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ADVANCED DEVELOPING COUNTRIES AND JAPAN IN CHANGING INTERNATIONAL ECONOMIC RELATIONSHIPS

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1. INDUSTRY AND SOCIETY IN THE FACE OF EMERGING WORLD STRUCTURAL CHANGES

(a) On the OECD Interfutures Study

Future perspectives of the relationships between the advanced industrial countries (AICs) and the third world - the topic for this particular session - are precisely what constituted the central preoccupation of the OECD Interfutures Project, the report on which has just become available this year.[1] The report demonstrates the strong probability for the LDC share in world production and trade to rise consistently for the coming decades, whichever one of the four basic scenarios may prove more probable than the others.

Scenario C (aggravation of North-South conflicts with increasing economic isolation between the two worlds) is shown to affect Japan more seriously than any other countries and regions, resulting in a sharp decline of her share in the world GNP down to 5 % by 2000 - just about a half of the position anticipated for her under Scenario B (medium rate of growth of the world-wide economy to be achieved with continued engagement in the style of N-N and N-S cooperation more or less comparable to the one currently in process).[2] Japan's vulnerability to North-South relationships, to a greater degree than is the case for the US and EC, is no surprise. She is known for being "defenseless on all sides", implications of which we will examine later in some detail.

A surprise to us was, however, the high degree of confidence reposed by the Interfutures study group in Japan's institutional capability of adaptation to changing world environments. The merits and demerits of our culture, or the very source of the efficiency of the Japanese ways of doing things as exhibited by her growth performances during the past several decades, are currently an object of broad controversies in Japan.

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[1] OECD, FACING THE FUTURE - MASTERING THE PROBABLE AND MANAGING THE UNPREDCTABLE (Interfutures Project Report), Paris, 1979

[2] The changes in relative size of GNP derived from simulations under four alternative scenarios of Interfutures Project are as follows:

[percent]

		USA	Canada	Japan	EC	OECD	E.Europe	LDCs	World
1975	(actual)	28.7	2.7	6.8	18.5	62.0	15.9	21.6	100
2000	A	19	2	10	16	53	16	31	100
	B	18	2	10	14	50	18	32	100
	C	24		5	13	47	20	33	100
	D	21		9	14	49	18	32	100

(b) Institutional Effectiveness versus Efficiency : the Case of Japan

Theorizing about institutional development may be of some help in joining such controversies. Even without theorizing, there is some truth in saying that what has proved good solutions to the problems we had till yesterday can easily become in turn the problems we have to solve for tomorrow.

It is no novelty to distinguish the "efficiency" of an institution from its "effectiveness", while economists tend to forget that these two criteria need to be satisfied simultaneously in order that our economic mechanisms function properly. By effectiveness is meant the effectiveness of given institution, be it a particular organisation or a nation, in resolving internal conflicts arising among its members. Some people prefer such terms as system integration, solidarity or emotional unity to refer to the same criterion.

Traditional organisation theories and decision theories tended to emphasise only "efficiency", i. e. efficiency in performing given tasks. Then, behaviorist and ecological theories have come to stress another, equally important, dimension of institutional adaptation, which concerns the mixing of different cultures or compromising between different interest groups within a given institution. There is still another important dimension, however, that is often neglected in formal organisation theories. Any system or institution must be viewed in relation to a larger system of which it constitutes a part. This opens up a new dimension: "consensus" as among members of the larger system regarding the external effectiveness of the particular subsystem.

For several decades Japan has enjoyed a national consensus about the ways of pushing through her process of economic catching-up. The rule for domestic conflict resolution has been the principle of economic efficiency via between-group fierce competition (coupled with extraordinary within-group solidarity, as often pointed out). And for some time the relative smallness of our economy, at least at the earlier phase of the post-war period, used to make us believe that an appeal to the pure theory of trade would be good enough to acquire a world-wide consensus about the management of our external linkages.

Indeed, the impressive growth performances of Japan up to 1973 obtained as a powerful justification of the peculiar institutional culture in the country and perhaps it had, I suspect, even an effect of reinforcing it if unintentionally.

We are now faced with a severe burden of adjustments for structural changes,

both internal and external. Required adaptations are possibly far-reaching, not confined to the mere adjustments of economic flows within the given institutional setup but demanding a conscious effort of institutional adaptation striking home deeply into our cultural heritage, with a view to becoming more effective in resolving conflicts vis-a-vis other cultures in the world and in accepting other cultures within our own decision-making mechanisms.

Internally, too, the element of national consensus seems to be weathering, the so-called "macro-micro divergences" becoming increasingly conspicuous. The whole nation is thus being pulled in on a new search for equilibrium paths for our institutional evolution or for a new style of mixing of efficiency with effectiveness considerations.

(c) Problems in the post-1973 period

The five-year period from 1973 to 1978 witnessed a pace of growth of real GNP in Japn as low as 4 % per annum - a sharp deflexion from the long-sustained post-war standard of 10 % . The extent of adjustment that has been invoked by this deflexion may be seized by conventional indicators such as:

i) A decline of the private fixed capital investment/GNP ratio from 21 % in 1973 to 13 % in 1978;

ii) Energy- and material-saving adaptations in industry which have resulted in a sharp downward trend of demand for the products of basic process industries: e.g., the active introduction of continuous steel casting has reduced the steel consumption (in terms of crude steel) per 100 million yen of real GNP from some 73 tons in 1973 to 52 tons in 1976;

iii) Sluggish expansion of aggregate consumption, particularly of products of consumer-goods industries, with the result of a relative increase in the proportion of consumer expenditures going for services;

iv) Increased frictions in overseas markets, resulting from the export drive reinvigorated by the stagnancy of domestic markets.

A rapid structural adaptation, if forced in a low-growth economy, would entail absolute reductions of supply capacity or business discontinuities in some sectors. Industries like shipbuilding, nonferrous metals, aluminium smelting, along with textiles and sundry goods, likely remain among those whose options for adjustment are limited rather to improved contractility than

improved productivity. In drawing up a new economic plan to 1985, the Japanese government could only stress merits of gradualism, having regard to obstinacies in employment adjustment and for fear lest a hasty enforcement of radical measures should impair the vitality of business enterprises.

The second oil crisis - for that matter one may prefer the term "second OPEC cycle" - had set in, however, by the time Japanese firms learned how to run moderately profitable business in an economy growing at less than 5 % per annum. The anticipated OPEC surplus for 1979 varies from some $ 70 billion (according to Morgan Guarantee Trust) to $ 31 billion (OECD June 1979) and so does the possible extent of its deflationary impact accordingly.

It is yet to be seen whether the world will manage to enjoy a pace of oil money recycling comparable to that during the First OPEC Cycle (i.e. provided that the recently anticipated rise in consumer goods imports by OPEC is sustained enough to offset the likely retrenchment of capital goods imports); whether the Second OPEC Cycle will last no longer than the first one (on account of the diffuse deflationary impact which successfully weakens the world demand for oil); and whether it is unlikely that the OECD economy should undergo as uneven a distribution of current account deficits as in the case of the First Cycle despite the floating exchange rate system. No matter whether one opts for optimism or pessimism about our ability to live through successive OPEC cycles in the future, no one would disagree as to the fact that uncertainty or insecurity facing any single nation has considerably increased and will continue to do so for some time in the future.

The OPEC Cycles are not the only source of our concern. There is still another important trend the significance of which it seems the Interfutures Project failed to explore thoroughly: that is, the rising share of newly industrialising countries (NICs) or advanced developing countries (ADCs) in world industrial production and trade.

2. ADVANCED DEVELOPING COUNTRIES AND INTERNATIONAL RELATIONS

(a) ADCs' Performances in the post-1973 period

The ADC affairs received more explicit attention in the recent work of the OECD Directorate for Science, Technology and Industry and, fortunately, the publication of its report was almost synchronised with that of Interfutures, as well as

another study by the same Directorate on "positive adjustment policies". [3]

The OECD report takes up a sample of 10 ADCs, relatively poor in natural resources and having characteristically "outward-looking" development strategy (Greece, Portugal, Spain, Yugoslavia, Brazil, Mexico, Hong Kong, South Korea, Singapore and Taiwan) except Brazil. It omits larger countries such as Argentina, india, Pakistan, as well as Chile and Egypt (in view of the persistence of import substitution-oriented policies in these countries and some difficulties they experienced in their recovery from the oil shock); also technologically less sophisticated countries such as Colombia, Malaysia, the Philippines and Thailand are not included (in view of the fact that their manufactures exports are still small compared to other ADCs despite their increasingly outward-looking policies). But it is clearly admitted that these middle-income countries form a dynamic continuum and that the sample to be defined for analytical purposes cannot be static.

As for the 10 ADCs in the sample, their share in OECD markets rose from 2.5 % in 1963 to 8 % in 1977 [4], and their share in LDC markets for manufactures from 4.7 % to 8.1 % during the same period.

Particularly impressive is the fact that since 1973 these ADCs have managed to increase their share in all markets, developed and developing, against intense competition. So far their exports growth has been concentrated on specific products within each two-digit SITC group and in the form of sudden upsurge of their share in particular items or the appearance of entirely new ones, which are no longer confined to traditional labor-intensive manufactures. For the reader's convenience, Chart 1 and Table 1 reproduce the summary statistics given in the OECD study.

For the period from 1973 to 1977, industrial countries' export growth (measured in current US $) were about 16 % per annum, whereas the number of ADCs which had higher export growth than that seems to exceed a dozen (counting countries like Malaysia, Thailand, Colombia, Bolivia, Ecuador, Uruguay in addition to

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[3] OECD, THE IMPACT OF THE NEWLY INDUSTRIALISING COUNTRIES ON PRODUCTION AND TRADE IN MANUFACTURES, Paris, 1979

OECD, THE CASE FOR POSITIVE ADJUSTMENT POLICIES, Paris, 1979

[4] If we include those other ADCs excluded from the OECD sample, the ADC share in OECD import markets will approach some 15 % or slightly higher than that as of 1977.

Chart 1

SHARE OF NICs AND OTHER LDCs IN TOTAL OECD IMPORTS BY BROAD COMMODITY GROUPS[a], 1963 AND 1977

(Percentages)

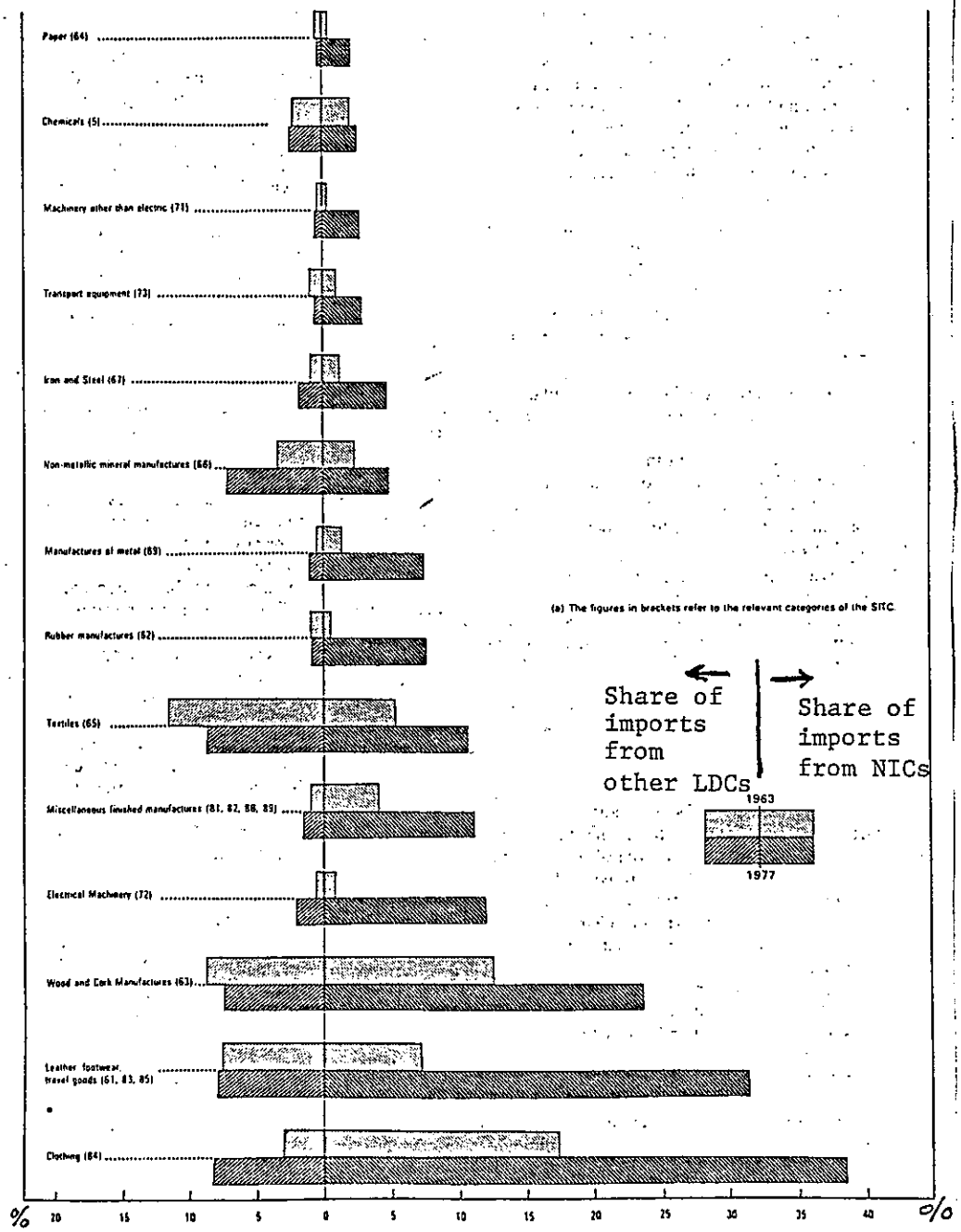

Table 1

NICs' share in world exports of manufactures to selected areas

Percentages

Exports to:	1963	1973	1976
Industrial countries[a]	2.6	7.0	7.9
Developing countries	4.7	7.2	8.1
OPEC	3.9	5.9	6.4
Others	4.9	7.6	8.6
of which: Far Eastern NICs	3.0	7.1	9.0
Eastern Bloc	1.3	2.5	3.1

a) OECD minus Australia and New Zealand.

Source: This and all subsequent tables on international trade are based on data supplied by the GATT Secretariat.

These are reproduced from the OECD report on NICs (op. cit.), Chart C and Table 30, respectively.

Korea, Taiwan, Singapore, Brazil and Mexico).

(b) Advantages of ADCs in Structural Adjustment

The tendency of the ADCs coming out more resiliently than industrial countries in structural adjustments to the oil crisis may be accounted for in many ways. Apart from country-specific situations, factors of general importance will be as follows:[5]

i) Poorer people living closer to the subsistence level are unable to withstand the loss of current consumption and thus make a faster and more complete adjustment than richer people;

ii) Developing economies are generally less dependent on oil to run their economies and thus oil price rises can be less disruptive to them;

iii) Developing countries had accumulated less investments by 1973 and thus were inflicted a relatively less amount of loss in the form of underutilisation of the installed capacities in which older energy-intensive technology was imbedded;

iv) The advanced legislation and other government measures in industrial countries which protect the incomes of the elderly, the retired, the unemployed, farmers, civil servants, etc. have added inflexibility to the economic mechanisms, whereas ADCs and other LDCs, having fewer such social policy measures, retain greater flexibility;

v) ADCs which happened to have underutilized industrial capacities before 1973 due to incomplete mastering of technology could easily gain their comparative edge in export markets through the adaptive innovations associated with output expansion and the cost reduction by higher capacity utilisation;

vi) The quicker recovery in ADCs, in contrast to the prolonged stagnation in industrial economies, has attracted capital (as well as newer technology with it) and thus been able to benefit the acceleration in technology transfer or even short-cuts in the product cycle through direct foreign investment.

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[5] Some , if not all, of these points are extensively treated in Lawrence B. Krause, "The World Economy and the Future", paper presented at the International Seminar on the World Economy and Energy Policy Issues, 6-7 July 1978, University of Tsukuba, Japan.

(c) Progress in Technological Capacitation in ADCs

At this stage it is difficult to assess with certainty the prospect of ADCs' sustained resilience against consequences of the Second and possibly subsequent OPEC Cycles. But it will be safe to assume continued privileges of "late comers", not only in terms of the institutional flexibility built into the young mechanism which has been gaining a momentum towards catching up, but also in terms of the acceleration in the technology transfer process caused by stagnant OECD markets.

In addition to these advantages, there is evidence for a growing understanding within ADCs of how to activate the mechanisms for technology absorption and indigenous adaptive innovations.

For example, the ECLA/IDB-sponsored program of micro-oriented studies on domestic technological development in several Latin American countries, although still at an early phase of its implementation, has been generating a series of penetrating reports. Their findings do indeed confirm that manufacturing firms in countries which are not technological leaders are inevitably working with techniques that are different from, and not merely outdated versions of, those used in the countries at the technological frontiers; that there have in fact been, in these developing countries too, significant elements of creativity and innovation involved in the process of mastering imported foreign technologies;[6] and also that ADCs' techniques and products can prove better suited for purchase and use in countries with comparable economic environments.

As for the last point, it is important to note that a growing number of firms in Brazil, Argentina and Mexico, both domestic and MNC subsidiaries, have started during the past several years selling complete technological packages to other countries in the region, especially Bolivia, Chile, Cuba, Paraguay and Uruguay. Also cases of local firms becoming multinationalised, transfering their own capital and technology in the form of direct investment to one or more countries in the region, have come to be observed in an increasing number.[7]

All these stories can convey us the growing confidence on the part of many ADCs

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[6] Jorge Katz, M. Gutkowski, M. Rodrigues & G. Goity, PRODUCTIVITY, TECHNOLOGY AND DOMESTIC EFFORTS IN RESEARCH AND DEVELOPMENT - the Growth Path of a Rayon Plant, ECLA/IDB Research Program in Science and Technology Working Paper No. 13, Buenos Aires, July 1978.

[7] E.g., Jorge Katz & Eduardo Ablin, FROM INFANT INDUSTRY TO TECHNOLOGY EXPORTS: - the Argentine Experience in the International Sale of Industrial Plants and Engineering Works, ECLA/IDB Research Program in Science and Technology Working Paper No. 14, Buenos Aires, October 1978.

in their ability to learn and catch up and even to act aggressively as agents for international technology diffusion towards technologically less developed countries.

(d) Implications for International Relations

The above-mentioned trend is bound to have consequences for international relations. The "dynamic continuum" reaffirmed by the actual performances of ADCs might offer a source of consolation for those tired with the game of ideological confrontation between North and South since the NIEO Declaration. But far more important is that greater diversity and pluralism would reduce the significance of the existing international institutions for promoting economic cooperation. For instance, how soon will the OECD with its current restricted membership have to recede in importance in tackling world-wide economic and industrial issues?

There still seems to exist a long and thorny way to a truly effective innovation in international organisations.

Take the Pacific Basin issues as an example. The desirability of creating a new OECD-like organisation for the Pacific Basin region has gathered attention already for some ten years, especially among those favoring a more pragmatic and locally-focused approach to development cooperation than the extremely formalistic "common efforts" through the global institutions like the UN and the OECD. Yet the notion has only been drugged around on this and that sides of the crevices open between the countries and subregions having widely different constraints and preoccupations. The only consensus of view prevailing at this moment seems to be that the Pacific Community is no more, if no less, than a "state of mind" of those who have been attracted by the notion.[8]

Just last month I had the pleasure of participating in the Conference on the Pacific Community and the Role for Latin America, convened under the initiative

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[8] This means among others that it is still premature to envision the Community in terms of an organisational innovation but that the most essential at this stage is to promote further mutual understanding among the widely divergent cultures and interests in the region; that is essential in satisfying the so-called "identification" criterion of institutional effectiveness, which precedes the "rules" criterion concerning political settlement of conflicts.

an ADC institution (Institute of International Studies of the University of Chile) at Easter Island, Chile. In my view this conference clearly demonstrated that any further initiative-taking by industrial countries on the Pacific Community issues would be rather self-defeating. The Pacific region, in retrospection, was long a scene of struggle and rivalry among major powers. Now, the clusters of independent nations in the region all desparately refuse any move that can be reminescent of the poles-of-influence game in the past. Indeed a more balanced relationship is desired. But even the ADCs, which may wish to claim a role for themselves as a buffer against the preoccupations of industrial countries, [9] do not seem to be in a very comfortable position to take initiatives towards that goal.

3. ON THE TECHNOLOGY-ONLY STRATEGY OF FOREIGN POLICIES

(a) "Defenseless on all sides"

Lacking in all of Kissinger's Three Securities (energy, food and military security), Japan is faced with the almost intractable task of evolving anew an effective framework of "economic security" policies. Okita tried to put this situation of Japan into relief by the expression "Defenseless on all sides".[10] He stressed "technological advancement" and "friendly diplomacy" as the only instruments of security available to the country. While this view seems to be shared by most people in Japan, the possibly far-reaching implications of this philosophy for our policy-scientific toolboxes have not yet been thoroughly examined.

Certainly, "technology as a bargaining power" and "economic security" are frequently invoked words but the concepts are more ambiguous than they first sound. Can commercial (non-military) technology figure in international trade as anything more than a source of comparative advantage? If we are prepared to believe that innovation and technology transfer are the only key to the future

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[9] Particularly interesting in this regard is Francisco Orrego Vicuña, THE PACIFIC ISLANDS IN A LATIN AMERICAN PERSPECTIVE: TOWARDS A SPECIAL RELATIONSHIP?, Institute of International Studies, the University of Chile, Special Publication Series No. 40 E, 1979

[10] Saburo Okita, "Dependence on Foreign Resources and Japan's Foreign Policy", FOREIGN AFFAIRS, July 1974.

dynamics of international division of labor, how far should our theory of trade be remolded and how does the principle of economic efficiency work its way in the new theory? In a world where the balance-of-power game of old days has become less and less relevant, should we still associate "economic security" with the absence of a "threat to survival"? Can't we redefine the concept in a more realistic perspective in which the interaction between domestic and international forces receives explicit attention in determining the strategy of foreign economic policies?

Let us reflect for a while on those questions.

(b) A General Equilibrium Model for Technology-Centered Trade Relationships

While it is a commonplace to say that technological innovations in AICs and transfer of technology to LDCs affect the world trade pattern, this commonplace has rarely been treated in terms of a formal theoretical model. Paul Krugman's recent attempt, highly simplified as it is, gives some useful insight into the consequences of our technology-only strategy.[11]

Assume that innovation takes the form of new products which can be produced immediately in North while South adopts the new technology only after a lag but in due course gains comparative edge in North market on account of N-S wage differentials. Assume for simplicity's sake that one unit of labor is required to produce one unit of any product wherever production takes place. North's wages are higher than South's to the extent that the former reflect a rent on North's monopoly of new technology. Thus, North produces all new goods and South only old goods.

Under such simplifying assumptions, it can be shown that as long as the rate of technological innovation is large enough the system can be explosive; moreover the system can generate a moving equilibrium or steady state where North's share in world production assumes a stable value. [12]

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[11] Paul Krugman, "A Model of Innovation, Technology Transfer and the World Distribution of Income", JOURNAL OF POLITICAL ECONOMY, Vol. 87, No.2, 1979

[12] Let n denote the number of products in existence; i stands for an exponential rate of innovation and t the inverse of the average immitation lag of South(λ). The model can be represented in capsule form by the following three equations:

(1) $\dot{n} = in$, (2) $\dot{n}_S = tn_N$ and (3) $\dot{n}_N = in - tn_N$.

North's share in world production is $n_N/n = s_N$. $\dot{s}_N = i - (i + t)s_N$.

$\dot{s}_N = 0$ when $s_N = i/(i+t)$, or $n_N/n_S = i\lambda$.

The steady state position of North will be the higher, the larger the rate of innovation and the slower the rate of technology transfer to South.

Innovation, by extending the range of new goods, increases the demand for North's products at given relative price. This leads to a rise in the relative price of North's products, thus attracting an inflow of capital (as well as skilled labor) from South to North. But note that technology transfer results in similar changes in the opposite direction, - flow of capital to South and a rise in the relative income of South.

A slowing of innovation or an acceleration of technology transfer would narrow the wage differential and may even lead to an absolute decline in living standards of North.

This simple model is firmly suggestive of the proposition that technical innovation is more important than it appears in conventional trade theories; new industries have to emerge constantly in North in order to maintain its living standard; but the new industries, once born, should sooner or later decline and eventually disappear in the face of low-wage competition from South - a recurrent event which is desirable from the standpoint of world productive efficiency.

However, the model concerns only the ultimate effects of innovation and technology transfer; it says nothing about their causes, nor about the economics underlying the North decision regarding the terms and the timing of technology transfer. In fact one may even suspect that thinking along this type of model could be responsible for the kind of commotion witnessed during 1978 in one of the OECD industrial policy fora about the plausibility of the North taking any joint steps for technology export restraint.

(c) A Model for Technology-Pricing Strategy

Protectionism in the form of control of exports of non-military technology is most unlikely to be compatible with the economic security preoccupation. This statement holds as long as the present rules of game among OECD countries remain essentially unaltered: i.e., drawing primarily upon competitive market mechanisms for resulution of most economic conflicts while allowing for only partial coalescence for special tasks of global interest (such as attacking technological frontiers for betterment of the mankind as a whole).

Technology, once it is born, has to diffuse in one form or others, and it is through its diffusion process that it can earn a quasi-monopolist rent, which is needed to recover R and D costs. Nevertheless diffusion gives rise to

emulation, if after a lag. As long as potential emulants are endowed with more or less comparable capacity to learn, the time speed of emulants' entry will be , inter alia, an increasing function of the price for which the leading innovator (in the particular field considered) is prepared to sell his technology.

Thus, the economic security strategy in a situatin where lateral technological competition prevails involves something common to the oligopolist pricing strategy under threats of emulators.

Here the principle of economics dictates that the pricing, subject to the above mentioned constraint, be consistent with the basic objective function: to maximize the sum of the present values of future income streams to be derived from technology sales. The discount rate applicable in this context should allow for various factors of uncertainty envisaged about future market conditions.

The decision maker is faced with a certain trade-off between short-run profits and long-run security. The latter may be expressed in terms of the innovator's expected eventual share in world market for the particular technology, that is, a long-run equilibrium point to be attained when the price has declined to a limit below which any further emulation would prove simply uneconomical and thus no more new entry is envisaged.

The behavioral parameters and economic calculations to be involved in the above sort of scenario lend themselves to formal treatments in the vein of the control theory. Leaving aside the detail of such a model,[13] here are some of the interesting findings to be obtained thereof:

i) The higher is the discount rate, the smaller will the innovator's long-run equilibrium market share tend to be, implying that the innovator will then put less weight on his long-run position and would rather adopt the "make-hay-while-the-sun-shines" type policy.

ii) The higher the innovator's R and D productivity and thus the larger his cost advantage, the lower the price charged now and the more weight assigned by him on his long-run market share.

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[13] A formal model in this vein is more explicitly treated in Mikoto Usui, TECHNOLOGICAL CAPACITATION AND INTERNATIONAL DIVISION OF LABOR, Paper presented at the Conference on the Pacific Community and the Role for Lain America, Easter Island, Chile, 18-23 Oct. 1979. A fuller development of similar models is available in D. W. Gaskins,Jr., "Dynamic Limit Pricing - Optimal Pricing under Threat of Entry", JOURNAL OF ECONOMIC THEORY, No. 3 1971. Also see Stephen P. Magee, "Application of the Dynamic Limit Pricing Model to the Price of Technology and International Technology Transfer"in K. Brunner & A. H. Meltzer eds., CARNEGIE-ROCHESTER CONFERENCE SERIES ON PUBLIC POLICY,VOLUME 7, North-Holland, 1977.

iii) The long-run equilibrium price tends to be higher in prosperity than in stagnation. In other words, even a leading innovator with insignificant cost advantage can maintain a stable market share over the long haul if the world market keeps growing; however, when world market is stagnant, the innovator with no cost advantage may opt for pricing himself out of the market.

iv) An institutional setup which keeps the speed of immitation at a reasonably high level would generally make the innovator choose the strategy of selling a larger quantity at a lower price at any point of time. That is to say, a a reasonable degree of competition among technologically advanced countries implies a greater benefit for the importing developing countries. Should the importers insist too prematurely (e.g. for political reasons) on diversification of their import sources, the innovator would rather raise his price now and sell less of his technology in favor of short-run profits.

v) The developing importers (e.g. ADCs), too, join sooner or later the position of emulants. But by that time it is likely that the market will have been shared fully by advanced emulants and the price settled at a level near what the original innovator once envisioned to be the long-run equilibrium position. An ADC, as a new entrant, will now have to undersell taking advantage of her lower wages.

vi) ADCs' own reponse coefficients, which determine their catching up speeds, depend on their respective domestic policies for technological and industrial development. Lower pricing by leading innovators may well have the effect of delaying the late-comers's effort of technological capacitation in the particular fields of technology considered.

(d) Further Thoughts on "Economic Security"

As is often pointed out, "security" is a negative goal, meaning the absence of of a sense of danger or threat. This concept by itself fails to convey any practical meaning, however, until it is made explicit what is at stake. If "survival" in the literal sense of the term is rarely at stake, we should be more explicit about the particular goals or values which our security policy is intended to protect: domestic welfare and employment, political independence, or prestige.

"Economic" security thus implies the absence of threat of severe deprivation of economic welfare. Security can then be a goal or value in itself, along with other clusters of values which a nation wishes to secure. This reflection led Lawrence B. Krause and Joseph S. Nye, Jr. to contend that the definition of security "as a goal" is more useful than the traditional (Kissinger-type) definition biased towards the "instruments" of security policy.[14]

A more naive argument would run that the problem of security is just a question of uncertainty - i.e., the question of how much we should be willing to sacrifice our current . . enjoyment in exchange for a little more certainty about future enjoyment. The reader will recall that in the technology pricing model examined in the previous section the security as a value was subsumed in the innovator's objective function: the present value to be maximized was already discounted by a factor of uncertainty just to the extent he is prepared to accept. In fact this treatment seems consistent with the convention of economic analysis. And the model revealed that a greater degree of uncertainty would affect the technology transfer strategy in such a way that the innovator may sooner opt for pricing himself out of the market in favor of short-run profits. That strategy obtains as an optimal solution for the model; hence it is an economically efficient solution.

Yet, don't we feel that this solution still leaves the very question of uncertainty unresolved ?

Apparently, security as a value had better receive a more explicit treatment. The discount rate should not just be a given, but be treated as a parameter that explicitly interacts with other parameters in the model. If one is confident that a lower price or softer terms of transfer can successfully solicit friendlier climates, our control variable, price of technology, may well be treated as affecting the discount rate itself. Alternatively, one could postulate the desired degree of security in the form of an additional constraint : e.g., a minimum acceptable level of long-run equilibrium share in world market to be secured at least up to a certain point of time.

The former approach would require building into the model new parts that could

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[14] L. B. Krause & Joseph S. Nye, Jr., " Reflections on the Economics and Politics of International Economic Organizations", in C. F. Bergsten & L. B. Krause eds., WORLD POLITICS AND INTERNATIONAL ECONOMICS, Brookings Institution, 1975.

make the discount rate endogenous. But the task can be a complicated one, demanding almost a new model. The latter approach may be more easily accomodated within the original simple model. Depending on the values of other parameters (emulants' response coefficient, the innovator's comparative cost position, etc.), the constrained optimal solution may sometimes turn out inferior, in terms of the present value of expected income streams, to the earlier unconstrained solution. When that is the case, it is then clear that the conventional sense of "economic efficiency" has been traded off for the goal of securing a minimum market share over the long haul.

Adopting this latter approach, one can imagine that due to the new security constraint the innovator will be forced to sell more of his technology at a lower price than otherwise at any point of time within the time horizon fixed for security reasons.

The point is thus that "economic security as a goal becomes visible when a country consciously chooses to accept economic inefficiency to avoid becoming more vulnerable to economic impulses from abroad"(Krause and Nye, op. cit. pp. 330-331). An agile reader will immediately note that this is synonymous to saying that "institutional effectiveness" is the precondition for "institutional efficiency" - topic dealt with at the beginning of this paper.

To make the matter burdensome, just sacrificing economic efficiency in exchange for a little more of institutional effectiveness is not always appropriate. When applied in the domestic context, such a proposition could be used only to defend the familiar practice of "negative" adjustment. In the international context, in which security issues arise, it may often prove necessary to sacrifice part of the domestic institutional effectiveness in exchange for a little more of the international effectiveness. Apparently what really deserves the expression "positive adjustment" to changing international division of labor would not be excempt from that ordeal.