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CORPORATE PROFITABILITY AND INVESTMENT IN JAPAN

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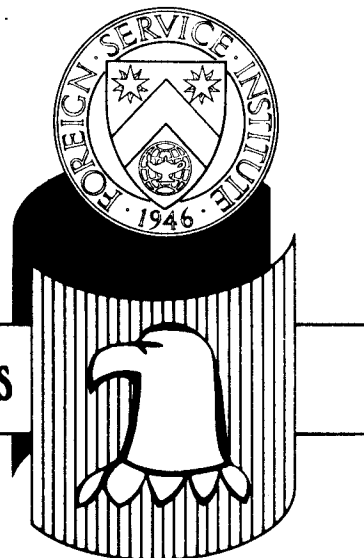
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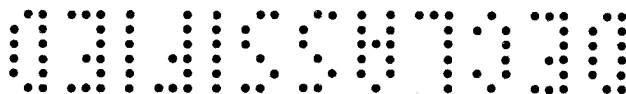
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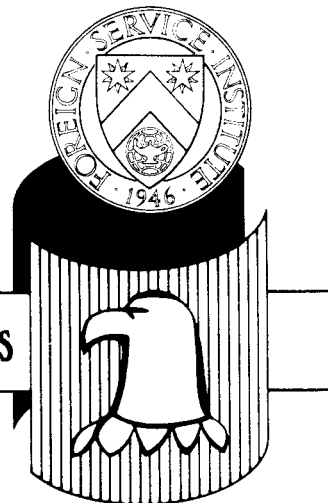
A Case Study by WILLIAM E. ESCOUBÉ



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CORPORATE PROFITABILITY AND INVESTMENT IN JAPAN

Case Study

by

William E. Escoubé

SUMMARY

An objective of this study was to analyze the impact on Japanese corporate profits of the shift from 20 years of exceptionally high economic growth and massive investments to the current period of very much more modest national growth objectives. The study found that profits of non-financial corporations, after eliminating inflation generated inventory profits, declined drastically after 1973 as a consequence of Japan's most severe recession since the 1930's. Corporations incurred heavy after-tax losses due to a combination of high fixed costs for labor and interest payments and unutilized capacity, as well as the leverage effect on profits of high debt-equity ratios so characteristic of Japanese corporate financing. This had improved by 1977, yet corporations did little more than break even.

Several measures of economic "profitability" were computed for the period 1970-77 in order to analyze the return on investment. These profit ratios were exceptionally high during the last years of the high growth era. They subsequently deteriorated, and, in recent years, have generally dropped below comparable ratios for U.S. corporations.

An original feature of this study was deriving a profitability measure for Japan recently advanced by economists as a more appropriate indicator of incentives for business investment. This so called "q" ratio consists of two separate valuations of the same physical assets, namely, the value investors place on outstanding corporate equity and debt compared with the current replacement cost of corporate physical assets. The "q" ratio for Japan was estimated at .65 in recent years. This is lower than the comparable ratio for the United States, currently about .75. The fact that ratios in both countries are well below the "equilibrium" rate thought to be 1, suggests that there is little incentive for corporate managers to acquire new physical assets. The low Japanese "q" ratio is very much influenced by the exceptionally high prices for land, and investors may well discount this in their valuation of corporate assets. If so, the "true" ratio for Japan would be higher but still less than 1 in recent years.

A final objective was to analyze how "profitability" influenced the rate of corporate investment in Japan. This was only partially realized because of the short time period, 1970-77, for which data were available and the likelihood that the relationship existing during the high growth era no longer prevails in recent years. The study found significantly high correlations between profit ratios and the rate of real investment in plant and equipment for Japan but not for the United States. These results reflect to some extent the simultaneous impact on both Japanese profits and investment of changes in total output on GNP and the overhang of excess capacity.

DISCUSSION

A final conclusion was that despite lower "profitability" and more excess capacity of Japanese corporations in recent years, compared with the United States, the rate of real investment remains considerably higher. Perhaps this reflects Japan's inability to raise the stock of capital relative to labor to the high levels attained by other leading industrial countries.

While the study presents new insights into Japanese corporate profitability and investment behavior, it leaves unanswered the specific nature of this complex relationship. It also raises questions about differences in behavioral relations between countries.

Executive Seminar in National
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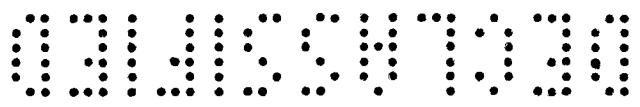
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03723000 PREFACE

The choice of this topic reflected my desire to re-explore an old issue: how profits influence business investment decisions. There has been extensive theoretical treatment of the determinants of capital accumulation in terms of both motivation of the individual investor and from a macro point of view. The conclusion is that new capital investment is stimulated by prospective profits and will be undertaken whenever expected returns exceed costs. To cite an old example, wine should be aged until the increment in market value from allowing the wine to mature one more year just equals the additional cost of holding it.

While theoretical propositions seem clear-cut, empirical evidence of their universal application has been more elusive. There have been repeated attempts in recent years to measure just how the volume of business capital investment is determined and understand the way in which profits as well as other factors influence it. There has been extensive analysis of investment behavior in the United States and some in other industrial countries.

My objective in this study was to extend the analysis of profits and investment to another large industrial country so as to provide a basis of comparison with analysis of the United States. More specifically, it was to derive various profit ratios deemed to be important in influencing business investment and compare levels and trends with the same ratios for the United States published by the Council of Economic Advisers. The reason for selecting Japan was dictated primarily by the availability of the necessary data to compute the several profit ratios. Unfortunately the recently published data are available only for the period 1970-77 which is too short a time span to satisfactorily test various hypotheses of how investment is determined.

Nevertheless, this study presents new information on how Japanese profits and business investment have behaved in recent years, following two decades of rapid growth. A relatively new measure of profitability deemed to be an important determinant of business investment was also calculated. This ratio of the market valuation of business net assets to their replacement cost, baptized "q", incorporates the influence of stock market values, unlike the other profitability measures. The study presents for the first time, the "q" ratio for Japan, heretofore available only for the United States and Great Britain.

This study has been written with a minimum of economic jargon, even though it deals with complicated economic concepts and involves many technical accounting and statistical details. A concerted effort has been made to present the results in plain English so that they can be understood by all. Highlights are presented in the Summary and each of the analytical sections (II and III) ends with a set of conclusions. Details on the derivation of the profitability measures and technical matters regarding the data have been relegated to the last section on Sources and Methods for those who have more than just a passing interest in the subject.

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I am indebted for advice and counsel so willingly given by various experts and specialists in Washington and Tokyo, particularly in gathering all of the necessary data. I especially wish to acknowledge the encouragement from George M. von Furstenburg to pursue this subject, and the genuine interest and invaluable assistance of Takao Akabane of the Economic Planning Agency in arranging meetings with knowledgeable experts in Tokyo. It is my hope that the results of this brief study will be of interest, at least, to those in the economics profession.

William E. Escoube'

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I. HISTORICAL SKETCH OF JAPANESE INVESTMENT

This introductory section presents a brief historical sketch of the phenomenal rise of business investment in Japan and introduces a few rudimentary economic concepts of how investment is stimulated and the role of profit.

A country's stock of physical capital consisting of factories, commercial and public facilities, houses, and land with its embodied natural resources, represents the nation's real wealth in a very basic sense. Additions to this stock of assets are created through a flow of new investments, a portion of which merely replaces worn-out or obsolete existing capital stock.

This flow of investment plus consumption represents the nation's total expenditure or national income which is another more conventional measure of a country's current wealth or well-being. An increase in the amount business spends on investment not only increases national income but it also raises the stock of physical capital. Equipping the labor force with more plant and equipment enables it to increase its production and enjoy a higher standard of living. As the rate of production rises additional opportunities for further investments are created.

This cumulative process is well illustrated in Japan. For nearly a century the establishment of the country has been growth oriented. ^{1/} In the twenty years to 1973 real GNP rose at an annual average of nearly 10 percent. It surpassed the government's own national goal, established by Prime Minister Ikeda in 1961 and maintained until the end of the decade, of doubling national income in 10 years (i.e. an average annual growth of 7.2 percent). Business capital stock increased at a pace quite outside the range observed in other advanced countries and was the main contributor to the very rapid rise in output and real income per worker. ^{2/} Growth of gross stock of plant and equipment reached an average of 13.1 percent per year in Japan during 1967-71 as compared with a rate of only 3.5 percent in the United States (1948-69) and 5.5 percent in West Germany (1950-62) ^{3/}. Despite the enormous demand for business capital in Japan its prices relative to that of other goods produced in Japan fell during this period indicating very substantial productivity advances in the production of capital goods. Corporate earnings on business capital appear to have been very handsome indeed over this period. In fact, the labor share of national income generated by the Japanese business sector appears to have been lower than in any other major industrial country. ^{4/}

These high profits were themselves an inducement for further investment to earn even larger total profits on capital employed in production and distribution. The rapid 10 percent annual rise in GNP over this entire period assured businessmen that additional facilities were indeed justified. Despite high profits, most of which were plowed back into further investment, financing requirements were so large that business had to borrow heavily from banks and through occasional issues of securities. With high rates of savings by Japanese households, held largely in deposits at financial institutions, the economy was able to mobilize the financial as well as real resources to sustain such high rates of fixed business

investment amounting to as much as one fifth of GNP in some years. Government policy was directed toward accommodating business in meeting its financial requirements. Only when inflation got out of hand and the balance of payments deteriorated did monetary policy restrain the pace of investment.

Economic theory stresses the importance of a profit motive in investment decisions. Surveys of American businessmen indicate that they do in fact analyze profitability of possible future investments. ^{5/} This involves a comparison of the present value of future streams of income against costs. Profitability can be expressed as a "rate of return" on invested capital. This is then compared with the "cost of capital" or finance, based on a combination of new debt and equity. Investment is profitable whenever the expected rate of return is greater than the cost of capital.

It is possible to use interest rates and stock market indices to derive estimates of the current cost of capital for the business sector as a whole. It is not possible, however, to derive an expected rate of return on prospective business investment for the economy as a whole. The future can only be judged in terms of past trends. It is for this reason that past rates of profit earned on existing investments are important indicators of changes in profitability that have already taken place and are likely to influence future investment plans.

Profits and profit rates are however influenced by changes in costs and prices as well as the rate at which current capacity is being utilized. These same factors will, of course, influence expected profitability of any additions to the capital stock. In view of the inter-related movements of profits on past investments, changes in output, inflation and monetary variables, it has proven difficult to establish empirically precisely how they influence the rate of new business investment. Economists have offered various alternative formulations of the determination of investment, yet when they are tested all of them involve substantial margins of error. ^{6/}

The following section presents and discusses the level of profits and profit ratios in Japan for the period 1970-77. This period includes the last years of the high growth era and the period of slower growth since 1973. Section III attempts to measure the extent to which a decline in "profitability" is associated with a much slower rate of capital investment.

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II. PROFITS AND PROFITABILITY RATIOS OF JAPANESE NON-FINANCIAL CORPORATIONS

Throughout Japan's history pursuit of profit has not been held in high esteem. There has, however, been a strong emphasis on frugality, a high rate of reinvestment, and maintaining a high quality of family management in the entrepreneurial class. A recent survey of business indicated that both profit and the rate of growth in sales were tied for top of the list of goals. Therefore it is likely that Japanese corporate managers look toward longer term objectives including strong profit positions, but not necessarily in the short run.

Profits can be measured in various ways, but most aggregate economic analysis prefers to rely on profits as presented in the national income accounts rather than data based primarily on corporate financial accounting procedures. National income accounting procedures are now standardized internationally. They make adjustments to business financial reports to reflect, among other things, uniform rates of economic depreciation of capital equipment (rather than those adopted for tax and financial reporting reasons), elimination of profits or losses on inventories due to price level changes, and recently in the United States adjustments to eliminate an upward bias in current profits from depreciation based on historical rather than current replacement costs. The Japanese national income accounts do not yet incorporate that last adjustment although officials are well aware of the bias in reported profits for which they have made adjustments in some of their analytical work. ^{8/} With this one exception Japanese and U.S. national income data on profits are quite comparable.

In addition to the national income data, the analysis below relies upon financial balance sheets and the fixed capital stock of the corporate sector published in the Japanese Annual Report on National Accounts, 1979. The analysis focuses on private non-financial corporations and therefore excludes government owned enterprises and financial institutions.

Declining Profit Levels

Japanese private non-financial corporations earned very substantial profits in periods of economic boom. In 1970 they peaked at 8.5 trillion yen before taxes or 5.9 trillion yen after taxes. Reported book profits were even larger during the 1973 boom but more than all of the gain represented inventory profits made during a very severe inflationary period. In the recession and slower growth years that followed pre-tax profits eroded as can be seen in Table 1. They dropped by more than one half from 1973 to 1974, but have recovered, to some extent, in the years 1976 and 1977. After taxes, however, non-financial corporations incurred very substantial losses in the three years 1974-6 and just about broke even in 1977. ^{9/}

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TABLE 1

Profits of Corporate Non-Financial Business,
Japan and the United States, 1970-77

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>JAPAN</u> - in billions of yen								
Undistributed profits ^{1/}	4,732	2,886	3,085	2,567	-3,949	-2,980	-2,013	-1,368
Dividend payments, net	1,182	1,188	1,225	1,555	1,735	1,508	1,501	1,445
Profits after taxes ^{1/}	5,914	4,074	4,310	4,121	-2,214	-1,472	- 511	2,77
Profits tax liability	2,628	2,870	2,886	4,075	6,218	5,330	5,200	5,957
Profits before taxes ^{1/}	8,542	6,944	7,196	8,196	4,004	3,858	4,689	6,034
Inventory valuation adjustment	328	-84	784	5,453	7,218	696	2,408	25
<u>U.S.</u> - in billions of dollars								
Undistributed profits ^{1/}	2.9	8.3	14.1	10.6	-6.2	19.8	29.2	30.7
Dividend payments, net	19.9	20.0	21.7	23.9	26.0	28.5	33.5	39.1
Profits after taxes ^{1/}	22.8	28.3	35.8	34.5	19.8	48.3	62.7	69.7
Profits tax liability	27.3	29.9	33.5	39.6	42.7	40.6	53.0	59.0
Profits before taxes ^{1/}	50.1	58.2	69.3	74.2	62.5	88.8	115.6	128.6
Inventory valuation adjustment	5.1	5.0	6.6	18.6	40.4	12.4	14.5	14.8
Capital consumption adjustment	-1.5	- .5	-2.7	-1.8	3.0	11.9	14.3	14.7

^{1/} After inventory valuation adjustment.

Sources: Japan - Annual Report on National Accounts 1979, pp. 246-7

United States - 1979 Economic Report of the President, p. 196

Several reasons can be cited for the highly volatile profits of Japanese corporations. The 1974-5 recession was the most severe since the mid 1930's. Japanese companies typically have heavy fixed costs as a result of the "lifetime" employment practices which prevent quick and substantial reductions in the labor force during periods of slack demand and production. In addition, the characteristic of heavy reliance on debt rather than equity financing entails a continuing heavy interest burden. Lastly, Japanese companies are reportedly operating with considerable unused capacity because of the slow recovery, which makes no contribution to sales and profits.

Table 1 also illustrates that profits in the U.S. of non-financial corporations have been considerably less volatile during the same 1970-77 period. Moreover, profits recovered more rapidly from the last recession so that by 1977 they were roughly double the pre-recession level of 1972. Furthermore, there has also been a notable increase in dividend payments year-by-year in contrast to Japan where net dividend payments have in fact been declining.

Profitability Ratios

Various profitability measures have been devised by economists and financial analysts, but many of them serve highly specialized analytical needs. This study presents four separate profit measures deemed useful in analyzing aggregate behavior of the business sector and which are thought to be important determinants of business investment. The Japanese ratios can be directly compared with those for the United States published in the 1979 Economic Report of the President.^{10/} There is one slight difference between the two sets of ratios, namely, U.S. profits are adjusted downward to take into account the fact that depreciation charges are based on historical cost of capital assets rather than on current replacement costs.

All of these ratios tend to move broadly together over the business cycle although there are differences in volatility and in their levels. As mentioned before, Japanese profits and profit ratios are heavily influenced by cyclical movements. There are high and statistically significant correlations between each of the ratios and a measure of cyclical variation such as the operating rate in manufacturing.^{11/} Over the same period the profit ratios in the United States showed no such significant correlation with the similar operating rate variable.

All of the profit ratios discussed below are presented in Table 2 for both Japan and the United States.

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TABLE 2

Determinants of Business Investment:
Japan and the United States, 1970-77
(in percent)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>JAPAN</u>								
<u>"Profitability" ratios:</u>								
1	Market value/replacement cost of net assets							
	"q" including land							.655
	"q" excluding land							1.032
2	Cash flow/GNP							7.9
3	Rate of return on depreciable assets							11.5
4	Rate of return on stockholder equity							2.2
<u>Investment and operating rates in manufacturing:</u>								
5	Real business investment/GNP							16.0
6	Increase in real net stock of fixed assets							4.3
7	Operating rate in manufacturing 1969 = 100							80.6

TABLE 2 (Continued)

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>United States</u>								
1. Market value/replacement cost of net assets-"q" excluding land	.911	1.000	1.076	1.016	.756	.725	.825	.768
2. Cash flow/GNP	7.9	8.2	8.6	8.0	6.9	8.7	9.1	9.0
3. Rate of return on depreciable assets	10.1	10.3	11.5	12.3	11.4	9.3	10.4	10.6
4. Rate of return on stockholder equity	4.4	5.2	6.4	8.7	8.4	5.2	4.8	6.2
5. Real private investment/GNP	10.2	9.8	10.0	10.6	10.7	9.4	9.4	9.7
6. Increase in real net stock of fixed assets	3.9	3.3	3.8	4.8	4.0	1.8	1.5	2.5
7. Operating rate in manufacturing 1969=100	91.9	90.5	96.4	101.5	97.7	85.4	93.0	95.6

Sources: Japan - see text; United States - 1979 Economic Report of the President, p. 128, Table 30, although capacity utilization rate in manufacturing (line 7) was converted to an index 1969=100 so as to conform to Japanese data and increase in real net stock of fixed assets (line 6) (non-residential business and residential) for non-financial corporations was derived as the percent increase in year-end constant dollar net stocks from data in the Survey of Current Business, April 1976 pp. 49 and 52, and September 1978 p. 46.

Market Value to the Replacement Cost of Net Assets

This relatively new measure, baptized "q" by its proponents, is of considerable interest to economists because it is thought to convey important information about investment incentives not available in other measures. ^{12/} This study presents, for the first time, the "q" ratio for Japan - world's second largest free-enterprise economy.

This measure is simply the ratio of two separate valuations of the same assets. One is the value investors place on the outstanding corporate equity plus debt, the other (denominator) is the current market value of replacing corporate net assets (fixed capital, inventories, land and net non-interest bearing financial assets.) The normal equilibrium value is thought to be 1. Values above 1 would stimulate purchases of new productive assets in excess of normal replacement and growth. For example, if market values of houses are above current building costs new housing construction would be stimulated. Alternatively, if "q" is less than 1 because equity prices and debt values are depressed, purchases of new assets would be discouraged because financing would be expensive relative to the cost of new physical assets. For example, prospective investment earnings have to be high enough to prevent total earnings per share from declining and creating a delusion of equity. As Keynes pointed out over 40 years ago in his General Theory:

"Daily revaluations of the Stock Exchange, though they are primarily made to facilitate transfers of old investments between one individual and another, inevitably exert a decisive influence on the rate of current investment. For there is no sense in building up an enterprise at a cost greater than that at which a similar existing enterprise can be purchased; whilst there is an inducement to spend on a new project what may seem like an extravagant sum, if it can be floated off the Stock Exchange at an immediate profit." ^{13/}

Moreover, the stock market is not only a determinant of equity values and, therefore the cost of new financing, it is a leading economic indicator both in Japan and the United States, apparently distilling important expectations about future business prospects. This expectational element contained in the "q" ratio but not contained in the three other profitability ratios presented in this study, based solely on past profits, is thought to make "q" particularly relevant in analyzing future investment decisions.

Derivation of "q" for the United States has not yet been standardized and the several sets of estimates differ. Conceptually the denominator should include all of the corporate assets: fixed plant and equipment, inventories, land, timber and underground resources, and net non-interest bearing financial assets. The current replacement cost of timber and underground resources has been excluded because there are no reliable aggregate estimates available. The market value of land holdings is included in one U.S. estimate but not in others.

For Japan, two separate ratios are presented, including and excluding land. As can be seen in Table 2 the "q" values are very different, the one including land is well below 1, whereas the ratio excluding land is generally above 1. This is because in Japan land values are extremely high, and, unlike the United States, the current market value of corporate held land exceeds the replacement cost of all of the factories and other net fixed assets. This requires a short digression.

The "scarcity" of land in Japan reflects in part a large population on a small land area, much of which is mountainous. It also reflects an unwillingness of property owners to sell except at very high prices. It is quite common for the published lists of taxpayers with the highest incomes in Japan to consist largely of persons who made enormous capital gains on land sales. ^{14/} Current land prices are therefore established in a highly restricted market, where sellers are reluctant and buyers are generally hoping to make capital gains rather than earn operating profits from their land purchases. ^{15/} Valuation of all land at these "scarcity" prices results in a very different composition of Japan's national wealth compared with the United States. Land represents roughly half of the national wealth of Japan, and buildings equipment and machinery less than 40 percent, whereas in the United States buildings, etc. represent almost two-thirds and land less than one-quarter of the total. ^{16/}

This situation very much affects the "q" ratio since the market value of land represents 40 percent of the non-financial assets included in the denominator for Japan in 1977. ^{17/} Conceptually "q" should contain all assets. If it is excluded for analytical purposes then some amount should be subtracted from the numerator as well. There is no clear answer whether this should be at book value or some other amount.

The question arises: how to interpret Japan's "q" ratio in view of the high valuation of land. One alternative is to consider "q" as a realistic indication of Japanese investor attitudes, the same as in any other country. In that case, a low "q" ratio - never rising above .75 even during boom years - would signify persistent and very pessimistic expectations by Japanese investors about the ability of corporations to make profitable investments. This interpretation does not appear to be consistent with other information. Japanese equity prices have continued to rise rapidly, yields are at historical lows (less than 2% compared with 4.6% in the U.S. in 1977) and price-earnings ratios virtually at their peak (an average of 23 times earnings compared with less than 10 in the U.S. in 1977). Moreover the rate of private investment in Japan remains considerably higher than in the United States and other industrial countries, measured either in terms of the ratio to GNP or as annual percentage increases in the real net stock of fixed assets (see Table 2).

An alternative interpretation, and the one adopted in this study, is that investors do not appraise the value of corporate land holdings at full current market prices, but at somewhat lower

prices. Investors may be unaware of the full extent of corporate land holdings and current purchases. Often these are made by affiliated companies or joint-venture firms whose real assets go unrecorded in the unconsolidated financial statements of their parent companies. Moreover these affiliates are often under-capitalized, relying on the willingness of Japanese banks to advance credit against mortgages. Corporate land purchases have often been motivated by speculation. The National Land Agency estimated they totaled 9,800 billion yen in 1973 -- equivalent to more than half of the total amount spent by corporations on gross investments in plant and equipment. ^{18/} Most of these speculative land purchases were financed by borrowing in anticipation of a continued rapid rise in prices resulting in large capital gains. Apparently when land prices fell slightly in 1974 corporations found themselves locked in, unable to realize their hoped for profits. In early 1976 a survey indicated that over half of the firms considered their holdings of "marketable real estate" to be "excessive." ^{19/}

If current land prices are clearly an inappropriate measure to use for "q" in Japan, and the other extreme of excluding land assets altogether (i.e. valuing land at zero) is too low, then the appropriate or "true" value lies somewhere in between. Considerable more experience with "q" is needed before its full meaning is clearly understood.

In this study, the two extreme values for Japan's "q" are shown in the tables. They have remained remarkably stable over 1970-77 in view of the very wide swing in corporate profits. The upsurge in Japanese equity prices since 1975, despite reductions and omissions of dividends, has contributed to the maintenance of "q" which is not very different from its values in the mild recession year of 1971. This contrasts with the experience in the United States where "q" has declined from about unity in the early 1970's to an estimated .7 in 1978. Therefore the U.S. "q" has dropped below that prevailing in Japan.

Corporate Cash Flow to GNP

Cash flow represents internally generated funds comprising after-tax profits, depreciation, and any inventory profits or losses. These funds are used for a variety of corporate purposes such as dividend payments, purchases of real or financial assets, or repayment of outstanding debt. Availability of adequate internal funds is deemed to be an important factor influencing investment decisions because they must be utilized in a manner that strengthens future earnings. Corporate managers have greater discretion in investing their own funds compared with borrowed funds.

Japanese non-financial corporations generated very large cash flows until the onset of the 1973 recession. High profits in 1970 boosted total cash flow to 17.5 percent of GNP but dropped to an average of 12 percent in the three subsequent years. After the onset of the recession it dropped below 8 percent because of very poor profits. In the United States the cash flow ratio is currently

above that in Japan although the longer-run average of 9.3 percent from 1955-70 is considerably lower than that prevailing in Japan during that period.

Rate of Return on Depreciable Assets

This measure compares the flow of pre-tax profits, inventory profits, and interest payments against the stock of fixed assets (after depreciation) and inventories valued at current replacement cost. It avoids the distinction between debt and equity and therefore is perhaps more appropriate to use for Japan where corporations characteristically rely heavily upon borrowed funds rather than additional stocks. Even in the United States it is a useful measure since purely tax considerations of being able to expense interest payments may well influence whether financing is done through debt or equity.

Japanese corporations earned very high rates of return on their depreciable assets during the high growth years, and in 1970 almost reached 28 percent. The onset of inflation drove up both the replacement cost of assets and inventory profits so that a high rate of return was maintained until very recently when it dropped below 12 percent. This is not very different from the 10 1/2 percent level currently prevailing in the United States especially taking into account the fact that the Japanese ratio would be perhaps 1 percent lower if depreciation were adjusted to current replacement rather than historical cost.

Rate of Return on Stockholder Equity at Replacement Cost

This measure, unlike the cash flow and the rate of return on depreciable assets ratios, takes into account the inflationary impact on corporate balance sheets and their income flows. Inflation requires increased business financing just to hold the same volume of inventories and liquid assets, for example. Generally, these requirements are met by increased indebtedness, not just because interest is tax deductible, but also because inflation reduces the real burden on corporations of outstanding debt. Increased interest payments also impact adversely upon profits.

This ratio seeks to correct for this downward bias on after-tax profits by including the unrealized capital gains of a lower real debt brought on by inflation. ^{20/} These adjusted profits are then compared, in ratio form, to corporate net worth in which tangible assets (net plant, inventories and land) are valued at current replacement costs. The ratio would appear to be particularly appropriate to Japanese corporations with their large debt-equity ratios and the leverage this produces on profits, a fact which the Japanese are well aware of. ^{21/}

The rate of return on equity of Japanese non-financial corporations reached an exceptionally high point of 11 percent in 1970 but subsequently dropped to about 6 1/2 percent in 1971-2. During the years of rapid inflation, 1973-4, unrealized capital gains on outstanding debt were exceptionally high. More recently, 1975-7,

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the return on equity has dropped to a very low level of only 1 to 2 percent, as capital gains on debt have not offset the adverse impact on profits of high leverage and underutilized capacity.

Japanese returns on equity these past three years are well below those recorded in the United States during the postwar period of roughly 6 percent.

Conclusions

It is useful to summarize the conclusions reached in this section before going on to analyze how profitability influences investment in Japan. Profits and profit ratios of Japanese non-financial corporations were high until the onset of the recent era of slower growth beginning in 1974. Profitability has generally dropped below, or at least to, levels prevailing in the United States. Correlation results indicate that, unlike the United States, Japan's low profit ratios reflect the high excess capacity and comparatively low operating rates in manufacturing. The so-called "q" ratio is difficult to interpret for Japan in view of the strong Japanese preference for land as an investment asset. Unlike the other measures, it has been exceptionally stable despite dramatic changes in profits and GNP growth rates. The "true" value of the Japanese "q" ratio in 1977 lies somewhere between .65 and 1.0, perhaps not very different from the U.S. "q" of .77.

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III. PROFITABILITY AND JAPANESE BUSINESS INVESTMENT

The period under review, 1970-77 may well include a fundamental change in Japan's economic history. The 20 year era of rapid growth during which real GNP increased an average 10 percent a year appears to have ended in 1973. The new national objective of more modest rates of advance averaging only 6 1/4 percent per year were embodied in the government's Medium-Term Economic Plan 1976-80. The subsequent plan, yet to be approved by the government, has scaled down the growth objective to an average of 5.8 percent per year. The 1970-77 period also includes the deepest Japanese recession since the mid 1930's which had very severe repercussions on business profits and has left industry with excess capacity. 22/

In view of this fundamental change in future economic prospects it is quite likely that profit-investment relationships of the past era have been changing. The nature of this relationship and the determinants of investment remain one of the unanswered questions in economics. Even in the United States, the Council of Economic Advisors comments that:

"Economists have suggested several alternative formulations, or models, of the determination of investment, which emphasize to various degrees the influence on investment of growth in output, variations in capacity utilization, changes in cash flow and in the rental price of capital, and the ratio between the market value of capital and its replacement cost. All involve substantial margins of error." 23/

In Japan, the reduced rate of growth in income and output has been accompanied by a very marked slowdown in investment, measured either in terms of business investment to GNP or increases in business real net fixed capital stock. That real stock had risen by a phenomenal 23.5 percent during one year (1970) but the average rate from 1971-73 had remained at a remarkably high rate of 15 percent. In the last two years for which data is available, 1976-7, annual increases have dropped to a little less than 4 1/2 percent (See Table 2). While this appears very low in comparison with the past it is high in terms of international standards. In the U.S. the net capital stock of non-financial corporations increased in average at less than 4 percent from 1955-75, and in the last three years at a rate of only from 1 1/2 to 2 1/2 percent.

Correlation Results

In order to test whether or not there is any relationship between the several profit measures and increases in the real net stock of business fixed capital, simple correlations were computed. With the exception of "q", all of the Japanese profit ratios showed statistically significant high correlations with changes in the capital stock which are presented in Table 3. While this does not imply anything about the direction of causality, it seems reasonable to presume that the severe pressure on profits combined with pessimistic expectations of any immediate relief of those pressures through a rapid economic recovery, must have had an influence on the

TABLE 3

Correlation Results: Business Profitability Against
Changes in the Real Net Capital Stock,
Japan and the United States, 1970-77

	<u>Independent Variables</u>	<u>Correlation Coefficients</u>			<u>Regression Coefficients</u>	
		<u>R²</u>	<u>Standard Error</u>	<u>t Statistic</u>	<u>Constant</u>	<u>Coefficient</u>
JAPAN	"q" including land	.228	.053	1.60	-.442	.826
	excluding land	.310	.049	1.96	-.285	.351
	cash flow/GNP ratio	.912	.018	7.88**	-.068	1.617
	rate of return on depreciable assets	.892	.021	7.02**	-.096	1.155
	rate of return on stockholder equity	.844	.024	5.71**	-.015	1.837
	operating rate in manufacturing	.755	.030	4.35**	-.556	.763
UNITED STATES	"q" excluding land	.267	.009	1.72	-.015	.053
	cash flow/GNP ratio	-.400	.008	-2.17	.126	-1.132
	rate of return on depreciable assets	.485	.007	2.51*	-.067	.921
	rate of return on stockholder equity	.302	.008	1.83	.004	.457
	operating rate in manufacturing	.386	.008	2.12	-.121	.163

* Statistically significant at the 5 percent level.

** Statistically significant at the 1 percent level.

SOURCE: Table 2

reduced rate of real business investment in Japan during this recent period.

Capacity utilization, as measured by the operating rate index in manufacturing, was also highly correlated with the rate of increase in the net capital stock. This indicates that all three variables profitability, the operating rate, and investment move in unison. It is impossible to measure the separate influences they have on each other with the very short data period available in this study. Nevertheless, correlations of three of the four profit ratios against investment were higher than for the operating rate.

Similar correlations for the United States on the other hand were very low over that same 1970-77 period, and except for one they were not statistically significant.

Interpreting the relationship between "q" and the rate of investment is more difficult. The simple correlation coefficients are very low, and not significantly different from zero, both for Japan and the United States. The reasons, however, are different: in Japan "q" has been relatively stable but the rate of investment has dropped sharply, whereas in the United States both "q" and the rate of investment were relatively steady at one level for half the period but then both shifted to lower levels for the remainder of the period.

What is interesting to note is that over the entire period the "true" Japanese "q" has been higher in the U.S. and Japanese investment rates have remained well above those in this country.

Whether "q" can be used to draw international comparisons may be premature. The hope that it would be an indicator of the influence of investor sentiment prospective on corporate investment is yet to be demonstrated, on the basis of the experience in Japan and the United States. Why "q" deviates so far from its supposed equilibrium value of 1 also remains unanswered.

Japanese Views of Investment Behavior

Most Japanese generally ignore profit in analyzing the determinants of business investment. Perhaps it reflects the general public's attitude that other factors have greater fundamental importance. In any case, some econometric models are able to satisfactorily explain the rate of business investment without any financial variable. On the other hand, monetary variables like the rates of interest on business loans, are used by some analysts as a signal of monetary ease or tightness rather than an indicator of the required rates of return on investment. Such models generally rely primarily on variables as changes in production index, operating rates in manufacturing, consumer spending, and the size of the existing capital stock.

Discussion

On the other hand Japanese are well aware that expectations play an important role in investment decisions. Recent annual reports of the Economic Planning Agency have stressed the profit motive: "When an enterprise makes a decision on additional investment in plant and equipment, an essential condition is that the expected profit rate in the future is higher than the interest rate." ^{24/} There has been extensive analysis in these annual reports of changes in the profits and profit ratios of various segments of non-financial business, the impact of leverage and the influence of profit on investment. Their conclusion is current or recent profit rates are important factors in determining investment in plant and equipment. ^{25/} Moreover, these analyses have stressed, that, based on past behavior, Japanese businessmen act in a manner to maximize current profits (after interest payments) and "that in making a decision on plant and equipment investment, they invest when the expected profit rate exceeded the level of interest even a little (that is, they invested until the marginal profit rate equaled the marginal interest rate)." ^{26/}

According to EPA officials one of the main reasons for favorable expectations during the period of heavy investment and rapid growth was that until 1973 most businesses were operating at a point on their long-run average cost curve, where costs were still rapidly declining. Therefore additional plant and equipment would achieve substantial reductions in unit costs although output and sales would have to be increased somewhat. Apparently corporate managers were prepared to cut prices if necessary and aggressively market their additional production. EPA officials believe that most businesses no longer face this situation, since they have now expanded their operations to the point where they are at the flat or bottom portion of their long-run average cost curves and close to the minimum efficient scale. ^{27/} Therefore, unlike previous periods of recession and economic slack in Japan, additions to existing capacity are no longer profitable because they are unlikely to lead to substantial cost reductions, as in the past. This is thought to be one of the chief reasons for the decline in the rate of business investment to GNP.

Future revival of investment is thought to depend heavily upon replacement needs. Much of the Japanese business capital stock was acquired recently so that its average age is still young, especially in manufacturing, compared with the United States. According to data supplied by the Japan Development Bank the average age of Japanese plant and equipment in 1976 was 7.2 years for all business and 6.8 years in manufacturing plants compared with 10.2 years and 7.9 years respectively in the United States. However, the average age in Japan has already begun to increase because of the modest level of new investment these past few years. Gross investment is not expected to revive substantially until the average age of the Japanese capital stock begins to approach and perhaps exceed that in the United States. At that time, not anticipated until 1981 by analysts at The Japan Development Bank, heavy replacements will become due.

Conclusion

Conclusions

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Additions to fixed business capital are related (statistically) to business profit ratios in Japan based on data developed in this study. This is consistent with Japanese views that business operates under a strong objective to maximize profits. However, the determinants of business investment are more complex, in part, because investment and profits are both influenced by the scale of output and capacity utilization. This study did not seek to assess the influence of these other factors that are deemed to be relevant. The importance of "q" as an investment determinant remains unanswered for Japan as it does for the United States.

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IV. SOURCES AND METHODS

For the benefit of those readers who are interested in details of the derivation of the several Japanese profit measures, this section provides the sources of data and indicates the methods.

One of the purposes of this study was to derive measures for Japan that could be compared with similar measures already computed for the United States. Various studies of U.S. profits could have been selected as the basis of comparison. The 1979 Economic Report of the President contained the most recent presentation of four broad and widely advocated profit measures and were selected for this reason. ^{28/} Ratios for Japan were derived by the same CEA methods, as far as possible.

The main Japanese data source for computing all of the ratios was the Annual Report on National Accounts, 1979 issued in January by the Economic Planning Agency of the Japanese government. It contains not only the up-to-date full set of national income and product statistics, but also presents the stock of fixed capital and financial balance sheet accounts for the period 1969-77. The Report contains separate data for Japanese non-financial corporations. Unidentified page references are to this Report, which is in Japanese.

"Q" Ratio of Market Value to Replacement Cost of Net Assets

The published statistics for the balance sheet accounts and the net stock of fixed assets, inventories and land valued at current market prices (i.e replacement cost) include government enterprises (pp. 430-1). This study utilized unpublished EPA data excluding these enterprises, such as the national railways, highway, and housing corporations, the telephone and telegraph company, etc.

The market value of privately owned non-financial corporations consists of equity and net interest bearing debt. It is measured indirectly. Japanese corporations do not report on a consolidated basis although there is some interest in this direction. Despite the prevalence of wholly or jointly owned ventures and corporations in the Japanese corporate system this need not create statistical problems. Equity investments in affiliates are carried at book value in parent financial statements but it is assumed that the market value of those investments will be reflected in the value of the parent's equity. Inter-affiliate debt will conceptually net out to zero in aggregate, and equity assets in the balance sheets were excluded.

Equity consists entirely of common stock since Japanese law prohibits issuance of preferred stock. Its market value was derived by dividing annual net dividend payments of non-financial corporations (pp. 248-9 and corrigenda) by an appropriate dividend-price ratio. The First Section of Tokyo Stock Exchange included 926 corporations in 1977. That represented 54 percent of all listed corporations in Japan but 94 percent of market value of all

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listed corporations.^{29/} The First Section, which includes all of the well known Japanese companies provides the broadest index. A dividend yield is published but it is computed only on the basis of those companies paying dividends.^{30/} In December 1977 only 777 or 84 percent of the companies listed on the First Section paid dividends. Moreover, the average dividend yield of 1.82 percent was naturally somewhat lower than the 1.97 percent on lesser known companies of the Second Section of the Tokyo Stock Exchange.

In Japan, equity ownership is broadly distributed, although as in the United States, the individual investor has been a net seller for the past decade. On March 31, 1977 individuals owned about one-third of total shares outstanding, and financial institutions and non-financial corporations each held about one-third.^{31/} Despite large holdings by financial institutions and non-financial corporations, officials of Nomura Research Institute believed that movements of equity prices reflected primarily the changing demand by individual investors (including foreigners) rather than buying and selling by corporate and financial investors.^{32/}

In view of all of these factors, the published dividend yield statistics for the First Section of the Tokyo Stock Exchange represent a broad and comprehensive indicator of the value placed on Japanese equities, suitable for deriving "q" ratio.^{33/}

The market value of the principal outstanding balances of net interest-bearing debt is represented by a stream of coupon payments plus the repayment of principal at maturity discounted to the present. Unpublished balance sheet figures were used excluding government enterprises, (similar to those published on pp. 430-1). The main liability item, other than bonds shown separately and loans from public sector which was reported to be virtually all long-term, is "loans from private sector" which combines both short-term and long-term debt. A percentage relationship was estimated for each year from slightly different data published by the OECD which does present a breakdown between long and short-term, but as of March 31 rather than end of December.^{34/} Netted against the total of these long term liabilities were holdings of long-term bonds and government securities. To obtain net liabilities during the year, year-end amounts were averaged.

Concrete information on maturities is more difficult to obtain. Bonds are issued for seven years, but represent only a small portion of total long-term debt. Most of it represents borrowing from banks and other financial institutions. Loans from the three so-called long-term credit banks is for only five years. Using that as a base an average maturity of three years was assumed in view of the rapid increase in total long-term debt that has occurred.

Choice of an appropriate Japanese interest rate also presents problems. The financial system has been described as "a disequilibrium system in which institutional controls, including rationing, have taken away from interest rates some of the functions of allocating resources."^{35/} Since published market or average

interest rates do not reflect market pressures, and credit from a friendly bank group is the predominant form of finance, it was concluded after considerable discussion with Japanese financial experts that the yield on corporate industrial bonds in the secondary market might best capture the influence of changing credit availability, even though trading in this market is light. This yield is computed for the last business day of each month by the Tokyo Stock Exchange by their so-called "simple interest method." ^{36/} This method, in comparison with the "yield to maturity" concept used in the United States, results in somewhat lower yields when bonds are selling above par and somewhat higher yields when below par.

This average annual yield index was utilized along with a three-year maturity in deriving the discounted value of net long-term debt. Net corporate interest payments (p. 247) were broken between payments on net long- and net short-term debt on the assumption that the interest rate was roughly the same so that the proportion of each type of interest bearing debt at book value could be applied. The value of net short-term interest bearing debt consisted of a portion of bank loans less transferable and other deposits and short-term bills and bonds.

Total market value comprises equity, the discounted value of long-term interest bearing debt, and short-term interest bearing debt at book value.

The replacement cost of the net assets of the non-financial business section include: assets already valued by EPA at current market prices (balance sheets on pp. 430-1) like fixed assets, inventories, and land, plus net outstanding non-interest bearing financial assets (cash, accounts receivable and payable, other assets and liabilities). The value for the year is the average of the two year-end values. Conceptually, all assets should be included, however there are serious problems in measuring the market value of resources like timber, oil and minerals on corporate owned land. In Japan where natural resources are few this presents a relatively insignificant problem. In the United States, on the other hand, estimates of "q" apparently exclude the value of these resources. The current market value of U.S. corporate owned land is excluded from the ratio published by CEA. ^{37/} Section II discussed the very high value of land in Japan. In deriving the Japanese capital stock data the Economic Planning Agency relies on annual land price surveys conducted by the national and the provincial governments which contain a sample of 40,000 plots of land. Therefore the quality of this data is very high.

Corporate Cash Flow to GNP

This comprises non-financial corporations, excluding Japanese government enterprises, and includes reinvested profits (after inventory valuation), dividends, and capital consumption allowances, all divided by GNP (pp. 246-7). The capital consumption allowance is published only including government enterprises (pp. 206-7).

Rate of Return on Depreciable Assets

This is a profit concept net of depreciation, comprising reinvested profits (after inventory valuation), dividends, and net interest paid (pp.246-7). This flow of "earnings" of private non-financial corporations is divided by the net stock of fixed assets for the same corporations valued at current replacement cost (pp. 430-1).

Rate of Return on Stockholder Equity at Replacement Cost

This measure, for private non-financial corporations, includes not only reinvested profits (after inventory valuation) and dividends but also the estimated capital gains from the real reduction of net debt. The latter was derived from balance sheets (pp. 430-1) by taking the year-end value of the so-called "financial assets" less corporate shares and "other" financial assets net of the so-called "liabilities to third parties" less "other" liabilities, and multiplying this outstanding net debt by the change in prices measured in terms of the GNP deflator from the fourth quarter of one year to the fourth quarter of the next year. These total returns (which in the U.S. include the capital consumption adjustment) are divided by stockholder equity i.e. paid in capital plus reinvested earnings. This measure of net worth is derived from balance sheets in which physical capital, inventories and land are all valued at current replacement cost (pp. 430-1).

Real Private Investment to GNP

The ratio is published (pp. 82-3) and represents gross domestic non-residential fixed capital formation by the private sector in machinery and equipment in constant prices divided by GNP in constant prices.

Increase in Real Net Stock of Fixed Assets

This was computed as the annual percentage change in the year-end net stocks of fixed assets in constant prices of non-financial corporations (pp. 586-7). The data include government enterprises.

Operating Rate in Manufacturing

The MITI (Ministry of International Trade and Industry) index of the operating rate in total manufacturing is currently published with a base of 1975=100. Because in that year manufacturing was operating at a rate well below previous years, the index was converted to a base of 1969=100, a year when the rate reached a cyclical peak in Japan. For the United States, the FRB index of capacity utilization rate in manufacturing was similarly converted to an index form with 1969=100.

FOOTNOTES

- 1/ Ohkawa and Rosovsky, p. 224
- 2/ Penison and Chung, p. 63. Nevertheless, it apparently did not raise the stock of capital relative to labor in Japan to levels prevailing in the United States and West Germany. Ibid., pp. 74-5.
- 3/ Ibid.
- 4/ Ibid., pp. 29-30, Okhawa and Rosovsky, p. 41
- 5/ Schall, Sundem and Geijsbeek
- 6/ 1979 Economic Report of the President, p. 129
- 7/ Caves and Uekusa, p. 8
- 8/ e.g. See Economic Planning Agency Economic Survey of Japan 1977/78, pp. 72-3
- 9/ In view of these heavy losses, the question arises why profits tax liabilities continued to increase. Corporations were taxed on their inventory profits and profits on their sale of real estate and purely financial investments (which are not carried into the national income accounts but were reputed to be very substantial). More detailed statistics for 1977 available in the Annual Report on National Accounts, 1979, p. 37 indicate the following:

<u>1977 Non-financial Corporations</u>	<u>In billions of yen</u>
Profit from operations (after inventory valuation adjustment and capital consumption allowances)	19,054.5
Other income: interest	4,206.0
dividends	815.7
rent	324.3
Total income	<u>24,400.5</u>
Payments of: interest	15,933.5
rent	1,259.2
Other Current transfers, net	357.9
Net income before taxes	<u>6,849.8</u>
Direct tax liabilities	5,956.8
Profits after taxes	893.0
Divident payments, gross	2,260.5
Reinvested earnings	<u>-1,367.5</u>

- 10/ P. 128, Table 30

11/ The correlation coefficients significant at the five percent level, are as follows:

<u>Ratio</u>	$\overline{R^2}$
"q" including land	.555
"q" excluding land	.669
cash flow/GNP	.725
rate of return on depreciable assets	.897
rate of return on stockholder equity	.927

- 12/ James Tobin and William C. Brainard, "Asset Markets and the Cost of Capital," in Bela Belassa and Richard Nelson, eds., Economic Progress, Private Values, and Public Policy, Essays in Honor of William Fellner, pp. 235-62
- 13/ John Maynard Keynes, The General Theory of Employment Interest and Money, p. 151
- 14/ Mills and Ohta in Patrick and Rosovsky, eds, Asia's New Grant, p. 699
- 15/ Land rents are capitalized into land values at a much lower rate in Japan than in the United States. Ibid.
- 16/ Supplied by the Economic Planning Agency, U.S. based on Conference Board data
- 17/ If land were included in the U.S. "q" ratio it would represent only about 11 percent.
- 18/ Economic Planning Agency, Economic Survey of Japan, 1975/76, p. 132
- 19/ Ibid., p. 130
- 20/ George M. von Furstenburg and Burton G. Malkiel, "Financial Analysis in an Inflationary Environment," pp. 575-88
- 21/ Economic Planning Agency, Economic Survey of Japan, 1975/76, p. 130
- 22/ One estimate placed it at 18 percent for manufacturing in 1976, see OECD, Economic Survey - Japan, July 1977
- 23/ Economic Report of the President, 1979, p. 129
- 24/ Economic Survey of Japan, 1976/77, p. 94
- 25/ Ibid., p. 92
- 26/ Ibid., p. 96
- 27/ See Aubrey Silberston, "Economics of Scale in Theory and Practice," pp. 369-91
- 28/ p. 128, Table 30

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- 29/ Nomura Sogo Kenkyusho (Nomura Research Institute), Zaikai Kansoku (Business Circle View), January 1979, p. 21
- 30/ Nomura Research Institute, Manual of Securities Statistics, 1978, pp. 122 ff
- 31/ Bank of Japan Statistics Department, Economic Statistics Annual, 1977, Table 101, p. 189
- 32/ This would be consistent with the capital asset pricing model, which has been tested against the Tokyo Stock Exchange. One U.S. study concluded that security prices moved in accordance with the model, whereas two Japanese studies concluded they did not. See Henry Wallich and Mabel Wallich, in Patrich and Rosovsky, eds., Asia's New Grant, pp. 304.9
- 33/ Average annual yields are also published in Nomura Research Institute, Manual of Securities Statistics, 1978, pp. 122 ff
- 34/ OECD, Financial Statistics, 12 (Tome I), 1978, pp. 622-3
- 35/ Henry Wallich and Mabel Wallich, op.cit., p. 314
- 36/ Nomura Research Institute, Manual of Securities Statistics, 1978, p. 263; Yield=coupon rate+ $\frac{\text{face value-current price}}{\text{current price}}$ years to maturity
- 37/ 1979 Economic Report of the President, Table 30, p. 128

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