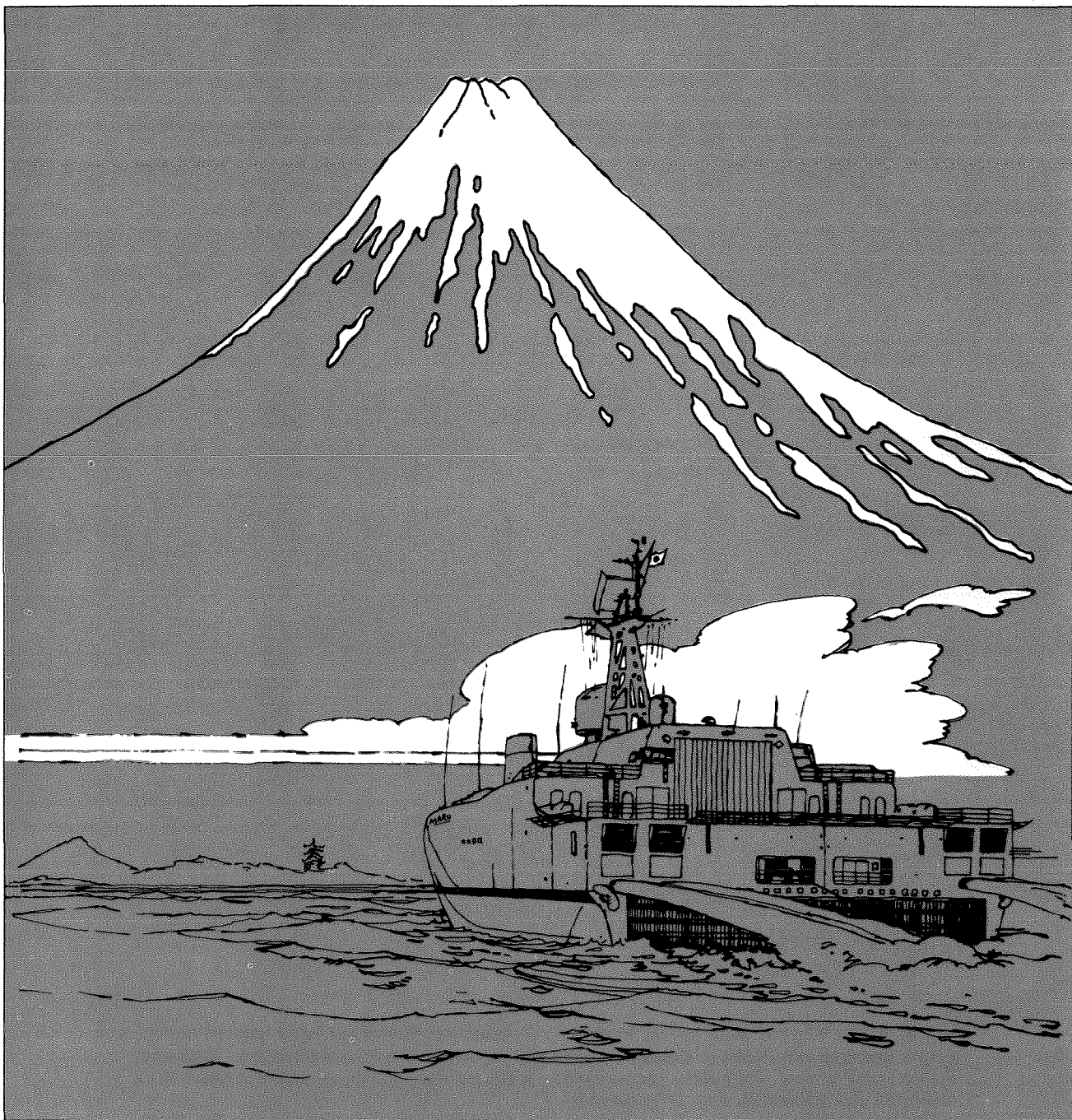


# FEDERAL RESERVE BANK OF SAN FRANCISCO

## ECONOMIC REVIEW



JAPAN: GROWTH AND PROSPECTS

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# On Japanese Economic Growth

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Perhaps uniquely among recently developing countries, Japan has experienced not one but two “economic miracles” during the past century. The first miracle coincided approximately with the Meiji Era, i.e., the reign of the Meiji Emperor Mutsuhito (1867–1912). It propelled Japan in half a century from a state not too far removed from Adam Smith’s “lowest barbarism”<sup>1</sup> to a world economic power of the second class—itsself a unique accomplishment for a non-European country with few significant natural resources, no significant Western population, and no history of Western colonization or dominance. The second Japanese miracle has been a postwar recovery (1945–73)<sup>2</sup> which not only surpassed all extrapolations of prewar growth but also lifted Japan past Britain, France, and Germany to the position of the world’s third-ranking economic power. Japan’s total GNP is now surpassed only by the U.S. and the Soviet Union. In terms of both income and productivity growth, Japan sharply exceeded the U.S. performance in the first two postwar decades (see Table 1).

After an introductory discussion of the stability of Japan’s underlying growth path, this essay will analyze the factors behind the nation’s post-1950 growth record. Japan’s rapid growth can be ascribed primarily to public policies designed 1) to increase the attractions of large-company investment by socializing risk, and 2) to finance such investment in part by the so-called inflation tax or “forced frugality.” We also consider the labor-market institutions which have raised la-

bor productivity so significantly. Some other growth hypotheses will also be mentioned, and likewise the “developmental arts” of avoiding overdoses of developmental medicine.

## Stability or Instability?

The question of growth-path stability is more than a pedantic or semantic quibble. The implication of a *stable* path is dominance by “market forces,” with an additional implication that growth would have proceeded at reasonably satisfactory rates in Adam Smith’s “natural course of things” even without such government intervention as has actually occurred. The implication of an *unstable* path is that public intervention is necessary, since the market process, left to itself, would be apt to shoot upwards from “knife-edge” equilibrium to hyper-inflation,<sup>3</sup> or downwards to some form of stagnation, or to fluctuations between these two states.

This writer is one of the numerous students (both Japanese and foreign) who have seen postwar Japanese growth, at least, as essentially an unstable process, and who have seen Japanese government economic policy as holding the actual growth path consistently above the equilibrium path without permitting hyper-inflation.<sup>4</sup> By the “equilibrium path” of growth I mean,

**Table 1**  
**Growth of National Income and Productivity**  
**Average Annual Increase (%)**

	Japan (1953–1971)	U.S. (1948–1969)
Real National Income	8.81	4.00
Real National Income per Employee	8.50	2.83

Source: E.F. Denison and William K. Chung. *How Japan’s Economy Grew So Fast* (1976), Tables 5–1, 5–3 (pp. 52, 54)

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following Harrod and Domar, a path along which planned or *ex ante* saving and investment remain equal at all points, or one along which the income effects of increased investment (through the Keynesian multiplier) balance at all points the output effects of investment as a whole (through the productivity of capital).<sup>5</sup> Many students, perhaps even a majority, may have taken a similar position as regards the instability of Japanese growth, usually without the formalism of Harrod-Domar growth models. (This does not mean that we have been right, but only that I cannot claim originality.)

More recent cliometric studies, applying econometrics explicitly to the longer Japanese historical record, have come out strongly on the “stability” side of the debate.<sup>6</sup> In view of the dispute, I find it desirable to discuss at once the principal factors—beyond hardening of the intellectual arteries—which keep me unconverted.

Let us consider as an example a mini-model, familiar to economists, from business-cycle theory but without “Japanese” or “growth” implications. Samuelson’s multiplier-accelerator model of business fluctuations develops a three-equation system relating income ( $Y$ ), consumption ( $C$ ), and investment ( $I$ ). Time periods are indicated by subscripts:

$$Y_t = C_t + I_t \quad C_t = aY_{t+1} \quad I_t = b(C_t - C_{t+1})$$

These equations can be combined to give a growth path of  $Y$ :

$$Y_t - a(1 + b)Y_{t+1} + abY_{t+2} = 0$$

which may be stable or explosive, monotone or cyclical, depending upon the numerical values of a Keynesian multiplier ( $\frac{1}{1-a}$ ) and an accelerator ( $b$ ).<sup>7</sup>

Suppose an econometrician were to fit a dynamic equation to the observed values of  $Y$  in a mixed or regulated economy, and obtain ( $a$ ,  $b$ ) estimates which imply stability. These estimates may be misleading, because the  $Y$  values might have been different in the absence of public intervention. The alternative coefficients which might have been derived from the “laissez-faire” path of  $Y$ —call them ( $a'$ ,  $b'$ )—might have implied explosive or anti-demand behavior. Such

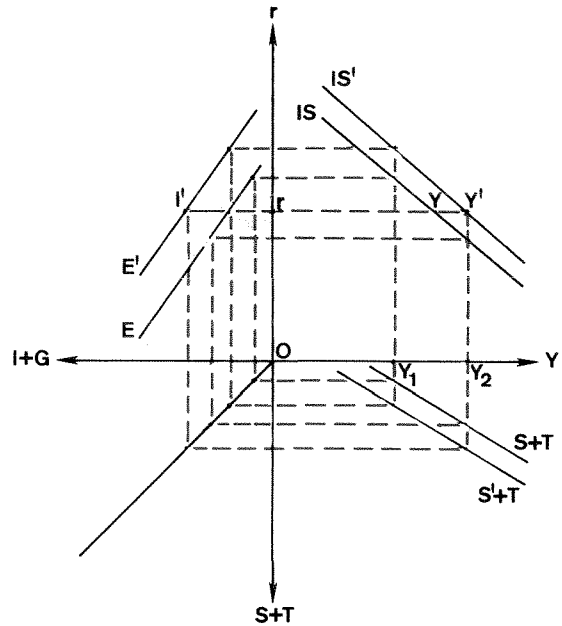
data on Japanese growth under laissez-faire have not been considered by any cliometric experiments with Japanese data in either the Meiji or the Showa (present) era, because they do not exist.<sup>8</sup> (I suspect that the difficulty may transcend modern econometrics.)

### Marginal-Efficiency “Sword”

Let us agree that public policy, including growth policy, really matters for better or worse, i.e., that it frequently surprises even the most rational of market expectations. Let us also agree that economic growth is more than the extrapolation of a multi-equation cliometric model. This leads, however, to the question of the disagreement between the “one-sword” and the “literary” schools of growth.<sup>9</sup> The “one-sword” school—the term is credited to Miyoei Shinohara and associated with Osamu Shimomura—explains the growth situation with a theory that cuts through a vital point of the economy—a point so vital that a push would set the whole economy pulsating.<sup>10</sup> The “literary” school contents itself with arraying large numbers of “factors responsible” for whatever one is trying to explain. Some journalists have listed as many as 25 such factors in explaining Japanese development performance. Hisao Kanamori, professing allegiance to this school, requires only six.<sup>11</sup>

My own “line” is rather closer to the “one-sword” school than to the “literary” (or “laundry-list”) one. My candidate for the role of “sword” is in Keynesian terms the high marginal efficiency of private domestic capital investment, permitting higher investments with longer pay-off periods than prevail in most other countries. High marginal efficiency of investment results in its turn from three fairly constant and consistent Japanese public policies: (1) “Socializing” risk by essentially guaranteeing against failure, financial stringency, or substantial lay-offs of permanent workers, for an important subset of large Japanese oligopoly firms of the sort formerly called *zaibatsu*;<sup>12</sup> (2) Holding foreign and multinational competition at bay by various capital-import controls and non-tariff protective devices, until these “chosen instrument” oligopolies have established for themselves secure and preferably dominant positions on the domestic Japanese

Figure 1



market;<sup>13</sup> (3) Reducing tax rates on business income to levels below those prevailing in other industrial countries. I should include a tacit codicil, that “chosen instrument” firms are expected in turn to support and protect their principal sub-contractors, sales agencies, and similar affiliates.

Two examples of socialization of risk may be listed:

(a) After the Nixon dollar-devaluation of August 1971, the Bank of Japan provided funds to permit commercial banks to buy Japanese firms’ dollar balances and dollar debts at ¥360 per dollar, at the cost of a sharp increase in the rates of both monetary growth and price inflation.

(b) Japan prides itself on applying a “polluter pays principle” to compensate victims of environmental pollution, on the basis of what our own common law calls “strict liability.” However, the firms’ resulting liabilities are then financed by long-term government loans at preferentially-low interest rates.

In macroeconomic theory, the marginal efficiency of investment in a capital instrument may be defined as the post-tax marginal productivity of that instrument as a percentage of its purchase price, averaged and discounted over its expected life with additional subjective discounting for uncertainty. Keynes in the *General Theory* stresses particularly the importance of uncertainty:<sup>14</sup>

It is important to understand the dependence of the marginal efficiency of a given stock of capital on changes in expectation, because it is chiefly this dependence which renders the marginal efficiency of capital subject to the violent fluctuations.

It follows that if uncertainty is socialized, and especially if pessimistic changes in general expectations are attenuated or eliminated by public policy, the over-all marginal efficiencies of both capital and investment are increased. The level of investment is thus increased—and likewise the growth rate of the capital stock and (diminishing returns to capital aside)<sup>15</sup> the growth rate of national income and product as well. A Hicksian four-quadrant diagram (Figure 1) illustrates the demand side of this dynamic mechanism.

On this diagram, the marginal efficiency func-

tion E relates the sum of private investment I and government expenditures G to the ruling real rate of interest r on the NW quadrant. The locus of planned (*ex ante*) equality between the sum of saving S and taxes T is then the IS function on the NE quadrant, given both the definitional *ex post* equality between (I + G) and (S + T) on the SW quadrant and a direct relationship between (S + T) and the national income Y (SE quadrant).

After the investment climate improves (as by lowered risks), the marginal efficiency function E eventually rises to the position E’ (NW quadrant). Private saving (plus taxes) also rises from (S + T) to (S’ + T) (SE quadrant), usually by a smaller amount. The locus of *ex ante* or planned equality between saving-plus-taxes and investment-plus-public expenditures therefore shifts from IS to IS’ (NE quadrant). The *ex post* or observed equality between these quantities remains operative (SW quadrant).

For any real interest rate such as r on the diagram, the equilibrium real investment level rises by the amount II’ (NW quadrant), while the real income level rises by the larger quantity YY’ (NE quadrant). The rise in income appears as a single once-for-all movement, but the rise in investment implies an increase in the society’s capital stock (not shown on the diagram), which raises the future income streams as well. What appears on the diagram as a once-for-all process is therefore actually a continuous one.

### “Short Sword” and “Dagger”

So much for the Shinohara sword, the role assigned to the marginal efficiency of investment, as per the  $E$  and  $E'$  functions of Figure 1. But in addition to his two-handed *daitō* the well-dressed *samurai* carried a short sword or *shōtō* and not infrequently a dagger or *tantō* as well. (The last-named weapon was also wielded at times by his lady!) In this arsenal of economic weaponry, I believe that both a *shōtō* of inflation and a *tantō* of labor flexibility accompany the marginal efficiency *daitō*, and will discuss them separately in a moment.

The short sword of secular inflation, more particularly its “inflation tax” aspects of forced saving or forced frugality, pertains to aggregate demand. The dagger, however, pertains to aggregate supply by way of labor productivity in Keynesian “efficiency units.” To some extent, of course, the impressive rise of Japanese labor productivity reflects the increased and improved capital stock with which that labor works. But insofar as rising labor productivity, average and marginal, reflects improved human capital—both the capacity and the willingness to up-date, broaden, or transform old skills while learning new ones—it calls for independent attention.

### The Role of Inflation

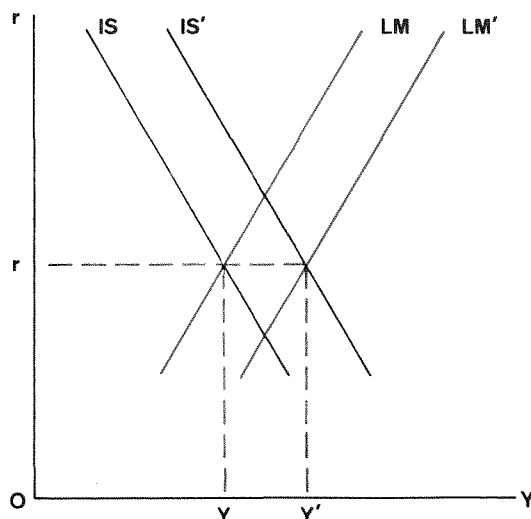
A long-term inflationary trend—so long as it remains within “reasonable” bounds which we cannot define explicitly—embodies a mechanism which can potentially encourage economic growth. That mechanism is forced frugality, otherwise known as the “inflation tax.”

In a period of inflation, holders of money balances are “taxed” in the sense that the real purchasing power of their holdings is eroded. This erosion is like depreciation on an ordinary capital good. It requires that the money-holder make a larger provision for depreciation out of current income than before. Spending by money-holders therefore is reduced, and in this way the private sector’s command over resources is reduced, freeing some for public-sector use. Thus, the proceeds of the tax accrue to the government. The impact of this tax on growth depends in turn on the government’s disposition of the tax “revenues” between (public) consumption and investment.<sup>16</sup>

As with any tax, there is a natural incentive for individuals to try to avoid its burden. Avoidance, in this case, would require economizing on money balances. Whether this is possible to any significant degree depends on the availability of alternative ways of holding wealth besides money. For the typical small saver in Japan, there are few alternatives to bank deposits available. Moreover, the small saver is largely dependent on his savings to provide for retirement, which suggests that the burden of adjustment to the inflation tax will take the form primarily of reducing consumption rather than saving.<sup>17</sup>

Figure 2 combines the long and short swords of marginal efficiency and secular inflation. The effects of reduced uncertainty upon the marginal efficiency of investment are represented by a rightward shift of  $IS$  to  $IS'$ , as in Figure 1. They are reinforced (in their effects on demand) by the effects of inflation upon the  $LM$  function of Figure 2, which becomes  $LM'$ . The rightward movements of these two Hicksian functions raise the equilibrium income level by the quantity  $YY'$  on Figure 2.<sup>18</sup> This rise combines once-for-all effects, which do not influence longer-term growth, with permanent effects springing from increased investment and capital stock. On the diagram as drawn, the equilibrium real interest rate remains unchanged at  $r$ , while the nominal rate rises by slightly more than the rise in the

Figure 2



inflation rate. This constancy of the real rate appears as a special case, but it may actually be a more permanent effect for reasons suggested by Frank Knight (see footnote 15).

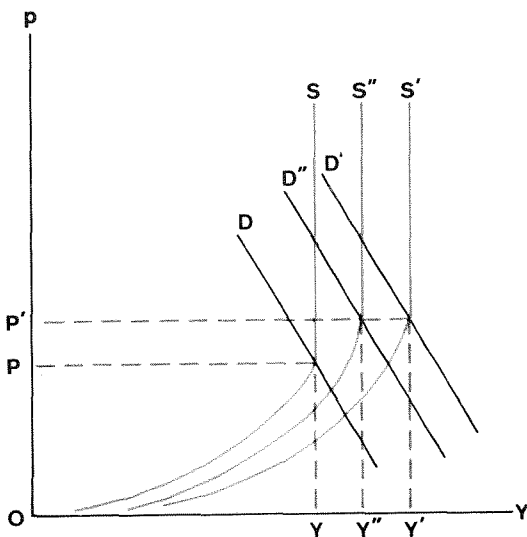
### Labor Productivity

Labor and capital resources are used together, usually in complementary fashion. Thus the marginal productivity of investment or the capital represented by a tractor is high when the superior farmer can fix it when it gets out of order, low when the ordinary peasant must bring it to town for repairs or call a repairman to his farm, and lower when some superstitious illiterate beats it with a sledge-hammer to punish it for running improperly.

The economist's usual way of handling such facts is to incorporate them in an aggregate *supply* function of output, like the *S* function of our Figure 3 relating output *Y* to the price level *P*, while our other arguments are reflected in the aggregate *demand* function *D* relating the same variables on the same diagram. We follow the conventional practice here, but note that aggregate demand *D* and aggregate supply *S* are less independent than they are drawn, because investment demand influences aggregate supply at a later date.

The supply function *S* of Figure 3 features an upward slope and upward concavity, both of

Figure 3



which represent diminishing returns to inputs. The function eventually becomes vertical when inputs are fully employed and no more output can be produced. (The analysis ignores the possible availability of supplements from abroad by foreign aid, or the running down of a country's reserves of international means of payment.)

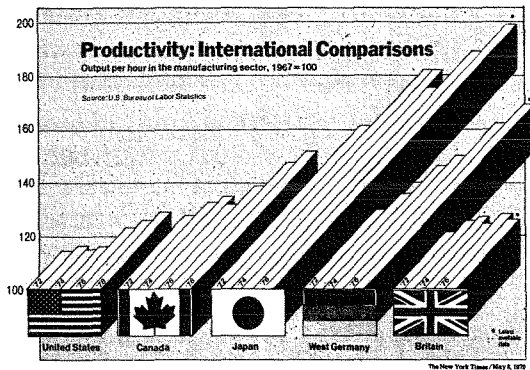
Increases in the marginal efficiency of investment, induced by the various considerations developed already, are reflected in outward and rightward shifts of a conventional aggregate demand function *D*. The higher capital stock to which they lead is reflected in outward and rightward shifts of the aggregate supply function *S*—marginal efficiency at one remove. The (historical) inflationary tendency of the Japanese economy is depicted also, by the upward shift of the *D-2* intersection points on Figure 3 as we move to the right.

In this diagram we also suppose that effective fiscal and monetary fine-tuning supplement, if necessary, the rising marginal efficiency of investment to keep the economy at high employment. (This assumption is reasonably accurate for Japan during the greater part of its development history.) This feature is indicated by the location of *D-S* intersection points where *S* becomes vertical, i.e., at points of full employment.

A question ignored thus far is why aggregate supply *S* moves over time from *S* to *S'* rather than only to *S''*, given a rise in aggregate demand from *D* to *D'*. Or, to put the matter differently, how can the Japanese economy support aggregate demand at *D'* with no greater inflation (from *P* to *P'*) than some "country X" of equivalent size which could support only the smaller rise of aggregate demand to *D''*?

Given Japan's well-known paucity of "land" and natural resources, an obvious explanation is the quality and quantity of the Japanese labor force. Attention has focused upon the average man-hour productivity of Japanese labor, which has apparently been increasing much faster than the corresponding rates for most of Western Europe and North America (Figure 4). To some extent, of course, the difference reflects the higher volume of capital investment in Japan—marginal efficiency again, at a second remove!—given the complementarity of labor and capital

Figure 4



inputs. But there is more to it than that, although the mathematics are unwieldy even under the simplifying assumption of a two-input world.<sup>19</sup>

If we believe, as I do, that high and rising labor productivity contributes to both rising Japanese income and rising Japanese marginal efficiency of capital, and that it is itself something more than a mere spin-off from high *past* investment and high *past* marginal efficiency, immediate questions arise as to what the “something more” may be, and from whence it arises. It is tempting at this point to relapse into tautological “national character” explanations, as Japanologists so diverse as Herman Kahn and Fosco Maraini have done.<sup>20</sup> Tautology-shyness, however, steers me away from “national character” into lesser degrees of abstraction. The principal components of high Japanese labor productivity—marginal efficiency of past investment aside—then appear to be the following quartet:

1. A well-educated and well-trained labor force, both blue- and white-collar, much of it capable of learning new skills and disciplines which maintain its initially high productivity well into adult life.

2. Availability of on-the-job training and re-training at many levels for workers hired on a “lifetime-employment” basis. This training, which apparently is a good investment for employers, compares in the larger firms to that

provided in modern military establishments.<sup>21</sup>

3. Systems of job tenure and of heavy weighting for age and seniority in salary and promotion decisions. These lessen workers’ reluctance to permit new methods and machines.

4. Absence of craft unionism (as distinguished from other forms of labor organization) with its overtones of job-consciousness, its “lump-of-work” theory of labor demand, its strictures against poaching on “the other fellow’s” specialties, and its history of jurisdictional disputes.

American home-owners, recalling their disputatious negotiations with construction workers (whose traditions of job-conscious craft-unionism are perhaps the strongest in America) may ascribe almost exclusive importance to the last point cited—especially when they learn that the Japanese *daiku-san* (literally, carpenter) is actually a multi-purpose construction worker-cum-building contractor. Such emphasis is probably exaggerated in most other trades, however, and our four points are mutually inter-dependent. At any rate, the significance of our developmental *tantō* of labor flexibility should be obvious.

#### Four Alternative Swords

Besides the three “swords” we have discussed and in addition to the antological “national character” explanation, four other factors are mentioned with sufficient frequency in literary and laundry-list explanations of “the Japanese Howdunit” to justify at least passing mention. These four alternative development “swords” are (1) the traditionally high private saving rate, (2) low expenditures on national defense, (3) cheap access to foreign technology, and (4) yen undervaluation.

1. *High saving ratios* without correspondingly high investment rates are a depressive and not an expansive factor in macroeconomic dynamics and macroeconomic statics. In our Figure 1, for example, IS would have moved in the wrong direction had (S + T) increased without an equal or larger increase in E. In Japan, the high saving rate has been for centuries an aspect, perhaps even a result, of the high marginal efficiency of investment.

The high saving rate apparently dates from the 17th Century, when the Tokugawa peace and Tokugawa dictatorship made capital, and there-

fore also investment, safe against marauding soldiers and bandits. The advantages of capital formation encouraged savings and investment simultaneously, as peasants saved to build new barns or potters' wheels, or to buy more silk-worms. The subsequent urbanization, with the rise of banks and other financial intermediaries between savers and investors, has loosened the present connection between the saving and marginal-efficiency functions of the Japanese macro-economy, but not to the vanishing point. Conventional Keynesians have been, I think, wrong when they treated the two functions as quite unrelated to each other, but right in pointing to investment rather than saving as the dynamic member of the duo. I accordingly treat the high saving ratio as an aspect or offshoot of the high marginal efficiency of investment rather than as an independent determinant of growth. (I do not claim that planned investment automatically generates precisely the amount of saving necessary to finance it—"Say's Law in Reverse.")

2. *Low defense expenditures* (below one percent of GNP) keep tax rates down, and marginal efficiency accordingly up, no more and no less than do other forms of public expenditure. We have already mentioned low taxes as a feature of the high marginal efficiency of Japanese investment. Is there anything more to be said?

Yes, there is. There are many countries—the U.S.S.R. is certainly one, and perhaps also the U.S.—in which the prior military claim on skilled manpower reduces the aggregate production function. I do not think Japan is such a country, thanks to its highly-developed systems of formal education and on-the-job training. Of course, if Japan were to attempt a Soviet- or Chinese-sized military establishment, the foregoing argument would not apply.

We should also recall that Japan's first (Meiji Era) economic miracle coincided with the building up of the best, though perhaps not the largest, defense establishment on the continent of Asia, which won two wars in ten years against China and Russia. The wars themselves slowed Japanese economic growth, but the build-up and maintenance of the defense establishment apparently did not do so.

3. *Cheap technology.* Research and development discourage immediate-run economic

growth, even when the later applications of their results encourage long-term growth. It is often advantageous, therefore, to buy existing technology ready-made and adapt it to one's own peculiar conditions, rather than attempt to do it oneself, blind alleys and all. This is particularly true in the early stages of a growth process. Largely for this reason, "appropriate technology" (usually labor-intensive) has been neglected even in developing countries, with their high population and labor-force growth rates, capital shortages, and substantial unemployment (open or disguised).

Japan took full advantage of purchased, borrowed, and sometimes stolen technology during the Meiji Era economic miracle, without actually catching up in many fields to the technological leaders of the West: Germany, the U.S., and Britain. Japan's "technology gap," never eliminated completely, widened again in the China Incident and World War II (1937–45), particularly after the American aerial bombing of the war's last nine months.

Using American EROA aid effectively, Japan applied Meiji Era methods again to close the gap with surprising speed in the first 10–15 years after the end of war. Many observers (including myself) accordingly expected Japanese "income-doubling" growth to slow significantly as soon as Japanese technology had caught up with the West or even gone ahead in some fields. The late 1960's or early 1970's were mentioned as dates when Japan would "run out of steam" because of shifting to domestic research and development from the cheaper imported varieties.

Japanese growth has indeed slowed since 1970. Most of the blame has been attributed, however, to labor shortages, the spread of investment from "factories, factories, and more factories" to social expenditures (such as housing and pollution controls), OPEC aggression, and subsequent world recession. It is difficult to associate any significant part of the decline with increased reliance on home-grown research and development. Comparing only Japanese and American statistics, Jorgenson and Nishimizu<sup>22</sup> estimate that by 1973 Japanese technology (as distinguished from capital intensity) had risen to surpass the American. Technology was then no longer cheap, but the growth-rate differential



between the two countries failed to narrow (see Figure 2 once more). Because of such fragmentary and circumstantial evidence, I would not stress superficially-plausible “cheap (or parasitic) technology” theses at least for the post-1945 Japanese miracle. (The Meiji Era case remains less clear.)

(4) *Yen undervaluation*. Our last alternative explanation is the cheap yen (¥360 to the dollar) which prevailed during the 22 years 1949–1971. Professor Shinohara was among the first Japanese scholars to maintain that the ¥360 rate undervalued the yen even under the Occupation conditions of 1949,<sup>23</sup> and he has maintained the same position over the years. Once the Occupation was over and basic freedom of trade restored, the equilibrium (purchasing-power parity) rate may have been as low as ¥250. Undervaluation, according to Shinohara in 1959, caused “a tendency for every industry to become an export industry” with a “trend toward all-out export industrialization in iron and steel, ammonium sulfate, shipbuilding, automobiles, cement, electrical machinery, and the like, to say nothing of textiles, dry goods, and foodstuffs.”<sup>24</sup> Export expansion paid for both the raw materials necessary to expand Japanese output and the staples necessary to feed the labor force while rural workers were being induced to leave their farms and come to the cities. A dearer yen would, Shinohara believes, have slowed down the growth process.

One may perhaps disagree to some extent, in view of the rapid rise of Japanese man-hour productivity in the 20-year period following the end of the Korean War. A dearer yen (say ¥250 to the dollar) would of course have required 30-percent lower yen-export prices to match Japan’s actual export performance. Could these lower prices have been achieved without a major depression, and without a reduction in real wages?

I believe they could have safely been achieved, in view of the productivity gains just mentioned (10–12 percent per year), the lower prices of imported raw materials, and the considerable inflation experienced during the Korean War. The main results of a higher yen rate would I think have been (1) a deeper “Dodge depression”<sup>25</sup> in the year preceding the Korean War, (2) less Korean War inflation of Japanese yen prices,

(3) some postwar deflation after that war ended in 1953, and (4) a lower long-term Japanese price level thereafter, but with no real hardship after mid-1950 and no material reduction of the Japanese growth rate. As in the actual case, money wages and consumer prices would doubtless have risen relative to wholesale and export prices, but from lower bases.

### Developmental Arts

These pages have been rather mechanical. Not only do they permit—they positively support—the questionable inference that a country already endowed with Adam Smith’s “peace, easy taxes, and a tolerable administration of justice” can increase the marginal efficiency of its capital and the measured growth rate of its economy indefinitely, simply by cushioning risks for certain leading firms and industries, by tolerating inflation, by training multi-skilled workers, and by suppressing craft unionism. Such inferences are exaggerated; this section proposes to indicate their limitations, and also to assess Japanese success in the developmental arts of remaining within these limitations.

As for risk reduction (or socialization): Clearly, domestic firms and industries should not be supported unconditionally. Conditions should be implied, if not imposed explicitly, relative to product quality, technological alertness, and cost control. Japan has done better than many rivals and imitators in this branch of developmental art. The case of the passenger car illustrates the point. When the American Occupation ended (1952) a number of companies were already building automobiles in Japan.<sup>26</sup> But the Japanese car was an over-priced “pile of junk” or “bag of bolts” imitating Western styling of last year or the year before. Its major technical defect was inferior durability on inferior Japanese roads. However, under the guarantee system supervised by the Ministry of International Trade and Industry—alias “notorious MITI”—that agency encouraged,<sup>27</sup> permitted, and apparently required a few major Japanese companies to overcome these deficiencies, and “administratively guided” the others to affiliate with one or another of the majors, avoid duplication, and reduce average costs of production. The result is history, despite MITI’s occasional fallibilities.

As for inflation: There is chronic danger of hyper-inflation. In a hyper-inflationary situation consumers hoard significant amounts of intermediate and final products which normally "belong" in production pipelines and business inventories.<sup>28</sup> Diversion of goods-in-process to consumer's capital slows down growth and employment by creating bottlenecks. Furthermore, the effective unit of circulation and account may cease to be the national currency. The national currency must share its position increasingly with something else in whose value people have more confidence, and whose quantity the monetary authorities cannot expand—gold, cigarettes, foreign currency are all examples. This too makes inflation counter-productive by diverting resources out of production, consumption, or import financing into the provision of domestic liquidity. But Japan has avoided hyper-inflation except during the decade of the 1940's, when it could be blamed rightly or wrongly upon "Acts of God"—the demands of the Imperial Army and Navy during the first half of the decade, and the policies of the Occupation during the second half.

As for labor productivity and flexibility: The jack of all trades remains master of none, except for the occasional Renaissance man. Flexibility and variety, training and retraining, can both be overdone. The professional linguist should not shift his emphasis from Japanese to Chinese until his Japanese has had time to penetrate his semi-

conscious if not his unconscious. Nor should the professional musician shift from the piano to the violin under similar circumstances. The great Einstein would have done well to avoid his occasional ventures into jejune and unoriginal Socialist Economics. Flexibility and retraining can indeed be overdone, but Japan has thus far refrained from overdoing them, perhaps because capital instruments have been too costly, too specialized, and too long-lived to permit indiscriminate fad-following.

### **Conclusion**

Modifying the Shimomura "one-sword" approach to explaining Japanese economic development, miraculous or otherwise, we suggest the marginal-efficiency as augmented by risk-diminution explanation to be at least the major sword. This major sword, however, we supplement with two additional aids to growth and to the marginal-efficiency schedule as well: the short sword of secular inflation and the dagger of the highly productive, flexible labor force. Finally, we have eschewed purely-mechanical theorizing by suggesting under the head of "developmental arts" the importance of carrying none of these devices so far as to bring on self-defeating negative returns. We have given Japan high marks for avoiding such excesses—avoiding, that is to say, swords too numerous or too heavy to carry or to wield.

## FOOTNOTES

1. This reference has become famous, although its original source is an early essay now apparently lost: "Little else is requisite to carry a state to the highest degree of opulence from the lowest barbarism, but peace, easy taxes, and a tolerable administration of justice, all the rest being brought about by the natural course of things." (Smith, **Wealth of Nations**, ed. Edwin Cannan, p. xlili.) The **Wealth of Nations** (1776) shows considerable familiarity with Japan, including (p. 416) a favorable comparison of "the empires of China, Indostan, Japan."

Among Smith's "requisites" for economic development, the most important of Smith's trio, to my way of thinking, is internal and external peace, especially if maintained indigenously and not imposed by outside power. Such a peace the Japanese had when Smith wrote, thanks to the long dictatorship (1603–1868) of the Tokugawa shoguns. (Some writers, indeed, claim that Japan would eventually have achieved some kind of economic miracle completely on its own, without the expansion of Western contacts which followed Commodore Perry's visit in 1853.)

2. The generation intervening between the death of the Meiji Emperor and the end of World War II (1912–45) was not a glorious one for the Japanese economy. Growth slowed somewhat because of World War I and postwar reconstruction. The 1920–21 recession was severe in Japan; the great Tokyo-Yokohama earthquake of 1923 prevented Japan from sharing fully in the prosperity of the 1920's; a forerunner of the Great Crash came to Japan in 1927. The period of 1931–45 was one of wars and war preparations, ending in a disastrous defeat.

3. On the monetary side, tendencies toward hyperinflation require "accommodative" money-supply policies.

4. M. Bronfenbrenner, "Economic Miracles and Japan's Income-Doubling Plan," in William W. Lockwood (ed.), **The State and Economic Enterprise in Japan** (1965) and "The Japanese Growth Path, Equilibrium or Disequilibrium?" **Keizai Kenkyū** (May 1970).

5. The first criterion is Harrod's, the second Domar's. The two are mathematically equivalent, and both paths are of the unstable "knife-edge" variety. See R.F. Harrod, "An Essay in Dynamic Theory," **Economic Journal** (March 1939) and Evsey Domar, "Expansion and Employment," **American Economic Review** (March 1947), reprinted in **Essays in the Theory of Economic Growth** (1957), ch. 4.

6. Allen C. Kelley and Jeffrey G. Williamson, **Lessons from Japanese Development** (1974); Williamson and Leo J. de Bever, "Saving, Accumulation, and Modern Economic Growth: The Contemporary Relevance of Japanese History," **Journal of Japanese Studies** (Winter, 1978).

7. The mathematics is not easy. Compare Paul A. Samuelson, "Interactions Between the Multiplier and the Principle of Acceleration," **Review of Economic Statistics**, May 1939, reprinted in Gottfried Haberler (ed.), **Readings in Business Cycle Theory** (1944), No. 12.

8. The cliometric results do not imply that public policy is without influence. Thus, the Kelley-Williamson model of Meiji Japan yields slower growth over a sub-period including two wars (Sino-Japanese War, 1894–95; Russo-Japanese War, 1904–05) than over earlier and later sub-periods, while stability prevails throughout.

9. This terminology is due to Hisao Kanamori, "Nihon no Seichō-Ritsu wa Naze Takai ka?" **Ekonomisuto** (Nov. 24, 1970), translated as "What Makes Japan's Economic Growth Rate so High?," **Japanese Economic Studies** (Fall, 1972). Kanamori's third school is the "econometric."

10. *Ibid.*, p. 32. An example is Shimomura's stress on fixed investment in heavy and chemical industries.

11. *Ibid.*, p. 32f. "I am often asked by foreigners why Japan's economic growth rate has been high; by mentioning the higher rate of savings, the fast increase in fixed investment, the sufficient manpower resources to draw on, the high educational level, and the small military expenditures, I find most of my questioners become satisfied."

12. The term *zaibatsu* has exploitative, imperialistic, and militaristic connotations, and is no longer popular in Japanese business circles. Conglomerates with substantial oligopoly power are now called *keiretsu*, and the group of all *keiretsu* (plus a few large independents) is called *zaikai*. I consider these distinctions more exclusively terminological than most Japanese industrial economists do.

13. Herman Kahn, however, goes somewhat too far in putting the very term "risk capital" in quotation marks when describing Japan, because:

.... under Japanese conditions the real risks are low. The high growth rate cuts down losses, and makes it easy to cover up any losses that occur. A large Japanese firm in serious trouble would be bailed out by the government—by arranging for a merger or for banks to extend loans. The employees, stockholders, (creditors) would be taken care of. Thus one of the reasons that large modern Japanese firms can afford to operate in a seemingly risky way is that they know their government and society is behind them... By American standards, the Japanese take too many risks. They are very expansionist. While this can produce some mistakes, they are the right kind of mistakes. They are the kinds of mistakes that allow for high expansion rates and for overcoming lethargy, inattention, and rigidity." (**The Emerging Japanese Superstate** (1970), p. 107 f.)

14. John Maynard Keynes, **General Theory of Employment Interest and Money** (1936), p. 143 f. We avoid here the controversial subject of the relations between the marginal efficiency of a given capital stock and of the investment flow which further specifies the rate at which this stock is to be augmented.

15. I accept the argument of Frank H. Knight, "Diminishing Returns from Investment?" **Journal of Political Economy** (February 1944) that investment as a whole is

immune from diminishing returns even though individual investments are not. This is because of the impact of other factors besides conventional physical capital, such as the impact of social investment on human capital, and also because of the "induced innovation" resulting from investment in research and development. Compare M. Bronfenbrenner, **Income Distribution Theory** (1971), p. 316.

16. Sukarno's Indonesia is a recent Asian illustration of how taxation can discourage growth when it finances public consumption or unproductive investment.

17. Apart from the continuing impact of inflation on growth via forced frugality, there may also be a one-time effect. An increase in inflation expectations will lower the demand for real balances. To the extent that such a shift in money demand occurred in Japan despite the institutional constraints referred to in the text, real growth would have been stimulated. But since the trend rate of growth of Japanese inflation was fairly constant over much of the post-war period, inflation expectations were presumably steady as well, so money demand would not have continued to shift.

18. Both this literary analysis and the diagrammatics of Figure 2 assume that the initial situation at income level  $Y$  includes sufficient unemployed or underemployed labor and capital resources to permit movement to or beyond  $Y'$ .

19. If an aggregate production function  $f$  relates output  $Y$  to the stock of physical capital  $K$  and the volume of employment  $N$ , we have:

$$Y = f(K, N) \text{ and } \frac{dY}{dN} = \frac{\delta Y}{\delta N} + \frac{\delta Y}{\delta K} \frac{dK}{dN}$$

If, in addition, the labor share of  $Y$ , denoted by  $s$ , equals the ratio  $\frac{\delta Y / \delta N}{Y/N}$  as per marginalist theory, and

is approximately constant, as is the capital or property share  $s/(1-s)$ , we derive:

$$\frac{dY}{dN} = s \frac{Y}{N} + (1-s) \frac{Y}{K} \frac{dK}{dN} \text{ and } \frac{Y}{N} = \frac{1}{s} \frac{dY}{dN} - \frac{1-s}{s} \frac{Y}{K} \frac{dK}{dN}$$

Differentiating average labor productivity  $Y/N$  with respect to time  $t$  we obtain its rate of change:

$$\frac{d}{dt} \left( \frac{Y}{N} \right) = \frac{1}{s} \frac{d}{dt} \left( \frac{dY}{dN} \right) - \frac{1-s}{s} \left[ \frac{Y}{K} \frac{d}{dt} \left( \frac{dK}{dN} \right) + \frac{d}{dt} \left( \frac{Y}{K} \right) \frac{dK}{dN} \right]$$

which decreases with  $\frac{Y}{N}$  and therefore increases with  $\frac{Y}{K}$

the capital-income ratio  $K/Y$ . It also increases with any increase  $d(K/Y)/dt$  attributable either to technical progress or to net investment.

20. Kahn, *op. cit.*, ph. 2; Maraini, "Japan and the Future: Some Suggestions from the *Nihonjin-Ron* Literature," in Gianni Podella (ed.) **Social Structure and Economic Dynamics in Japan** (1975). (The Maraini article considers much Japanese-language literature.) For a futuristic slant, see also Robert Prager and Thomas P. Rohlen, "The Future of a Tradition: Japanese Spirit in the 1980's," in Lewis Austin (ed.), **Japan: The Paradox of Progress** (1976), ch. 9.

21. This contrasts with the situation alleged to prevail in the U.S. automobile industry, where:

Computerized and robotized plants will divide workers into very highly skilled and very low-skilled categories, wiping out the intermediate skill range vital for a sense of upward mobility. "It's scary," says a UAW skilled trades committee-man at GM's Willow Run (Mich.) assembly plant. "It may mean more skilled jobs, but we're not getting the training. When one of these machines breaks down, they call in the vendor." ("UAW Fears Automation Again," **Business Week**, March 26, 1979, p. 95.)

22. Dale W. Jorgenson and Mieko Nishimizu, "U.S. and Japanese Economic Growth, 1952-1973: An International Comparison," **Economic Journal** (December 1978).

23. Shinohara cites Professors Masao Takahashi and Shigeto Tsuru, who worked with SCAP at the time, as asserting "from the inside" that the Occupation originally thought in terms of a ¥300 dollar rate, but chose ¥360 as a subvention to Japanese exports. Miyōhei Shinohara, "Evaluation of the ¥360 Exchange Rate," in Shinohara, **The Japanese Economy and Southeast Asia in the New International Context**, Institute of Developing Economies Occasional paper 15 (1977), p. 4. (Dollars, however, were selling for as much as ¥500 on the Japanese black market of 1949.)

24. *Ibid.*, p. 5, translating Shinohara's earlier essay, "Jiyūka to Kawase Reito," **Ekonomisuto** (Nov. 10, 1959). While Shinohara seems to have thought of ¥250 as an appropriate dollar rate, he did not (contrary to my own contemporary misunderstanding of his views) actively favor a revaluation policy. Shinohara, "Evaluation," *op. cit.*, p. 7.

25. Joseph M. Dodge, President of the Detroit Bank and (later) Budget Director in the Eisenhower Administration, was a principal architect of the Japanese disinflation of 1949-50. At that time, the sudden unfavorable disappointment of Japanese business leaders' anticipations of continuing inflation caused a recession, which lasted for nearly a year before being relieved after the outbreak of the Korean War (June 1950).

26. Nissan and Mitsubishi had embarked on automobile production well before World War II.

27. This "encouragement" included refusal to permit Ford and General Motors to purchase sufficient yen to reactivate their pre-war assembly plants in Japan, or to permit the Hino company to continue making obsolete Renault models for the Japanese market with used machinery.

28. I owe to another former teacher (Melchior Palyi) an example from the German clothing trades in the 1922-23 inflation. Production and employment were hindered because the public was accumulating drawers and closets full of cloth, needles, and thread as inflation-hedges.