the new system by exposing Korean people to the incessant price-quality competition of international market; and (4) to suppress possible social frictions by using naked forces over a fairly long period of time.

One may of course argue that, compared with most other developing countries, Korea was blessed by having been subject to fewer insurmountable socio-political obstacles to institutionalizing incentive schemes to promote export activities. Indeed, Korea had already eliminated the tradition-bound landlord class by the early 1950s through land reforms. Korea had experienced an import-substitution-oriented regime in the 1950s, but the regime did not last long enough to generate extremely powerful vested interest groups entrenched in the monopolistic import-substituting activities geared to the captive domestic markets. Too much emphasis given to these kinds of facts, however, may simply enlarge the list of necessary preconditions.

As suggested by Myint(1977), in order to bring out the effect of export-oriented strategy on domestic growth, we may need an “open-ended” model of the economic system in which the less-than-perfect utilization of available domestic resources would leave room for its productive potentialities to be brought out more fully by the forces introduced through international specialization and export-oriented growth.

### 3. VEHICLES FOR CATCH-UP

Hamilton (1791) and List (1841) argued for the promotion of infant manufacturing activities as a vehicle for catch-up. Pre-War Japan, to name one example, pursued imperialist colonialism with imported Western technologies for catch-up, and in its era of *industrial structure policy* (1955-74) pursued a government-guided heavy and chemical industrialization

strategy, integrating its economy into the global trade regime armed with an undervalued yen (see Komiya, 1992). The East Asian NICs have been pursuing outward-looking export-oriented growth strategies ever since the 1960s as a device for catch-up.

Hamilton and List are always cited as the original proponents of the infant industry argument, but their works are very rarely read even by those who cite their names. Many economists seem to recognize the importance of their analysis of the growth-stimulating effect of infant industry promotion. Hamilton and List, however, are not respected as development theorists or trade theorists. The traditional criticism against them seems to be that they failed to clarify the concept of the engine of growth and to discover the idea of [transient] Marshallian external economies associated with a dynamic learning process, and this failure vitiated their approach to the subject. Kemp (1960) even fails to mention List in writing about “The Mill-Bastable Infant-Industry Dogma.”<sup>9</sup> If one, however, reads the writings of Hamilton and List carefully, one can feel that these criticisms leveled against them might well be unwarranted. The only valid criticism might be that Hamilton and List argued for the promotion of infant manufacturing activities without particularly warning against the possible undesirable results when an import-substitution-oriented approach is adopted in pursuing such an object. After all, justifying government intervention in the form of infant industry promotion is one thing, and ranking the alternative forms of intervention is another. If Hamilton and List could have the luxury of the hindsight of our contemporaries, they might well have recommended the outward-looking export-oriented promotion of infant labor-intensive manufacturing activities at the starting point of catch-up.

This section reexamines the infant industry argument of Hamilton and List as well as the nature of export-oriented growth strategy. Myint (1977) acknowledges that “the outward-looking approach emphasizes the expansion of external trade as the engine of growth” but points out its tendency “to underplay the fact that a country may not be able to take full advantage of its external economic opportunities unless its internal domestic economic organization is strengthened and improved.” We will, however, illustrate the inherent dynamism of international specialization that takes care of the

<sup>9</sup>Kemp defines the case for infant industry promotion as follows. Practice makes perfect and a firm can learn from its own experiences and from those of other firms in the same industry. Even if later profits, suitably discounted, sufficiently exceed the losses of the early learning period, firms will not be willing to shoulder the early losses if the lessons of its experiences would be freely available to any followers. Then the initial subsidy is an essential condition for the establishment of the industry.

improvement in domestic economic organization. The aspect of strengthening domestic economic organization was originally very much emphasized by List.

### A. Alexander Hamilton

Hamilton (1791; 1966: 249) believes that manufacturing establishments not only contribute to increasing the national product but they also contribute to rendering the national product “greater than [it] could possibly be, without such establishments.” That is, manufacturing activity is the engine of growth. Manufacturing activities furnish (*ibid*: 254-255) “greater scope for the diversity of talents and dispositions, which discriminate men from each other. . . And [therefore]. . . the results of human exertion may be immensely increased by diversifying its object. When all the different kinds of industry obtain in a community, each individual can find his proper element, and can call into activity the whole vigour of his nature.” Hamilton believes that (*ibid*: 242) manufacturing activities “open a wider field to exertions of ingenuity than agriculture” and that (*ibid*: 256) “the spirit of enterprise. . . must necessarily be. . . expanded in proportion to the. . . variety of the occupations and productions (*ibid*: 156).” Hamilton not only emphasizes a fuller utilization of the given existing resources, but also the longer run changes in the supply of productive factors.<sup>10</sup>

Hamilton believes that (*ibid*: 268), because of “the *natural disadvantages* of a new undertaking,” “to maintain between the recent establishments of one country and the long matured establishments of another country, a competition upon equal terms, both as to quality and price, is in most cases impracticable. The disparity. . . must necessarily be so considerable as to forbid a successful rivalry, without the extraordinary aid and protection of government.”

According to Hamilton (*ibid*: 266-267), “the strong influence of habit and. . . the fear of want of success in untried enterprises—the *intrinsic difficulties incident to first essays* towards a competition with those who have previously attained to perfection in the business to be attempted—[make the changes from agriculture to manufacturing] likely to be more tardy than might consist with the interest either of individuals or of the society. . . . To produce the desirable changes, as early as may be expedient, may therefore require the

<sup>10</sup>According to Hamilton (*ibid*: 256), manufacturing activities tend to “provoke exertion,” “cherish and stimulate the activity of the human mind” “by which the wealth of a nation may be promoted” which is “of greater consequence in the general scale of national exertion.”

incitement and patronage of government [as may be capable of overcoming the obstacles].” Hamilton believes that (*ibid*: 269) the “existence of assurance of aid from the government. . . may be essential to fortify adventures against. . . [those who enjoy] the *advantages naturally acquired from practice* and previous possession of the ground.” According to the U.S. constitution (*ibid*: 302-303), the National Legislature has express authority “to lay and collect taxes, duties . . . and provide for the common defense and general welfare.” And according to Hamilton, the “phrase [general welfare] is as comprehensive as any that could have been used.” Hamilton (*ibid*:302) believes that “it is the interest of the society. . . to submit to a *temporary* expense, which is more than compensated, by an increase of industry and wealth, by an augmentation of resources and independence; and by the circumstance of *eventual* cheapness. . .” Hamilton believes that (*ibid*: 286) “the internal competition, which takes place, soon does away every thing like monopoly, and by degrees reduces the price of the article to the minimum of a reasonable profit on the capital employed. . . In a national view, a *temporary* enhancement of price must always be well compensated by a *permanent* reduction of it.”

Hamilton and List are often criticized for their failure to understand the second best nature of tariff protection of infant industries. Hamilton, as well as List, however, seem to have been well aware of the first-best nature of a tax-cum-subsidy approach. Hamilton states that (*ibid*: 298-301) pecuniary bounties are “the most efficacious means of encouraging manufactures. . . overcoming the obstacles which arise from the competition of superior skill and maturity elsewhere” because they tend “to stimulate and uphold new enterprises [undertakings]. . . in the first attempts” avoiding “the inconvenience of a temporary augmentation of price.”

Hamilton believes that (*ibid*: 301 & 336) the “public encouragement” of the “acquisition of a new and useful branch of industry” leads to “a permanent addition to the general stock of productive labor” and hence bounties and premiums as well as tariff protections “are productive, when rightly applied” and “particularly in the *infancy* of new enterprises [they are] indispensable.” Hamilton (*ibid*: 307) emphasizes the needs for “the *encouragement of new inventions and discoveries*, at home, and of the introduction into [the home country]. . . of such as may have been made in other countries; particularly those, which relate to machinery.” Hamilton (*ibid*: 338) recommends the creation of a fund for paying the bounties and argues that the “commissioners be empowered to apply the fund confided to them to defray the expenses of. . . manufactures in particular branches of extraordinary importance—to induce the prosecution and introduction of

useful discoveries, inventions and improvements, by proportionate rewards, judiciously held out and applied—[and] to encourage by premiums both honorable and lucrative the exertions of individuals.”

### **B. Friedrich List**

List believes that (1841; 1966: 226) “the revenue of the nation are dependent. . . on the sum of mental and bodily powers” and that (*ibid*: 170) “aggregate of the productive powers of the nation is not synonymous with the aggregate of the productive powers of all individuals, each considered separately—that the total amount of these powers depend chiefly on social and political conditions, but especially on the degree in which the nation has rendered effectual the *division of labor* and the *confederation of the powers of production* within itself.” List thereupon visualizes the economic system in which the existing incomplete development of economic organization would leave room for the nation’s long-run productive potentialities to be brought out more fully by the dynamisms generated by the promotion of infant manufacturing activities.

List further believes that (*ibid*: 144) history has proved that “a manufacturing power developed in all its branches forms a fundamental condition of all higher advances in civilization, material prosperity, and political power in every nation,” and (*ibid*: 153) the nation “which has cultivated manufacturing industry in all branches within its territory to the highest perfection” will therefore “possess most productive power, and will consequently be the richest.”<sup>11</sup> List also suggests a concept akin to the Marshallian externality (*ibid*: 152-153): “The productive powers of every separate manufactory are also increased in proportion as the whole manufacturing power of the country is developed in all its branches, and the more intimately it is united with all other branches of industry.” This sentence can be interpreted to imply that the production costs of an individual firm may decrease not only with its own size but also with the size of the industry or of some other industry due to, say, diffusion of new knowledge acquired as firms expand output, or due to improvement of the productive environment for industrial activities in general (see Baldwin, 1992). List apparently understands that the productivity of a firm depends on how large an industry it is part of rather than purely on the size of the firm itself.

<sup>11</sup>List believes that (*ibid*: 197) the “spirit of striving for a steady increase in mental and bodily acquirements, of emulation, and of liberty characterize. . . a state devoted to manufactures and commerce.”

List does not seem to regard the promotion of infant industry solely as a means for import-substitution oriented growth. He apparently takes an outward-looking approach and takes the eventual international price-quality competition as a natural sequence to follow the promotion of infant industry. According to List (*ibid*: 199), a manufacturer “has a hundred times more opportunity for developing his mind than the agriculturist. In order to qualify himself for conducting his business, he must become acquainted with foreign men and foreign countries; in order to establish that business, he must make unusual efforts. . . [T]he continual competition of his rivals, which perpetually threaten his existence and prosperity, are to him a sharp stimulus to uninterrupted activity, to ceaseless progress. . . These circumstances produce in the manufacture an energy which is not observable in the mere agriculturist. . . [M]anufacturing occupations. . . develop and bring into action an incomparably greater variety and higher type of mental qualities and abilities than agriculture does.”

The infant industry argument of List is closely interwoven with the theory of development. To List, the manufacturing activity is the engine of growth. He addresses the long-run mutual interaction between the promotion of infant manufacturing activities and economic development, involving invention and discovery. He believes that the expansion of manufacturing activity would lead to a more than proportional increase in the amount of human resource that is devoted to the inventive research activity. He apparently understands that technological progress arises in large part because of intentional activities taken by people who respond to market incentives. According to List (*ibid*: 200-202): “Manufactures are at once the offspring, and at the same time the supporters and the nurses, of science and the arts. . . [I]n the manufacturing state there is no path which leads more rapidly to wealth and position than that of invention and discovery. Thus, in the manufacturing state genius is valued and rewarded more highly than skill, and skill more highly than mere physical force. . . manufactures operate beneficially on the development of the mental powers of the nation. . . the competition of. . . talents. . . has a most beneficial influence not merely on the further progress of science itself, but also on the further perfection of the arts and of industries. . . . [S]cience and industry in combination have produced that great material power. . . [Furthermore] a manufacturing nation has a hundred times more opportunities of applying the power of machinery than an agricultural nation. . . It is evident that canals, railways, and steam navigation are called into existence only by means of the manufacturing power.”

List believes that the superiority of one country over another in one branch of industry, say, manufacturing, often arises simply from having begun it



sooner (*ibid*: 316): “under a system of perfectly free competition with more advanced manufacturing nations, a nation which is less advanced than those, although well fitted for manufacturing, can never attain to a perfectly developed manufacturing power of its own, nor to perfect independence, without protective duties. . . .” List states that (*ibid*: 299-300), “the reason for this is the same as that why a child or a boy in wrestling with a strong man can scarcely be victorious or even offer steady resistance.” List apparently conceptualizes a country with potential comparative advantages in (say, labor-intensive) manufacturing and the problem of converting its potential advantages into the actual ones by taking care of the transient externalities. List understands that initial advantage can cumulate over time because such an advantage is self-reinforcing due to better flow of information, a more flexible labor market, more specialized suppliers of inputs and technical services, and so on. According to List (*ibid*: 294), “it is the more difficult to set new business going in proportion as fewer branches of industry of a similar character already exist in a nation; because, in that case, masters, foremen, and workmen must first be either trained up at home or procured from abroad, and because the profitableness of the business has not been sufficiently tested to give capitalists confidence in its success.”

Many contemporary economists argue that, although individual firms may exhaust internal economies of scale at very low level of production and hence operate with constant or decreasing returns to scale, the industry as a whole may enjoy scale economies because, as the overall size of the industry grows, specialized machineries and equipment would begin to be produced, railroads and other transportations facilities would be built, better educational and research institutions would be established for industry, and so on. Although List failed to give an explicit formulation of [transient] external economies, he gets to the essence of Marshallian externalities (*ibid*: 300): the entrepreneurs in an advanced industrial country “can obtain skilled and experienced workmen in the greatest number and at the cheapest wages, the best technical men and foremen, the most perfect and the cheapest machinery, the greatest benefit in buying and selling advantageously; further, the cheapest means of transport, as respects raw materials and also in respect of transporting goods when sold, more extended credit for the manufacturers with banks and money institutions at the lowest rates of interest, greater commercial experience, better tools, building arrangements, connections, such as can only be acquired and established in the course of generations. . . .” List apparently understands that the infant manufacturing activity will generate substantial external economies that will accrue, with time lag, to those who are not the initial undertakers of the activity.

List believes that (*ibid*: 145) if “a sacrifice of value [of exchange, i.e., current consumption] is caused by protective duties, it is made good by the gain of a power of production [i.e., an increase in the aggregate amount of the productive powers of the nation], which. . . secures to the nation an infinitely greater amount of material goods. . .” List continues saying that therefore the “sacrifices of material goods for a time [to take care of the transient externalities]. . . are. . . merely reproductive outlay by the nation (*ibid*: 226).”<sup>12</sup> Modern economists argue that old trade theorists had not emphasized the importance of external economies sufficiently. List, however, apparently understands that the external effects that arise from knowledge spillovers in manufacturing activity cause the investment in manufacturing to be under-compensated, and therefore a temporary protection or subsidy for manufacturing industry, designed to eliminate the divergence between social and private marginal costs, would increase the growth rate of an economy.

List believes that (*ibid*: 226-227) “the ability of the whole nation to increase the sum of its material capital consists mainly in the possibility of converting unused natural powers into material capital, into valuable and income-producing instruments, and. . . in the case of a merely agricultural nation a mass of natural powers lies idle or dead which can be quickened into activity only by manufactures.” List not only notes the “vent-for-surplus” mechanism that is brought into play by the promotion of infant manufacturing industry, but also emphasizes the transient nature of the infant industry promotion. According to List (*ibid*: 315), bounties “are to be justified as *temporary* means of encouragement, namely where the slumbering spirit of

<sup>12</sup>List, however, warns against excesses: “[P]rotection is only beneficial to the prosperity of the nation so far as it corresponds with the degree of the nation’s industrial development. Every exaggeration of protection is detrimental. . . . The less advanced nation can, while is not yet able to produce for itself with profit finer manufactured goods [say, capital- or technology-intensive goods]. . . nevertheless supply the further advanced nation with a portion of its requirements of coarser manufactured goods [say, simple unskilled labor-intensive manufactures]. Such treaties might be still more allowable and beneficial between nations which stand at about the same degree of industrial development, between which, therefore, competition is not overwhelming, destructive, or repressive, not tending to give a monopoly of everything to one side, but merely acts, as competition in the inland trade does, as an incentive to mutual emulation, perfection, and cheapening of production.” List seems to have anticipated the modern approaches to international trade in terms of inter-industry and intra-industry trades. List further suggests that (*ibid*: 314) “nations which have not yet made considerable advances in technical art and in the manufacture of machinery should allow all complicated machinery to be imported free of duty. . . .”

enterprise of a nation merely requires stimulus and assistance *in the first period of its revival*, in order to evoke in it a powerful and lasting production and an export trade. . . ." It is interesting to notice that List emphasizes export trade rather than import-substitution.

If the trade theory of Adam Smith can be considered as an attempt to study the long-run mutual interaction between trade and economic development by incorporating the long-run changes in factor supplies (i.e., capital accumulation) and their productivity (through the division of labor), Hamilton and List may be attributed with having focused on the more fundamental dynamic nature of trade and growth, i.e., the manufacturing activity as a sharp stimulus to human exertion, the spirit of enterprise, invention, discovery, and the drive for perfection of domestic economic organization (see Myint, 1977). Smith emphasized the *division* of labor but List emphasized also the *confederation* of the powers of production within a nation.

### C. Outward-Looking Export-Oriented Growth

The role of infant manufacturing in promoting catch-up, that was expounded by Hamilton and List, has been replaced by the role of outward-looking export-oriented manufacturing activities in promoting catch-up in the East Asian NICs. The export-expansion of labor-intensive manufactures in a resource-poor developing country enables a full utilization of its abundant labor by providing an outlet for what Lewis calls the disguised unemployment. It also increases the over-all factor productivity by reallocating productive resources from low productivity primary sector to high productivity labor-intensive manufacturing sector and also by taking advantage of scale economies. Furthermore, the effort to export labor-intensive manufactures by a less developed country, which requires incessant price-quality competition at international markets, are believed to result in a rapid accumulation of physical and human capital, a rapid technology transfer through learning-by-someone else's-doing, a rapid technical progress through global transmission of economic knowledge such as production methods and product designs and, most importantly, substantial improvements in the organizational and institutional arrangement of the domestic economic system. However, it is also believed that, due to the existence of externalities, the potential comparative advantage to such a less developed country in labor-intensive manufacturing will not be realized in the form of actual exports unless its government actively intervenes in the market with tax-subsidy measures.

A country may begin the export-oriented growth with simple unskilled-

labor intensive manufacturing. There is, however, the inherent dynamism of international specialization. Every labor-abundant underdeveloped country has potential competitive power in the world market for labor-intensive products according to the Heckscher-Ohlin theory of comparative advantage and specialization. As soon as the governments of East Asian NICs, for example, took care of the externalities associated with infant labor-intensive export industries at the beginning of the 1960s, they began to penetrate into the developed countries' markets for labor-intensive manufactured products. The traditional suppliers of labor-intensive products, such as Japan, were pushed up to more capital-intensive and technology-intensive production activities. Japan began to supply the intermediate inputs and capital goods to East Asian NICs that were used for their labor-intensive export activities. Japan began to lose its traditional overseas markets in labor-intensive products, but it could keep expanding the magnitude of its exports by supplying intermediate and capital goods to East Asian NICs and by penetrating into the higher value-added products market in advanced countries. On the other hand, the traditional manufacturers of labor-intensive products in Japan could prolong their life-span by relocating their production activities in the cheap-labor East Asian NICs in the form of FDI (foreign direct investment) or subcontracting arrangements.

In the 1980s, the governments of China and some ASEAN countries such as Thailand, Malaysia and Indonesia began to take care of the externalities associated with infant labor-intensive export activities and, in due course, they could convert their potential competitive power into the actual one. The East Asian NICs began to be pushed out of their traditional labor-intensive export markets into the markets of more capital-intensive and skill-intensive products. The logical alternatives for the old East Asian NICs are the production activities that supply intermediate and capital goods for the Chinese and ASEAN exporters and the restructuring of their industries towards more capital-intensive, skill-intensive, technology-intensive, and higher value-added products. The traditional manufacturers of labor-intensive products in these old East Asian NICs may prolong their life-span either by achieving quality up-grading of their products or by relocating their plants to the cheap-labor later-comer countries. In the meantime, the Japanese manufacturers became to dominate the world markets of the most technology-intensive products and became the sole supplier of most essential intermediate and capital goods to the old and new Asian NICs. Any economy that can not implement the continuous restructuring of its production activities in accordance with shifting comparative advantage may drop out of world market, fall into stagnation, and degenerate into another failure case.

The role of government may be crucial not only at the beginning stage of catch-up, but also at the transitional phase of catch-up. For instance, if the external economies associated with knowledge spillovers from high-technology industries are believed to be important, the role of government intervention also has to assume a commensurate importance.

In our framework of growth mechanism, a correct political leadership can first induce a substantial reduction in the rate of time preference that causes a substantial rise in savings (and investment) propensity. The success in maintaining a low rate of time preference, however, requires the ability to maintain high rates of return on the extra capital stock that is supplied by extra savings of the people in the society. In this context, any political leadership that can not implement a continuous restructuring of the country's production activities in accordance with shifting comparative advantage will make the country drop out of world market, experience a sharp reduction in the rate of return on investment, experience a loss of credibility of the political leadership, and return to the vicious circle of poverty with disappointment.

#### 4. CONCLUSION

We may contend that the initiation of catch-up implies a reduction in the rate of time preference. We may further contend that the successful maintenance of high savings propensity depends on the ability of the country to sustain high rates of return on investment, and that export-oriented growth through international price-quality competition is indeed conducive to achieving this objective.

The experiences of the East Asian NICs and Japan show the spectacular success of outward-looking export-oriented growth strategy in generating economic progress. We have to provide an analysis of how that successful catch-up came about, i.e., an analysis of the dynamics of the system. An analysis of the failure cases, however, will enable us to understand what factors undermine a country's social, organizational, and moral foundation and hence set the stage for the ascendance of economic stagnation and social chaos.

International trade based on static and dynamic comparative advantage quickens the pace of technological change and overall economic growth. International specialization introduces new opportunities, new world markets, new products, new methods of production, and new forms of industrial organization that are conducive to maximize the energy and effort of each

individual member of society. International competition forces the government to institutionalize an economic system that minimizes the rate of return on rent-seeking and other non-productive activities and thereby channel the individual energies into the socially most productive activities. Furthermore, government intervention can amplify the market system's rewards that propel the innovative activities of entrepreneurs and also minimize the unnecessary frictions among the members of the society. The innovative leaders in an export-oriented economy can be either small firms, or large business enterprises, or both.

The activities of outward-looking firms undermine the market position of inward-looking firms that are bound to be relatively ignorant about new products, new technology, new sources of supply, and new types of organization. International competition in world markets rewards decisive cost and quality advantages to export-oriented firms, and encroaches not at the margins of the profits of the inward-looking firms but at the foundations of their lives. The outward-looking export-oriented economy may provide the most favorable climate for industrial innovation and maintenance of a vigorous pace of technological advance, i.e., and autogenous dynamism of an economy. Joining the world markets with innovative ideas may be the important ingredient for progress and catch-up.

#### REFERENCES

- Abramovitz, Moses, "Catching Up, Forging Ahead, and Falling Behind," *Journal of Economic History*, Volume XLVI, Number 2, June 1986, pp. 385-426.
- \_\_\_\_\_, "The Elements of Social Capability," a paper presented at the KDI Symposium on Economic Growth of Developing Countries: 1940-1980, July 1-3, 1991.
- Baldwin, Robert, "Are Economists' Traditional Trade Policy Views Still Valid?" *The Journal of Economic Literature*, June 1992, 804-829.
- Barro, Robert J., "Government Spending in a Simple Model of Endogenous Growth," *Journal of Political Economy*, Volume 98, Number 5, Part 2, 1990, S103-125.
- Baumol, William J., "Entrepreneurship: Productive, Unproductive, and Destructive," *Journal of Political Economy*, Volume 98, Number 5, Part 1, 1990, pp. 893-921.
- Cass, David, "Optimum Growth in an Aggregative Model of Capital Accumulation," *Review of Economic Studies*, July 1965, 223-240.
- Epstein, Larry G. and Hynes, J. Allan, "The Rate of Time Preference and

- Dynamic Economic Analysis," *Journal of Political Economy*, Volume 91, Number 4, 1983, pp. 611-634.
- Hamilton, Alexander, *Report on Manufactures*, originally reported on December 5, 1791, and reprinted in *The Papers of Alexander Hamilton*, edited by H. C. Syrett, New York: Columbia University Press, 1966.
- Hong, Wontack, "Time Preference in Dynamic Trade Model: An Empirical Critique," *Economic Development and Cultural Change*, July 1988, pp. 741-751.
- Kemp, Murray C., "The Mill-Bastable Infant-Industry Dogma," *Journal of Political Economy*, February 1960, pp. 65-67.
- Komiya, Ryutaro, "Three Stages of Japan's Industrial Policy after the World War II," Research Institute of International Trade and Industry Discussion Paper 92-DF-13, Tokyo, March 1992.
- List, Friedrich, *The National System of Political Economy* (1841), London: Longmans, Green & Co., 1885, reprinted by Fairfield: August M. Kelley, 1977.
- Lucas, Robert E., Jr., "On the Mechanics of Economic Development," *Journal of Monetary Economics*, July 1988, pp. 3-42.
- \_\_\_\_\_, "Making a Miracle," *Econometrica*, Volume 61, 1993 (forthcoming).
- Myint, Hla, "Adam Smith's Theory of International Trade in the Perspective of Economic Development," *Economica*, August 1977, pp. 231-248.
- Rivera-Batiz, Luis A. and Romer, Paul M., "Economic Integration and Endogenous Growth," *Quarterly Journal of Economics*, May 1991, pp. 531-555.
- Romer, Paul M., "Increasing Returns and Long-Run Growth," *Journal of Political Economy*, October 1986, pp. 1002-1037.
- \_\_\_\_\_, "Endogenous Technological Change," *Journal of Political Economy*, Volume 98, Number 5, Part 2, 1990, S71-101.
- Smith, Adam, *The Wealth of Nations*, the first edition published in 1776, New York: The Modern Library, 1937.
- Solow, Robert M., "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics*, Volume 70, 1956, pp. 65-94.
- Uzawa, H., "Time Preference, the Consumption Function, and Optimum Asset Holdings," in *Value, Capital and Growth*, edited by J. N. Wolfe, Chicago: Aldine, 1968, pp. 485-504.