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PROSPECTS FOR LONGER-RUN PRODUCTIVITY GROWTH IN JAPAN

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I. Introduction

One of the remarkable features of the world economy over the past quarter century has been the economic performance of Japan.[1] Over that period it has grown from a modest GNP with less developed country levels of per worker output and productivity to the third largest GNP in the world, with Western European levels of living, output, and productivity. In the process it has become a major participant in American and world trade, with extensive benefits for all nations.

Japan's achievement has been based on the exceptionally rapid growth of a large country. National income grew at an annual average rate of 8.65 percent between 1953-61, accelerating to 9.59 percent between 1961-71 and to 9.47 percent for 1971-73 before the most severe postwar recession of 1974-76 engulfed Japan.[2] Over this period Japan's population increased from 87 million to today's 112 million--almost double that of the largest Western European nation--in a land area about $1\frac{1}{2}$ times that of West Germany or the United Kingdom, two-thirds that of France, or nine-tenths that of California. The modest growth in population and labor force meant that labor productivity (output/worker/year) increased at about 7 percent annually for 1953-61, 8 percent for 1961-71, and 8.3 percent for 1971-73.

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[1] For a comprehensive, detailed study see Hugh Patrick and Henry Rosovsky, editors, Asia's New Giant--How the Japanese Economy Works (Brookings Institution, 1976), 943 pp.

[2] Data for 1953-71 are from Edward F. Denison and William K. Chung, "Economic Growth and its Sources" in Ibid, Table 2-5, p. 84. An expanded monograph of their study has been published as How Japan's Economy Grew So Fast (Brookings Institution, 1976), 267 pp. Subsequent data are for GNP based on the official statistics. During 1953-1973 GNP grew somewhat more rapidly than national income, at a 10 percent average annual rate.

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Several fundamental questions arise. What were the sources of this extremely rapid and sustained increase in labor productivity and output? More important but not unrelated: what are Japan's future prospects for growth in labor productivity and output over the coming 10-15 years? Will future growth be less rapid? If so, why and how much? This paper examines these questions, with main emphasis upon future prospects. The next section presents recent comprehensive estimates of the sources of Japan's postwar productivity performance, as compared with Western Europe and United States. The succeeding section examines future prospects in terms of macro projections of growth in output and labor productivity, and brief consideration of related factors for economic performance. The final section is on two specific themes important for future productivity performance: government policy and government-business relations; and employment practises and labor-management relations.

II. Postwar Productivity Performance

Japan's economic success has, not surprisingly, resulted in a number of studies, macro and micro, attempting to explain various causal forces at work. Two recent studies--by Denison and Chung, and by Christensen, Cummings and Jorgenson[1]--provide useful macro evidence on the sources of increases in output and labor productivity for the Japanese economy in comparison with other national economies. Both studies employ the well-known growth accounting approach, based on

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[1] Denison and Chung, op.cit.; Laurits R. Christensen, Dianne Cummings, and Dale W. Jorgenson, "An International Comparison of Growth in Productivity, 1947-1973," NBER Conference on New Developments in Productivity Measurement, Nov. 13-14, 1975, mimeograph.

standard assumptions of competition in commodity and factor markets, no economies of scale in production, the equivalence of labor and capital shares in income to their respective marginal productivities in production, and no synergistic interactions among causal factors explaining output. The growth accounting approach has been subject to criticism: it does not take into account the indirect but important effects of interactions among capital, labor, technology and other causal variables; and it treats only the proximate causes of growth, without much explanation of the causes of the growth of capital stock or manhours worked. Conceptually other methods of analysis, such as longer-run general equilibrium econometric models of the growth process, may be superior, but the forces causing the growth of output and productivity involve a complex of "myriad economic, social, and natural phenomena, that no credible econometric model has been constructed."[1] Thus, at present these studies are the best comprehensive empirical analyses available, especially for comparative purposes.

Denison and Chung adjust national figures to correspond to U.S. procedures for price deflation of output in current prices as well as differential effects of weather, strength of aggregate demand, and the like.[2] The results are presented in Appendix Table 1, which provides estimates of the contributions of labor and capital inputs to output, and of the effects of improved resource (mainly labor) reallocation, economies of scale in growth of market size and, residually, advances in knowledge and other unspecified sources. Appendix Table 2 provides a comparison of the sources of growth in labor productivity (output/worker/year) in the business sectors for Japan and the United States. It should be noted that the Denison-Chung estimates give considerable attention to changes

[1]John W. Kendrick, "Productivity Trends and Prospects," in Joint Economic Committee, U.S. Economic Growth from 1976 to 1986: Prospects, Problems and Patterns, Volume 1 - Productivity (September, 1976), p. 12.

[2]These adjustments, mainly for deflation procedures, reduce Japanese growth rate negligibly, for 1953-71 from 9.17 percent to 8.81 percent.

in labor inputs and in the reallocation of labor to more productive uses.

While Christensen, Cummings, and Jorgenson employ a general approach similar to that of Denison-Chung, they differ somewhat in their methodology. Their output measure uses gross private domestic product rather than national income; accordingly depreciation is included (which raises the share of capital services) but the government sector is excluded. Moreover their measures of capital inputs are more detailed, taking into explicit account different tax treatment by type of ownership and differential effects of inflation; on the other hand, their treatment of labor is much less detailed, limited to measurement of skills by level of educational attainment. Their results appear in Appendix Table 3 for sources of total output growth and Appendix Table 4 for sources of growth of labor productivity (output/worker/hour). They include directly in the labor and capital input estimates measures of the improvement in the composition of these resources.[1]

While the two studies differ somewhat in time period covered, extent of coverage, and methodology, a number of important conclusions emerge, and certain similarities are striking. In comparison with Western Europe and the United States, both output and the combined input of capital and labor grew substantially more rapidly in Japan. The growth in aggregate labor input and contribution to output was somewhat higher, but not so much so as to account significantly for Japan's rapid growth. Accordingly, Japan's growth in labor productivity was triple that in the United States, and about 50 percent above that in the most rapidly growing Western European nations. The increase in capital input in Japan was much more rapid than for labor, and was $1\frac{1}{2}$ times its nearest competitor West Germany, a consequence of Japan's extremely high shares

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[1] In their study this is referred to as increases in the quality of labor (as measured by changes in educational attainment) and the quality of capital (as measured by changes in the composition of capital, sub-components of which have constant but different rates of capital service flows).

of productive investment and private saving in GNP. Moreover, the increase in output per unit of combined capital and labor input--variously referred to as total factor productivity, technological change, or the unexplained residual--was substantially higher in Japan, contributing some 4.1 - 4.4 percentage points to total growth. Nonetheless, because total growth was so rapid, the contribution of Japan's increase in total factor productivity was slightly lower than in Western Europe, though higher than for the United States.

The broad similarity of--and certain differences in--the two studies hold as well for a more detailed examination of the Japanese case per se . Let us examine the Denison-Chung data for 1961-1971, closest in time period to the Christensen-Cummings-Jorgenson 1960-1973 coverage. The results are given in Tables 1 and 2 for sources of Japanese growth of output and of labor productivity (output/manhour) respectively. The tables reflect some reorganization of the underlying categories in order to achieve greater comparability.

First, the total combined input of labor and capital in amount, changes in composition,and sectoral reallocation explains about 56-60 percent of total output growth, and 48-49 percent of the growth in labor productivity (output/manhour). I return to this point below.

Second, increases in direct labor input only explain 15-20 percent of Japan's output growth. Most came through the increase in employment, together with some rise in total manhours worked as labor shifted out of agriculture and as overtime remained important. Improvements in the average educational level of the labor force, while substantial, made a relatively small measured contribution to output and productivity increase. However, it is probably true that given levels of educational

TABLE 1. Comparison of Sources of Growth of Output
(in percentage points and percent of total)

	Denison-Chung 1961-71		Christensen et al 1960-73	
	Amount	Share of Total	Amount	Share of Total
Output	9.29	100	11.0	100
Direct labor input	1.78	19.2	1.65	15.0
Other than Education	1.43	15.4	1.30	11.8
Education	0.35	3.8	0.35	3.2
Direct capital input	2.57	27.7	3.52	32.0
Change in capital composition	---	---	1.37	12.5
Labor sectoral reallocation	0.81	8.7	---	---
Total factor inputs, including reallocation effects	5.16	55.5	6.6	60.0
Total factor productivity	4.13	44.5	4.4	40.0
Economies of scale	1.96	21.1		
Trade barriers reduction	0.01	0.1		
Irregular factors	-0.27	-2.9		
Advances in knowledge, etc. (residual)	2.43	26.2		

Source: Denison and Chung, How Japan's Economy Grew So Fast, Table 4-6, p. 38; Appendix Table 3.

TABLE 2. Comparison of Sources of Growth of Labor Productivity (in percentage points and percent of total)

	Denison-Chung 1961-71		Christensen et al 1960-73	
	Amount	Share of Total	Amount	Share of Total
Output/manhour	8.02	100.0	8.9	100.0
Capital per worker	2.21	27.6	2.61	29.3
Change in capital composition	---	---	1.37	15.4
Labor education	0.35	4.4	.33	3.7
Labor other direct changes	0.61	7.6	---	---
Labor reallocation	0.81	10.1	---	---
Land	-0.06	-0.7	---	---
Total factor inputs, including reallocation	3.92	48.9	4.3	48.4
Total factor productivity	4.10	51.1	4.6	51.6
Economies of scale	1.94	24.2		
Trade barriers reduction	0.01	0.1		
Irregular factors	-0.27	-3.4		
Advances in knowledge etc (residual)	2.42	30.2		

Source: Denison-chung, How Japan's Economy Grew So Fast , Table 5-1, p. 52; Appendix Table 4.

Note: Rounding error of 2.4 percentage points in Christensen-Cummings-Jorgenson is attributed entirely to the residual total factor productivity item.

skills were better utilized as time went on; Japan has had, and to some extent still has, excess capacity in the quality of its labor force as denoted by educational attainment.

Third, the rapid growth of capital stock in total and per worker meant that its contribution has been substantial: 28-32 percent of output and 28-29 percent of manhour productivity. Since the early 1960s Japan has been ploughing back 35-40 percent of its GNP into gross domestic investment. Moreover, much of this investment was for business plant and equipment, with directly productive implications for further growth of measured GNP. Both the (realized) optimism of business investment demand and private voluntary saving behavior have been extraordinary, resulting in the highest shares of saving and investment in GNP of a free market economy in peacetime the world has ever seen.

Fourth, both studies emphasize the importance of the reallocation of labor and capital as additions to the labor supply and capital stock are put to more productive use. Denison-Chung focus on the transfer of labor, adjusted for sex, education, and age, on a net basis away from low productivity agriculture and self-employment (including family workers) in small-scale non-agricultural activities; they find such labor reallocation comprised about 9 percent of the sources of growth in output and 10 percent in labor productivity. Christensen-Cummings-Jorgenson focus instead on improvements in the composition of capital, as new additions to capital go into highly productive (of GNP) uses. Such improvements in capital quality explain 13 percent of output growth and 15 percent of labor productivity improvement.

Both studies ignore the problems which these particular reallocations of labor and capital created for welfare as distinct from growth. Rapid growth has been concomitant with, in a causal pattern of interaction,

workers pouring into burgeoning cities and their suburbs. Rapid urbanization has meant urban crowding, congestion, and pollution. Moreover, during the 1960s the priority allocation of savings to business investment was increasingly at the expense of welfare, as private housing and social overhead needs were relatively--if not absolutely--starved and as pollution and other external diseconomies of urban-oriented growth were not taken care of. A very recent study indicates that between 1955-1970 net national welfare grew considerably less rapidly than GNP.[1] Interestingly, between 1970 and 1975 net national welfare grew more rapidly than earlier--at an average annual rate of 9.0 percent--and also much more rapidly than GNP growth (5.2 percent). This recent improvement was due mainly to the absolute reduction in air pollution levels due to the very effective anti-pollution program of the past five years, and increased leisure time (perhaps not all desired) together with a rising valuation given to leisure, while private real consumption continued to hold up fairly well, growing faster than GNP.

It is disturbing that the macro explanations of Japanese postwar economic performance--in terms of increases in aggregate labor and capital inputs and in their more productive allocation--leave 40 percent plus of output growth and half of labor productivity growth unexplained. The extent of ignorance remains substantial. This is important both for our understanding of the past and for the reliability of projections into the future.

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[1] The estimated annual average growth rates in 1970 prices were:

	1960/1955	1965/1960	1970/1965	1975/1970
NNW	4.8	6.8	7.8	9.0
GNP	8.7	9.7	11.6	5.2

Hisao Kanamori, "Economic Growth and Welfare: GNP and NNW," paper presented to the International Economic Conference Commemorating the Centennial of the Nihon Keizai Shimbun (Tokyo: Oct. 26-28, 1976), Table 1.

Fortunately, some further explanations can be made, qualitatively at least, of sources of Japanese growth not measured in these aggregate estimates. First, disaggregation of inputs and outputs will lead to higher estimates of the contribution of labor and capital. The two studies considered above give evidence that disaggregation of either capital or labor increases the degree of explanation; presumably a study incorporating disaggregation of both inputs would be even more effective. So too would be a disaggregation of output. In a recent study based on the former's dissertation, Nishimizu and Hulten have achieved some disaggregation both of inputs and outputs in a ten sector model. They stress that productive (input-output) relationships among sectors have been quite important: productivity change in one sector contributes to the performance of those sectors using its products. They estimate that, when intermediate input relationships are taken into account, capital and labor inputs explain between 68-75 percent of Japanese gross output growth for 1955-71.[1]

Denison-Chung examine a number of other specific sources of output growth. They lump together several irregular factors: changes in weather has only a negligible impact; work time lost through strikes and other labor disputes was so little that it had a zero negative impact on growth; and Japan's mild recessions ("fluctuations in intensity of demand") reduced output growth by about 1/4 percent in the 1960s--and substantially more of course in 1974-76. Quantitatively most important--"explaining" 21 percent of output growth and 24 percent of labor productivity growth--is

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[1]Mieko Nishimizu and Charles R. Hulten, "The Sources of Japanese Economic Growth: 1955-71", Econometric Research Program, Princeton University, Research Memo #200, June 1976. The definitions and methodology are similar to Christensen et al; the general government sector and housing are excluded but government enterprises are included. The difference in total factor productivity estimates of 25 and 32 percent depend entirely on the capital stock measure used; unfortunately the more recent, and presumably better, capital stock series demonstrates slower real growth, with the attendent higher share of output growth attributed to total factor productivity.

the estimate of economies of scale. Denison-Chung argue that local, regional, and national market growth provides opportunities for greater specialization, longer product runs, larger units of production, and increases in private consumption concentrated in products where potential gains from economies of scale are particularly large. Their estimation procedures are indirect and somewhat controversial, based on assumption rather than empirical evidence. They find such synergistic interactions were larger in Japan than elsewhere, due both to faster growth itself and to the substantial changes in Japanese consumption patterns.

An important contributer to Japanese output and productivity performance has been technological change itself, not in a residual sense but in terms of advances in knowledge. Some improvements are embodied in new machinery and production processes (not fully caught in measures of capital). Others reflect improvements in human skills and understanding, as a given level of education encompasses more knowledge, and new production technologies and other changes provide greater opportunities for learning on the job.

The best documented source of technological change--and it still is not very thoroughly studied--has been Japan's extensive purchase of foreign technology through patent and license agreements, combined with complementary research and development by Japanese firms, and an eventual diffusion domestically Peck and Tamura's excellent study[1] points out that Japan's R & D efforts differed from those in the United States and United Kingdom by a) the focus on commercial application and economic pay-off, rather than basic

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[1]Merton J. Peck with Shuji Tamura, "Technology," in Patrick and Rosovsky, Asia's New Giant, pp. 525-85.

science, space exploration, defense or other national goals; b) the high reliance on private industry technology search and import, and R & D expenditure; and c) active government policy to encourage yet set the terms of technology flows, especially controls over technology imports until the late 1960s. Japanese R & D efforts have focussed particularly on making technology commercially feasible and profitable, and on improving foreign technology to lower production costs or produce new products. Of course by no means all technological innovations were foreign in source, as Japan's pioneering role and commanding international market position in shipbuilding--especially of very large tankers and other bulk cargo ships--attests. Moreover, while Japanese productivity is still below the American level for the economy as a whole,[1] in certain industries it is higher. For example, it appears that in producing a ton of steel Japanese mills use less capital, less iron ore, less coal and even less labor than do American mills.[2]

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[1] Denison-Chung find that Japanese national income per worker employed in 1970 was only 54.8 percent of that in the United States. Of the shortfall of 45.2 percentage points, 8.4 percentage points was due to less capital per worker, 9.3 percent to overallocation of labor to agricultural and non-agricultural self-employment, 3.5 percentage points to their measure of economies of scale, and 26.0 percentage points to lags in knowledge and general efficiency. How Japan's Economy Grew So Fast, Table 11-1, pp. 96-7 and Table 0-1, p. 250.

[2] Measures of output per manhour are to be treated with caution because of differences in product mix at the aggregate level and because of the extensive use of subcontract labor at the plant level. The U.S. Department of Labor estimates that in 1975, perhaps earlier, Japan surpassed the United States and other major producers in output per manhour; see Jerome A. Mark, "Comparative Growth in Manufacturing Productivity and Labor Costs in Selected Industrialized Countries", prepared for the European Association of National Productivity Centres, Workshop on Recent Progress in Productivity Measurement and Prospects, Copenhagen, October 27, 1976, Table 11. See also Institute for Iron and Steel Studies, Commentary August and September 1976 for comparison of U.S. and Japanese Steel industries; one point made is that the Japanese shipment yield from production is substantially higher, with concomitantly less recirculating scrap.

At the same time, Japan's large amount of unexplained growth (total factor productivity) can be no means be attributed predominantly to foreign technology licenses and domestic R and D. The amounts of expenditures involved have simply been too small to account for more than a modest share of the increases in total output and productivity.[3]

The quality of the Japanese labor force should not be underestimated. Japanese workers in the early 1950s had on average more formal education than their European counterparts, and the level of education has increased substantially since then. To some extent this has served as a reservoir of labor skills to be drawn upon as more capital and better technology have become available. While the Denison-Chung and Christensen et al studies find that increases in educational attainment account for surprisingly little of the rise in output and productivity, in part this may be because wage differentials used as weights were narrowing over the period. Other research (in progress) by Saxonhouse and Patrick in explaining Japan's postwar foreign trade performance finds that between 1955-1970 the quality of labor (reflecting real productivity) increased at an average annual rate of 10.4 percent for secondary school graduates, 8.3 percent for college graduates with science or engineering degrees, and 2.7 percent for other college graduates.

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[3] Japanese R and D expenditures have been about 1.3-1.6 percent of GNP. As Gary Saxonhouse has pointed out, most domestic R & D expenditures are included in labor and capital measures in growth accounting, so do not (formally) contribute to an explanation of total factor productivity; licensing of foreign know-how could be so attributed but the amounts have been miniscule relative to GNP (less than 0.2 percent).

III. Aggregate Labor Productivity Growth Prospects

The past is only an imperfect guide to the future, but short of divine revelation it is the only guide we have. The appraisal in the previous section of the sources of Japan's postwar output and productivity performance should make us beware of any direct extrapolation into the future. Moreover, the future will not be even a sophisticated extrapolation of the known past: we do not comprehend fully what has actually occurred historically, especially the evolution of fundamental long-run forces, so extrapolation is based on imperfect knowledge; and random events are bound to occur domestically and internationally which, to a greater or lesser degree, will affect Japan's future economic performance. The longer term the projection the greater the margin of error; a wider range of possible futures are consistent with past patterns, and the possible effects of random shocks loom greater.

Accordingly, any long-run projections of Japanese labor productivity and GNP growth are basically informed judgments. To a considerable degree long-run projection remains an analytical art form rather than highly scientific in methodology and empirical content. Japanese planners, policymakers, and businessmen are generally well aware of the uncertainties of long-run projections, which may be one reason they are willing both to prepare them and not to take them too seriously.[1]

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[1] Perhaps Americans, craving certainty (or something close to it) more, are less willing to indulge in long-run projections; certainly American policymakers in the past took Japanese projections of economic performance more seriously than did their Japanese counterparts. Cultural anthropologists may explain Japanese attitudes about uncertainty of projections of the future by their closeness to an uncertain nature replete with earthquakes, typhoons, and similar unanticipated disasters; it would be presumptuous for an economist to do so.

One further caveat: the projections here are for a period of reasonably full employment of resources, after emergence from the current recession. The present degree of underutilized capacity--still close to 10 percent--somewhat contaminates the statistics on future growth, since for several years actual growth will probably be greater than the rise in potential growth capacity. As discussed below, the severity of the 1974-76 recession may also have altered somewhat Japan's longer-run growth prospects.

At the macro level, increase in labor productivity in the long run is closely related to the rate of GNP growth. On the whole labor inputs are easier to project than output growth rates, since the new entrants into the labor force between now and 1990 have all been born. Moreover, output growth in Japan will continue to be due substantially more to increases in labor productivity than to increases in numbers of workers and total hours worked.

Given these qualifications and disclaimers, let us begin with three increasingly specific projections and then attempt to justify them.

1. Japan's growth rate of output and labor productivity will be substantially slower between "now" (post-recession) and 1990 than in the 1960s.
2. Japan's growth rate of output and labor productivity will be considerably (at least 2 percentage points) more rapid than the United States, and somewhat more rapid than that of West European nations.
3. There is a (subjectively) very high likelihood the GNP growth rate wil be between 5-8 percent, and probably between 6.7 percent, with growth of labor manhour productivity 0.5-1.0 percentage point less rapid.

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[1]A difference in 2 percentage points means that the amount of increase in Japan's GNP will be about one-half that of the United States. It is worthwhile remembering that during Japan's superfast growth period of 1962-72 that amount of Japan's GNP increase was also one-half of the United States. That performance caused major transformations in Japan's economic position in the world and in both its exports to and imports from the United States and the rest of the world.

These projections are now supported by many specialists in Japan and most academic specialists on the Japanese economy in the United States, including me. Even the Japanese pessimists have come around to a 5-6 percent projection.

At the aggregate level growth in labor productivity and output is determined by the interaction of forces which increase the productive capability of the economy and its workers (supply effects) and forces which determine whether or not the productive capacity potential is fully utilized (demand effects). Clearly in the long run interaction and feedback effects are very important. High demand tends to generate a larger supply--of labor force participation, hours worked, savings and capital stock. Higher wages for labor concomitant with increases in labor productivity (or union power) encourages substitution of capital for labor and new labor-saving innovations. And so forth.

Both supply and demand factors enter into the three projections above. While concensus exists on the slowdown of future growth, there is less agreement concerning the causes of that slowdown. The majority view, which I share, is that while no single factor will be dominant each of the sources of growth will diminish over time. Lower population growth and increased desire for leisure will slow the increase in total hours worked. Capital formation and saving may decline slightly as a share of GNP, though I do not believe dramatically. More important, the aggregate capital-output ratio will rise, slightly within the business sector (in part due to ongoing pollution control costs), and more so because a higher proportion will be allocated to government investment--increasing welfare more than measured GNP. The opportunities for technological borrowing will probably diminish somewhat and costs rise (though Peck-Tamura argue that Japan may continue to maintain its comparative

advantage in the borrowing, improvement and commercial application of technology).

A second interpretation is that the impact of the present recession is so severe it will noticeably reduce Japan's growth prospects for at least a decade relative to what the trend performance would have been without recession. Capital formation foregone means a lower capital stock than otherwise. More important, the severity of the recession may have substantial longer-run dampening effects on business optimism and hence willingness to expand capacity through new investment. Previous recessions were mild, without actual declines, and brief. Japanese businessmen may never again achieve the pinnacles of optimistic expectations that prevailed in the late 1960s: the age of innocence is over. Equally of rapid growth in the past was rapid growth itself. As Japan has difficulty in returning toward a rapid growth path, the beneficial synergistic effects will not occur to so large a degree.

A third interpretation, particularly prevalent among the government bureaucracy in Japan, is that Japanese growth will be increasingly constrained by lack of available supplies of natural resource imports in a world increasingly resistent to Japan's burgeoning share of world import markets in these materials. (I suspect these concerns help account for the low profile approach of government policy, and the internationally non-threatening, modest growth rate objectives in the new five year plan). The fall 1973 oil crisis, following the summer 1973 US soybean export embargo, once again brought home vividly to all Japanese the great vulnerability of their economy to interruptions in imports of energy, industrial raw materials, and foodstuffs.

The correct lesson of the experience of the various shocks to which Japan's economy has been subject since 1971 is that the country is indeed vulnerable but not weak;rather, it is fundamentally very strong indeed. It has strong bargaining

power with foreign suppliers of its raw materials. More important, it has the domestic economic capacity, flexibility, and leadership to respond relatively quickly and effectively to such problems. It has solved the balance of payments problems of the quadrupling of imported oil costs. It has halted rampant inflation--at the 25-35 percent rate--without causing serious open unemployment.(As with other industrial nations the cost in terms of GNP foregone because of underutilization of labor and capital during the recession has been very high, in excess of $100 billion.)

Nonetheless, the vulnerability remains. For example, five-sixths of Japan's total energy is imported; this ratio will be at least that high in the mid-1980s.[1] Some argue that while natural resource supplies are abundant internationally and will continue to be into the 1980s, by 1990 the pinch will begin to be felt, especially in oil. My expectation is that any such gradual tightening of supplies will be met by the usual economic responses: rising prices; efforts to conserve; heightened R & D efforts to improve utilization and to develop substitutes; exploitation of new, previously submarginal, supplies; and the like. The Japanese have indicated they can play that game well. So long as they can purchase raw materials they will be able to adjust. I find it extremely difficult to envision as a realistic possibility a world environment in which Japan is denied physical access to oil or other raw materials for a sustained period of time (say more than six months) by means of blocade or embargo.[2] While it certainly behooves Japanese government officials to worry about this possibility, I regard it

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[1] Japan Economic Research Center, The Japanese Economy in 1985 (Tokyo: March, 1976) p. 26. The government and JERC's estimates of nuclear power in 1985 are overly optimistic, even though it is projected that it will comprise only 7.9 percent of energy supply in 1985.

[2] For a discussion of various scenarios see Hugh Patrick, "Japanese Growth in Alternative 1980 World Economic Environments," in Lewis Austin, ed. Japan: the Paradox of Progress (New Haven: Yale University Press, 1976) pp. 89-140.

as very unlikely. The more serious retarding factor on growth has been the worsening in Japan's terms of trade; due to large imports of high-priced oil, Japan now must export 40 percent more goods to import the same amount. The terms of trade may worsen even further in the shorter run as Japan must generate exports to pay for a substantially larger import bill at full employment, and in the longer run if the relative prices of raw materials rise further. Thus, in various respects, Japan's vulnerability is at the center of its interdependence with the rest of the world, and it can be expected that Japanese policymakers will continue to pay great attention to relations with other nations and to the international economic system itself.[1]

Given all these negative or retarding forces at work, how can one project Japanese growth as more rapid than the best West European performance? In general one can be optimistic or pessimistic about the future. I see no substantial reasons to be more pessimistic about Japan's prospects over the next fifteen years than those of other countries. Everyone has problems: the question is how one responds to them.

Fundamentally, I expect the Japanese to respond rather well. The society has demonstrated a strong capacity and will to overcome problems and a high priority to economic objectives. Despite temporary problems economically and politically, these traits will persist. Work and performance values permeate the society and will erode only slowly. Japanese are intelligent, diligent, and hard workers; they want to see a task well done. They are ambitious and eager to improve their material welfare. Alienation from the workplace is relatively low, and management makes a conscious effort to keep its workers loyal, relatively happy, and locked into the firm. This is not to deny that

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[1]For a discussion in terms of American interests and potential problem areas in future economic relations with Japan, see Gary Saxonhouse and Hugh Patrick, "Japan and the United States: Bilateral Tensions and Multilateral Issues in the Economic Relationship" in Donald C. Hellman, ed. China and Japan: A New Balance of Power (Lexington: D.C. Heath, 1976), pp. 95-157 .

larger organizations, private and government, are often petty, bureaucratic, and not always quick to respond--especially to what might be termed software changing conditions in distinction to hardware technological changes. The complex Japanese webs of personal relations and obligations have strengths and weaknesses. (One weakness is that they are difficult and slow to change when they become inefficient, as exemplified by the Japanese distribution system). Japan will continue to be a high saving-high investing society, so capital stock will continue to grow more rapidly than elsewhere. The remaining productivity differential, together with R&D-based innovations internationally and domestically, offer further opportunities for advances in knowledge. Japanese firms, including the large trading companies, seem to have developed an excellent international search and importation process for new technologies; although not well studied yet, it apparently is considerably more comprehensive, systematic, and effective than the methods used by American and European firms.

While there are no recent, comprehensive projections of Japan's economic performance to 1990, two projections to 1985 are available. Foreseeing no particular discontinuities in the mid-1980s I anticipate the growth rate at the end of the decade will be only moderately slower, if at all, than at the beginning. Starting in fall 1974 the advisory Industrial Structure Council of MITI (the Ministry of International Trade and Industry) has issued what is intended to be an annually rolling ten-year projection, appropriately subtitled "A Long Range Vision."[1] It is a statement of national economic goals and how they can be achieved. The difference in long-run projections of the first two reports is small, and the latter is used here. Also, the private Japan Economic Research Center (JERC) prepares a series of annual, five-year and ten-year projections on

[1]The first two are available in English summary as Japan's Industrial Structure--A Long Range Vision (Tokyo: Japan External Trade Organization, June 1975) and Japan's Industrial Structure--A Long Range Vision 1975 Edition (Tokyo: MITI Background Information BI-17, February 1976). The 1974 report suggests a mild slowdown in growth to 6.0 percent for 1985-90, but the 1975 report suggests a continuation at 6.5 percent for 1986, and does not project beyond that.

an on-going basis. In spring 1976 it released a new projection to 1985.[1] These projections are summarized in Table 3.

The two projections are broadly similar in methodology and in results. JERC expects slightly faster growth of output (7.0 percent versus MITI's 6.5 percent), slightly slower labor productivity growth (6.7 percent per manhour versus 6.9 percent), less of a decline in the workweek, slower increase in consumption expenditures, more rapid inflation, and higher rates of business and government fixed investment. The methodology is simple: the growth rate of output (and perhaps even of labor productivity) is assumed (based on informed and sophisticated judgment), then the implied consistent sequence of final demand, intermediate demand, capital and labor inputs, and (implicitly) total factor productivity is derived, and the results presumably examined to be sure they are plausible and reasonable.

Both projections on labor inputs start from the same demographic facts of slower labor force growth and higher average age. Participation rates will decrease slightly overall, somewhat more for young (remaining longer in school) and old (more old people and a higher proportion retired), and increase modestly for married women age 35-64 re-entering the labor force. Both projections assume that labor productivity, while increasing slower than before, will continue to rise rather rapidly--so much so that demand for labor relative to supply may be somewhat slack. In effect increasing labor shortage is assumed away; rather both are concerned--unduly since the employment system is quite flexible--about rising unemployment. While MITI visualizes the labor adjustment mainly in a substantially shorter

[1] Japan Economic Research Center, The Japanese Economy in 1985 (Tokyo: March 1976).

Table 3. Japan Economic Research Center and Ministry of International Trade and Industry Projections of Growth Rates of Japanese Economic Performance

	JERC, 1975-85		MITI, 1980-85	
	Real	Current Price	Real	Current Price
GNP	7.0	13.0	6.5	10.5
Primary	1.3	9.0	2.3	
Secondary	7.6	12.3	6.6[a]	
(Manufacturing)	7.6	11.8	6.3[a]	
Tertiary	7.0	14.5	6.0[a]	
Personal Consumption Expenditure	6.2	12.5	6.8	10.9
GNP deflator		5.6		3.7
CPI		6.0		4.5
WPI		4.0		2.5
Land Price		12.0		-
Labor Force Population	0.8		-	
Employment	0.9		0.7[a]	
Primary	-4.9		-3.8[a]	
Secondary	1.2		1.1[a]	
(Manufacturing)	1.1		0.9[a]	
Tertiary	1.7		1.5[a]	
Hours per worker	-0.6		-1.1[a]	
Output/worker/year	6.0		5.2[a](5.8[b])	
Output/worker/manhour	6.7		6.3[a](6.9[b])	
Business Fixed Investment	7.0		5.2	
Private Capital Stock	6.9		-	
Housing Construction	6.7		6.7	
Government Fixed Investment	8.1		7.4	
Compensation per employee		10.0		
Corporate profits (before taxes)		14.4		

Note: Since 1975 was a recession year and 1985 is assumed to be a year of full employment of resources, growth rates are slightly different from those of a full employment base year.

Source: Japan Economic Research Center, The Japanese Economy in 1985 (March 1976), various tables; Ministry of International Trade and Industry, Japan's Industrial Structure--A Long Range Vision, 1975 Edition (MITI BI-17, February 1976), various tables.

[a]For 1970-1985 during which the projected GNP growth rate is 5.9 percent.

[b]For 1980-85, assuming 1970-85 rates of employment growth and hours per worker decrease apply.

work week (36.5 hours), JERC perceives it mainly in the degree of utilization (and presumably terms of work) of older and female workers. The marginal suppliers of labor will continue to be treated marginally.

A related concern is whether the economy can absorb in fully productive jobs the ever burgeoning numbers of college graduates. It is suggested in the 1975 MITI report that in the mid-1980s about 50 percent of the age cohort will enter universities or junior colleges. This poses potential problems for the handling of managerial personnel; the bulge in lower to middle management numbers means that future promotion prospects look less good than in the past. At the other end of the spectrum large numbers of workers, especially females, remain in low productivity jobs throughout the economy. All in all, it is difficult to think of shortages of labor--in amount and in educational and skill levels--as being a serious constraint on future growth.

We can do better than simply assuming a growth rate of 6.5 or 7 percent, projecting labor force participation, and deriving labor productivity estimates. The primary long-run focus properly is on the increase in productivity capacity of the economy, the sources of growth as discussed in the previous section. In Table 4 the JERC projections on employment, hours worked per worker, and growth of the capital stock are combined with the Christensen-Cummings-Jorgenson estimates of relative shares to labor and capital, the (invariant) share of total factor productivity, and different assumptions concerning the degree of benefit from reallocation of capital and labor. This provides a test for consistency between the demand and supply sides.

The results in Table 4 can be interpreted various ways. Broadly, growth of output and labor productivity is consistent with the JERC-MITI projections, as long as a substantial benefit from reallocation and

Table 4. Illustrative Projections of Growth Rates of Japan's Gross Private Domestic Product, 1975-1985, Based on Alternative Assumptions for Improvements in Labor and Capital Composition (in percent)

	Input Compositional Effect		
	Nil	1960-73 Rate	One-half 1960-73 Rate
Labor Input	0.3	0.9	0.6
Employment[a]	0.9	0.9	0.9
Manhours per worker[a]	-0.6	-0.6	-0.6
Composition[c]	0	0.6	0.3
Capital Input	6.9	9.9	8.5
Amount[a]	6.9	6.9	6.9
Composition[c]	0	3.3	1.6
Average Share to			
Labor[b]	60	60	60
Capital[b]	40	40	40
Total Capital and Labor Input	2.94	4.50	3.76
Total Factor Productivity[d]	1.96	3.00	2.51
Output (Gross Private Domestic Product)	4.9	7.5	6.3
Output/worker/year	4.0	6.6	5.4
Output/worker/manhour	4.6	7.2	6.0

Notes:

[a] Based on Japan Economic Research Center, The Japanese Economy in 1985 (see Table 3).

[b] Approximate estimate consistent with Japanese and international data reported in Christensen, Cummings and Jorgenson (see Appendix Table 3).

[c] Assumed, based on data in Christensen, Cummings and Jorgenson (see Appendix Table 3);

[d] Assumed to be 2/3 of contribution of total capital and labor input (40% of total output), based on data in Christensen, Cummings and Jorgenson (see Appendix Table 3).

improvement of labor and capital persists. That seems likely for the labor force. It seems considerably less likely for the private capital stock, since higher proportions will go into housing, pollution control and the like. The assumption that total factor productivity will cause a constant proportion (40 percent) of output growth is rather rigid; it implies that growth is proportionally augmenting of direct factor inputs. One might make alternative plausible assumptions for total factor productivity growth: at a constant annual rate (2-3 percent); at some ratio of past total factor productivity growth (1/2, 2/3); at some rate increasing more than proportionately as the rate of output growth increases. It is a confession of our ignorance that such a wide range of assumptions are plausible.

Denison and Chung go through an interesting exercise in seeking to answer the question of the degree to which Japan's 1961-71 growth rate of national income is sustainable to the end of this century. They argue that almost two-thirds of Japan's postwar growth was due to the elimination of backlogs of inefficiency, the technology gap, and related features of being a latecomer to economic development. As the economy continues to grow, these transitional contributions are used up and growth will slow down to an eventual "mature" rate of 3 1/4 percent.[1] The Denison-Chung estimates are reproduced in Table 5. Based on an assumed pattern of phasing out of these transitional elements the implied growth rate is 6.4 percent for output and 5.9 percent for labor manhour productivity for 1977-82 (excluding any effects of the current recession), and 5.7 percent for output and 5.2 percent for labor manhour productivity for 1982-90. The authors are careful

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[1] Denison and Chung in Patrick and Rosovsky, Asia's New Giant, pp. 139-151.

Table 5. Denison and Chung Estimates of Sustainable and Transitional Contributions to the Standardized Growth Rate of National Income, 1961-71, and Year Transitional Contribution Expires

Rate or source	Contribution in percentage points, 1961-71			Year transitional contribution expires[a]
	Total (1)	Sustainable (2)	Transitional (3)	(4)
Standardized growth rate	9.56	3.24	6.32	...
Labor	1.78	0.68	1.10	...
Employment	1.09	0.33	0.76	1973
Hours	0.11	−0.15	0.26	1974
Age-sex composition	0.19	0.11	0.08	1977
Education	0.35	0.35	0.00	...
Unallocated	0.04	0.04	0.00	...
Capital	2.57	0.86	1.71	...
Inventories	0.86	0.21	0.65	1976
Nonresidential structures and equipment	1.44	0.38	1.06	1976
Dwellings	0.27	0.27	0.00	...
International assets	0.00	0.00	0.00	...
Land	0.00	0.00	0.00	...
Advances in knowledge and n.e.c.[b]	2.43	1.28	1.15	2002
Contraction of agricultural inputs	0.62	0.00	0.62	1982
Contraction of nonagricultural self-employment	0.19	0.00	0.19	1990
Reduction in international trade barriers	0.01	0.00	0.01	2002
Economies of scale				
Measured in U.S. prices	1.14	0.42	0.72	[c]
Income elasticities	0.82	0.00	0.82	1995

Source: Denison and Chung in Patrick and Rosovsky, Asia's New Giant, Table 2-19, p. 140.

a. Assumes contribution continues at 1961–71 size until expiration.
b. Not elsewhere classified.
c. The distribution among years follows: 1973, 0.10 points; 1974, 0.03; 1976, 0.22; 1977, 0.01; 1982, 0.08; 1990, 0.02; 1995, 0.11; 2002, 0.15.

to state this is not an actual projection but does represent a means of bringing past experience to bear upon judgments about the future. I regard these estimates as somewhat conservative, notably the assumed sustainable rates of growth of investment and capital stock of 3 1/3 percent and technological progress (advances in knowledge) of 1 1/4 percent.

Both these estimates of potential output and labor productivity growth from the supply side are on the order of 1 percentage point lower than the MITI-JERC projections.[1] Since my intuitive judgment is that a relatively higher growth rate (in the 7 percent area) is possible, it is tempting to stress the high degree of uncertainty inherent in the supply potential projections. Nonetheless, these relatively conservative estimates do suggest a growth rate in the 1980s on the order of 6 percent for output and 5.5 percent for labor productivity--still very good by most standards.

IV. The Government-Business-Labor Environment for Growth

These projections of macro economic performance provide useful guides to judge the future prospects for Japanese productivity. However, they should be regarded as the skeleton upon which the real world flesh of the institutional environment and of public and private policy must be draped. It is a mistake to take these as given, unalterable over time. Due to space limitations, I concentrate this all-too-brief discussion on two themes: government policy and government-business relations; and employment practices and labor-management relations.

I am of the school which interprets Japanese economic performance as due primarily to the actions and efforts of private individuals and enterprises responding to the opportunities provided in quite free markets for commodities and labor. While the government has been supportive and indeed indeed has done much to create the environment for growth, its role has

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[1] Projections based on the Nishimizu-Hulten results are even lower since their total factor productivity component is smaller, even though they obtained a slightly higher (45 percent) capital share.

often been exaggerated.[1] Rapid growth in the past has meant that almost all have benefitted--workers, managers, stockholders, government officials, consumers--and almost all economic policies have looked good. MITI has been quick to claim credit for virtually all industrial development, but with some justice only for a limited number of industries.

The current domestic political difficulties and the fast growth-slow growth debate signal that the mere extension of the past role of the government cannot be taken for granted. The present fight over political power in the Liberal-Democratic Party (LDP) and control of the government has resulted in inattention to aggregate demand management and prolonged slowness in emergence from the depths of recession. Fundamentally it also reflects the long-run erosion of LDP support at the polls. And, since the rise in concern over pollution, environmental disruption generally, the oil embargo, and heightened inflation, there has arisen a group arguing for slow growth(the rate undefined but perhaps 4-5 percent) as desirable to reduce the creation of problems and associated social tensions.

I predict that either the LDP will remain in power or a centrist coalition will be formed and that under either the main thrust of economic policy, domestically and internationally, will not be substantially altered. The government's share in GNP will rise, but slowly, to meet needs for social infrastructure investment and transfer payments for health, retirement, and other welfare purposes. High priority will continue to be given to economic goals, with emphasis shifting somewhat to quality of life objectives

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[1]There is by now a fairly substantial literature on this issue. See Philip H. Trezise with Yukio Suzuki, "Politics, Government, and Economic Growth in Japan" and Hugh Patrick and Henry Rosovsky, "Japan's Economic Performance: An Overview" in Patrick and Rosovsky, Asia's New Giant. For a more positive view see William V. Rapp, "Japan's Industrial Policy" in Isaiah Frank, ed. The Japanese Economy in International Perspective (Baltimore: Johns Hopkins University Press, 1975).

rather than economic growth per se. The rapid growth proponents--which include MITI and the Japan Economic Research Center--will emerge the winners (though this is more an American than a Japanese characterization, since it will be termed a new concensus). The justification will be that only growth can provide the resources for improving the quality of life and provide a higher share of government revenues in GNP without raising tax rates. Moreover, once fairly rapid growth is again underway politicians will be loathe to slow it down for preconceived lower targets. Thus, I anticipate that the long-run likelihood of inadequate demand management or adoption of slow growth objectives is low, so that the economy will be able to achieve fairly close to its potential.

While the government does engage in planning of a sort and issue five-year plans, the effective role of planning is rather modest.[1] Perhaps its most important function is to provide a mechanism for thinking in longer-run terms about the economy's goals, prospects, and problems, and hence for providing information and signals for public and private decision-making. Its other important function is to formulate government investment programs on a longer run basis; unlike the rest of the plan, which is highly aggregative, indicative, and not really implemented, government investment projects embodied in the plan do enter the budgetary process and are done. MITI's Long Range Vision describes and justifies planning as follows:

> In order to realize an industrial structure capable of satisfying the diverse needs of the people... it will be necessary to complement the market mechanism by introducing "soft planning", establishing guidelines, elements and relevant measures. Important for the introduction of such planning is a securing of broad consensus among those concerned and in turn, the concensus of the people.[2]

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[1] See Ryutaro Komiya, "Planning in Japan," in Morris Bornstein, ed. Economic Planning. East and West (Ballinger, 1975); Tsunehiko Watanabe, "National Planning and Economic Development--A Critical View of the Japanese Experience," Economics of Planning Vol. 10, #1-2 (1970).

[2] MITI, Japan's Industrial Structure--A Long Range Vision, 1975 Edition, p. 11.

Government involvement in the activities of big business, especially in so-called key industries, is active, extensive, routine, and more or less taken for granted. It is much less clear how effective it is, and by what criteria. Often intervention is in support of policies favorable to business. This was particularly true when the government bureaucrats, the LDP politicians in power, and big business leaders agreed that the main goal of economic policy was rapid growth.

Although business' heyday of power probably peaked in the late 1960s Japan nonetheless remains very much a big business society, like Western Europe and the United States. The earlier concensus eroded as pollution control and other quality of life issues came to the fore in recent years. However, pollution control is being achieved remarkably rapidly and inexpensively in Japan--at least compared to the earlier fears of business. It seems likely that a new concensus will emerge focussed on the slogan of the quality of life, with the understanding that private sector-based rapid growth will be essential. Thus far organized labor has not been an important, accepted participant in the government-business relationship in formal policymaking at the national level. Coalition government enhances the prospects that it may be incorporated somewhat, at least ceremonially. Nonetheless, in fact labor is already an important participant in setting national guidelines for the annual wage package through its annual spring offensive.

Descriptions (and stereotypes) of Japanese labor-management relations abound.[1] Most discussion focuses on large organizations--large private

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[1] Useful studies include Walter Galenson with Konosuke Odaka, "The Japanese Labor Market" in Patrick and Rosovsky Asia's New Giant; Kazuo Okochi, Bernard Karsh, and Solomon B. Levine eds. Workers and Employers in Japan: The Japanese Employment Relations System (Princeton Princeton University Press, 1973); and Robert M. Marsh and Hiroshi Mannari, Modernization and the Japanese Factory (Princeton: Princeton University Press, 1976).

firms, government enterprises such as the Japan National Railroad, and the government bureaucracy itself--where in the ideal model employees are hired only when they first enter the labor force after school, they are kept on until retirement at 55 or so, they are never laid off, wages increase through seniority until retirement, and production and clerical workers belong to a union organized and negotiating at the company level rather than industry-wide. The real-world adjustments of this model give employers considerably more flexibility in adjusting labor inputs and costs than the model's rigidity would suggest. Moreover, the permanent employment system and union membership cover somewhat less than one-third of the total labor force. And even within large organizations, it applies more to the educated managerial track than to clerical or production workers.

Nonetheless the labor-management relationship is rather more symbiotic than in the United States. Each is more clearly locked into the other in Japan, and each is more aware of it. Reward to labor comes predominately through increasing the size of the pie. The system has certain productive benefits: it is worthwhile for management to train and retrain such permanent workers, labor benefits from technological innovations since jobs are secure; and workers identify their own welfare directly with the performance of the company so work stoppages are minimized. The system also has disadvantages for labor: bargaining power over labor's share in the total pie is weakened; it is difficult for labor and management to collude at the industry level to reach wage bargains whereby the costs are passed on to consumers through higher prices; and lack of good alternative job opportunities reduces the freedom of mobility of individual workers, and means they may have to put up with less attractive work environments than if they were not so immobile. On net balance, most observers seem to feel that this system

of labor-management relations has been beneficial for rapid growth of output and labor productivity, and consequently that the incomes and level of living are higher for Japanese workers than otherwise would have been the case.

Management takes great pains to perpetuate the structure of this system, while all sorts of wage differentials within the firm have narrowed in response to changing labor market conditions. Management stresses an ideology of harmony, cooperation, loyalty, performance, and identification of employee with the company.[1] It rewards all workers so long as output and productivity are rising rapidly with substantial wage increases, a wide range of fringe benefits, and large semi-annual wage bonuses. (Bonuses are so institutionalized that a major portion is simply regarded as part of the regular wage). This emphasis on concensus and harmony, while important in itself, also covers over a great deal of competitiveness, and mutes the inherent adversary relationship between labor and management and indeed the whole range of conflicts of interest that exist in any economy. It is also a means of de-emphasizing victory and assuring the help of those who lost.

This managerial style is reflected also in the internal decision-making process throughout all levels of management. Japanese management is highly people oriented and communications and coordination oriented, especially laterally at all levels within the organization. Great emphasis is placed on initiative and flow of ideas from the bottom up. The Japanese managerial system is well described in a study sponsored by the National Center for

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[1]This management strategy is highly rational, especially since it reflects basic Japanese values symbolized by such key terms as concensus, group orientation, cooperation, harmony, negotiated compromise, loyalty, performance, thorough preparation, and merit. A list of such key terms for the United States includes individualism, self-interest, initiative, spontaneity, responsibility, competition, winning, and litigated resolution as well as performance and merit. While the United States and Japan occupy quite different places on a complex cultural spectrum--with Western European countries on average somewhere in between--these symbolic terms reflect extremes or ideal-types that are stereotypic rather than accurate reflections of reality. For example, strong tendencies exist in American society for cooperative efforts (pulling together as a team), mechanisms for muting conflict, and search for a middle ground (concensus by compromise). And a high degree of competitiveness is a major, if socially somewhat muted, feature of Japanese

Productivity and Quality of Working Life.[1]

Are Japanese industrial relations, decision-making processes, and managerial styles exportable? Can Japanese apply them well to their own foreign direct investment? Does it make sense for Americans and others to adopt all or some of these practices? While we do not know, since the number of cases are relatively few and careful study of them far fewer, available evidence suggests that American production workers respond positively to the personal interest manifested in Japanese supervisory style, but that lower and middle American managers in Japanese firms have trouble responding to the (often implicit) signals and modes of behavior of the Japanese managerial system.

More important for the purposes here, to what extent will the Japanese permanent employment system persist in the future? What are the prospects for labor-management relations? A few years ago--before the current recession--I was concerned about a serious intensification of labor strife as the real growth rate of output and labor productivity slowed down yet labor would be unwilling to accept a slowdown in hitherto annual wage increases of 12-15 percent, while consumers and the government would be unwilling to accept the higher rates of inflation implied by such wage settlements if they did occur. I thus foresaw a difficult transition process.

I no longer feel so concerned this will occur. One of the few beneficial effects of the current recession is that it brought about this transition, and painlessly so in terms of labor-management strife. The recession has proven for most large firms to be the first real testing of their permanent employment commitment. When close to bankruptcy a Japanese firm like any other ruthlessly fires workers in order to stay alive. Short of that the

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society--among individuals (by year of entry) in business firms and government bureaucracies, and among competing factions prevalent in virtually all kinds of large organizations.

[1]Richard Tanner Johnson and William G. Ouchi, "Made in America (under Japanese Management)," Harvard Business Review, Sept.-Oct. 1974, pp. 61-69.

question is: for how long and to what extent are large firms prepared to keep workers on the payroll when output demand is so slack that their labor cannot be utilized? The answer is: for a long time (up to two years) and to a considerable extent (perhaps 10-15 percent of the firm's work force), and with serious deterioration of profits, and even losses.[1] In other words, while there have been various adjustments (early retirement, sending workers home while still receiving base pay, and the like) basically the commitment has been maintained. But at a price to labor as well. In its bargaining over wage settlements in spring 1975 and 1976 management made it clear that if substantial wage increases--or indeed any increases in real terms (after adjusting for inflation)--were negotiated it would have to be at the expense of firing workers, i.e., the effective ending of the permanent employment commitment. Labor union leaders, as in other countries during this recession, thereupon decided that job security for all regular employees (namely union members) was of higher priority than wage increases in such periods of adversity, and accepted very moderate raises. Moreover, actual wage settlements by industry and firm were spread over a far wider range than previously, reflecting business ability to pay and labor willingness to compromise to keep the enterprise going and their jobs secure. Moreover, labor is probably prepared to settle for wage increases in the future consonant with productivity and cost of living increases.

I thus feel fairly sanguine about the overall prospects for labor-management relations. Slower labor force growth and some continued tightening of labor markets will mean some increases in turnover, decline

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[1] It should be stressed that this is not irrational behavior by large firms; it simply reflects the nature of institutional arrangements in Japan, including the explicit and implicit terms of the contract with labor. In effect the unemployment compensation system has been privatized in Japan, and firms are not subject to payroll taxes to finance unemployment funds. One reason profit performance has been so bad in the recent recession is that firms had not funded such contingent liabilities through reserve accounts Prior to the 1974-76 recession Japanese firms were ahead of the game since previous recessions were so mild that labor was never seriously underutilized. In the future there probably will be an expansion of government funding of situations where workers remain on the payroll but their services are not used.

in employee identification with employer, and continued modification of the seniority basis of wages.[1] Management will seek ways to be able to reduce the fixed component of labor inputs. Nonetheless, the permanent employment system will remain pretty much in force.

It may be well to end on the same note of caution with which this paper began. Projection, muchless prediction, is hazardous since the range of error is large and increases with the time span being considered. Thus, while the projections of output and labor productivity growth are plausible, they represent little more than "best guesstimates." On the other hand, for those concerned with Japan's involvement with the rest of the world, especially their own world, it probably is wiser to overestimate Japan's expected future economic performance than to underestimate it.

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[1] For an interesting discussion see Robert E. Cole, "Changing Labor Force Characteristics and Their Impact on Japanese Industrial Relations," in Lewis Austin, ed. Japan: The Paradox of Progress.

Appendix Table 1. Denison-Chung Estimates of Sources of Growth of Standardized Growth Rate of National Income, Whole Economy, by Country, Various Periods, 1948-71 (Percentage points)

Item	Japan, 1953-71	United States, 1948-69	Canada, 1950-67[a]	Belgium, 1950-62	Denmark, 1950-62	France, 1950-62	West Germany, 1950-62	Italy, 1950-62	Nether-lands, 1950-62	Norway, 1950-62	United Kingdom, 1950-62
Standardized growth rate	**8.81**	**4.00**	**4.95**	**3.03**	**3.63**	**4.70**	**6.27**	**5.60**	**4.07**	**3.43**	**2.38**
Total factor input	**3.95**	**2.09[b]**	**3.02**	**1.17**	**1.55**	**1.24**	**2.78**	**1.66**	**1.91**	**1.04**	**1.11**
Labor contribution	1.85	1.30	1.85	0.76	0.59	0.45	1.37	0.96	0.87	0.15	0.60
Employment	1.14	1.17	1.82	0.40	0.70	0.08	1.49	0.42	0.78	0.13	0.50
Hours of work	0.21	−0.21	−0.20	−0.15	−0.18	−0.02	−0.27	0.05	−0.16	−0.15	−0.15
Age-sex composition	0.14	−0.10	−0.13	0.08	−0.07	0.10	0.04	0.09	0.01	−0.07	−0.04
Education	0.34	0.41	0.36	0.43	0.14	0.29	0.11	0.40	0.24	0.24	0.29
Unallocated	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capital contribution	2.10	0.79[b]	1.14	0.41	0.96	0.79	1.41	0.70	1.04	0.89	0.51
Inventories	0.73	0.12	0.10	0.06	0.15	0.19	0.33	0.12	0.22	0.13	0.09
Nonresidential structures and equipment	1.07	0.36	0.87	0.39	0.66	0.56	1.02	0.54	0.66	0.79	0.43
Dwellings	0.30	0.28[b]	0.30	0.02	0.13	0.02	0.14	0.07	0.06	0.04	0.04
International assets	0.00	0.03	−0.12	−0.06	0.02	0.02	−0.08	−0.03	0.10	−0.07	−0.05
Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Output per unit of input, standardized	**4.86**	**1.91[b]**	**1.96**	**1.86**	**2.08**	**3.46**	**3.49**	**3.94**	**2.16**	**2.39**	**1.27**
Advances in knowledge and n.e.c.[c]	1.97	1.19	0.66	0.84	0.75[d]	1.51	0.87[d]	1.30[d]	0.75[d]	0.90	0.79
Improved resource allocation	0.95	0.30	0.64	0.51	0.68	0.95	1.01	1.42	0.63	0.92	0.12
Contraction of agricultural inputs	0.64	0.23	0.54	0.20	0.41	0.65	0.77	1.04	0.21	0.54	0.06
Contraction of nonagricultural self-employment	0.30	0.07	0.10	0.15	0.18	0.23	0.14	0.22	0.26	0.23	0.04
Reduction of international trade barriers	0.01	0.00	0.00	0.16	0.09	0.07	0.10	0.16	0.16	0.15	0.02
Economies of scale	1.94	0.42	0.66	0.51	0.65	1.00	1.61	1.22	0.78	0.57	0.36
Measured in U.S. prices	1.06	0.42	0.63	0.40	0.42	0.51	0.70	0.62	0.55	0.45	0.27
Income elasticities	0.88	...	0.03	0.11	0.23	0.49	0.91	0.60	0.23	0.12	0.09

Source: Edward F. Denison and William K. Chung, "Economic Growth and its Sources" in Hugh Patrick and Henry Rosovsky, ed. Asia's New Giant - How the Japanese Economy Works (Brookings Institution, 1976), Table 2-13, pp. 98-99.

a. Details may not add to totals because of rounding.
b. The −0.01 percentage point contribution of the "dwellings occupancy ratio" is included in the contribution of "dwellings" for comparability with other countries.
c. Not elsewhere classified.
d. Estimate for 1955-62 period.

Appendix Table 2. Denison-Chung Condensed Classification of Sources of Growth of National Income per Person Employed, Nonresidential Business, Japan, 1953-71, and the United States, 1948-69

Output measure or source of growth	Percentage points			Percent of standardized growth rate	
	Japan, 1953-71	United States, 1948-69	Difference	Japan, 1953-71	United States, 1948-69
National income per person employed (U.S. deflation procedures)	8.45	2.65	5.80	...	...
Irregular factors	−0.05	−0.18	0.13	...	...
Standardized national income per person employed	8.50	2.83	5.67	100.0	100.0
Advances in knowledge and miscellaneous determinants	2.37	1.44	0.93	27.9	50.9
Economies of scale	2.35	0.51	1.84	27.6	18.0
More capital per worker	1.85	0.40	1.45	21.8	14.1
Less labor misallocated to agriculture and nonagricultural self-employment	1.14	0.36	0.78	13.4	12.7
Changes in working hours and characteristics of labor except education	0.44	−0.34	0.78	5.2	−12.0
Increased education per worker	0.41	0.50	−0.09	4.8	17.7
Reduced international trade barriers	0.01	0.00	0.01	0.1	0.0
Less land per worker	−0.07	−0.04	−0.03	−0.8	−1.4

Source: Edward F. Denison and William K. Chung, How Japan's Economy Grew So Fast (Brookings Institution, 1976), Table 5-3, p. 54.

Table 3. Christensen, Cummings and Jorgenson Estimates of Average Annual Rates of Growth of Input, Output, and Total Factor Productivity; Average Shares of Labor and Property Compensation (in percent) 1960-1973

	Japan	Canada	France	Germany	Italy	Korea	Nether-lands	United Kingdom	United States
Labor input	2.8	1.5	0.4	-0.8	1.2	5.0	0.3	0.0	2.5
Manhours	2.2	1.5	0.0	-0.9	-1.1	3.8	-0.2	-0.6	1.7
Improvement in Composition[a]	0.6	0.0	0.4	0.1	2.3	1.2	0.5	0.6	0.8
Average Share to Labor	58.6	55.3	58.4	59.9	61.7	63.1	55.5	62.7	59.2
Capital Input	11.8	4.5	6.2	7.1	5.4	7.3	5.8	4.0	4.1
Amount	8.5	3.9	5.4	6.6	5.0	5.9	4.5	3.3	2.9
Improvement in Composition[a]	3.3	0.6	0.8	0.5	0.4	1.4	1.3	0.7	1.2
Average Share to Capital	41.4	44.7	41.6	40.1	38.3	36.9	44.5	37.3	40.8
Total Capital and Labor Input[b]	6.6	2.9	2.8	2.3	2.8	5.8	2.7	1.5	3.2
Capital	**4.9**	**2.0**	**0.2**	**-0.5**	**0.7**	**3.2**	**0.2**	**0.0**	**1.5**
Labor	**1.6**	**0.8**	**2.6**	**2.8**	**2.1**	**2.7**	**2.6**	**1.5**	**1.7**
Output[c]	11.0	5.1	5.9	5.2	4.8	9.8	5.1	4.0	4.5
Total Factor Productivity	4.4	2.3	3.1	2.9	1.9	4.0	2.4	2.5	1.3
Share Output due to Total Factor Productivity	40.2	44.2	51.9	55.6	40.7	41.2	46.6	62.2	29.2

Notes: [a]"Improvement in composition" is referred to in the source as increase in the quality of labor and capital respectively; it reflects the difference between aggregate capital and labor measures and disaggregated measures which take into account different labor skills and different capital service flows, and changes in the relative share of subcategories in the aggregate.

[b]Capital and labor inputs are weighted by their relative shares in output.

[c]Output = gross private domestic product.

Source: Laurits R. Christensen, Dianne Cummings, and Dale W. Jorgenson, "An International Comparison of Growth in Productivity, 1947-1973," NBER Conference on New Developments in Productivity Measurement, Nov. 13-14, 1975, Table 6, mimeograph.

Appendix
Table 4. Christensen, Cummings and Jorgenson Estimates of Average Annual Rates of Growth of Manhour Productivity and Its Sources, 1960-1973

(in percent)

	Japan	Canada	France	Germany	Italy	Korea	Nether-lands	United Kingdom	United States
Manhour Productivity	8.9	3.6	5.9	6.3	5.8	6.0	5.3	4.6	2.8
Capital per Worker	6.3	2.4	5.4	7.4	6.1	2.0	4.8	3.9	1.2
Percentage Attributable to:									
Capital/worker	29.3	29.8	38.0	47.7	39.7	12.5	39.7	32.0	17.7
Improvement in Capital Composition	15.4	7.7	5.7	2.9	2.7	8.6	10.5	5.9	17.6
Improvement in Labor Composition	3.7	0.7	4.2	0.9	24.7	12.6	5.2	8.2	17.8
Total Factor Productivity	49.2	61.9	51.9	46.6	33.2	67.3	44.6	54.2	47.0

Note: Percentages in final four rows may not add to 100 due to rounding errors.

Sources: From Table 9 in source cited in Table 3.