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THE COST OF CAPITAL IN THE U.S. AND JAPAN: A COMPARISON

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ABSTRACT

This paper uses financial statement data for large samples of U.S. and Japanese nonfinancial corporations to estimate the return to capital in each country for the period 1967-83. Interpreting these as measures of the cost of capital, we find that the before-tax cost of corporate capital was higher for U.S. firms than for their Japanese counterparts, with the average gap potentially as high as 5.8 percentage points. The use of alternative measurement techniques alters the gap slightly but does not alter the basic finding. However, market returns in the two countries were much closer during the same period.

Certain potential explanations for the gap in returns are rejected by empirical evidence, including differences in corporate taxation, differences in borrowing and differences in asset mix. This leaves three potential explanations: differences in risk, differences in the tax treatment of individual capital income and imperfections in the international flow of capital.

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1. Introduction

In the past few years, the enormous U.S. trade deficit and, in particular, the bilateral trade deficit with Japan, has led to serious industrial and political problems in the U.S., with trade-sensitive industries experiencing serious declines in demand and employment and seeking protection and trade sanctions. The severity of these problems has led economists and others to search for their source. Certainly a major factor implicated is the U.S. federal budget deficit, which has hovered around 5 percent of GNP in recent years, far above the levels previously experienced during peacetime. These deficits have been blamed for high real interest rates which, in turn, helped keep the U.S. dollar strong until the past two years. Though the U.S. trade balance has very recently improved somewhat, it still remains quite large long after the dollar's decline began.

Other attempts to explain Japan's favorable trade position with respect to the U.S. have focused on differences between the structure of the Japanese and American economies and government policies toward business. Some have suggested that Japanese business is more efficiently organized, while others have argued that Japan imposes barriers to American firms' attempts at establishing markets, either through explicit policy actions or collusive behavior among government, industry and the banking sector. An additional possible explanation, which is the subject of this paper's investigation, is that Japanese firms face a lower cost of capital, giving capital intensive Japanese companies a competitive advantage over their American rivals.

This explanation is not entirely independent of the others already mentioned, since the U.S. cost of capital would be elevated by the high real

interest rates induced by domestic deficits, and Japanese borrowing costs could be lowered by targeted lending below market rates. There are, however, many additional factors that could contribute to a cost of capital differential between the two counties. These include differences in the taxation of capital income, capital market restrictions that could cause the higher Japanese level of savings to drive down domestic returns to capital rather than flow abroad, and differences in the perceived riskiness of investments or investor attitudes toward risk in the two countries.

Our approach involves the use of market and financial statement data for nonfinancial corporations in the U.S. and Japan. We extend our earlier study on the same subject (Ando and Auerbach, 1985) by considering a large part of the nonfinancial corporate sector in each country rather than a small representative sample of firms, and by testing the sensitivity of our measures of the cost of capital to a variety of alternative assumptions. All of the measures we use are based on observed returns of corporations. The fundamental premise that underlies this approach is that, in the long run, corporations will earn, before tax, a rate of return relative to the value of their securities just sufficient to achieve their cost of capital, taking account of risk, taxes, and the required returns to holders of debt and equity. This need not be the case in any given year, since unanticipated events can cause returns to be above or below their expected values. Hence, we compute our statistics over a period of nearly two decades, extending from 1967 to 1984 (to 1983 for Japan).

2. The Data and Initial Estimates

Our data source for the U.S. is the COMPUSTAT Tapes,[1] and for Japan the NEEDS-NIKKEI Financial Data Tapes.[2] Information on both tapes is both based on published reports from companies themselves, and while they are similar enough to make comparisons between the two countries possible, we must be careful to allow for a number of critical differences in institutions including accounting rules used in the two countries, as well as tax laws. We shall discuss the critical differences involved and make some adjustments for them as we proceed with our analysis.

We begin, in Table 1, with familiar ratios of earnings to price after taxes and the rate of return on total capital before and after taxes, without any adjustment. The rate of return on total capital before tax is defined as earnings after tax plus taxes plus interest payments divided by the sum of total financial debt and the market value of equity. The return after tax equals earnings after tax plus interest payments, less the imputed tax deduction received for the interest payments, divided by the same base. We see that, for Japan, the earnings price ratio generally declines slowly during the period of 1967 to 1983, while the total return to capital is very low and does not have any discernible trend.

For the U.S., the trend is less obvious, with the earnings-price ratio increasing during the 1970s, then falling recently. Because of the increased real interest rates in the U.S., there is no decline on returns to capital in the 1980s, with such returns having been stable since about 1978. For Japan, except for a period in the mid 1970s, the returns to capital have been quite

stable. Overall, the numbers suggest a rate of return to capital that is much higher in the U.S. than in Japan.

3. Adjustments to the Measured Rates of Return

These figures should not be taken too seriously because they require a series of adjustments in order for them to be meaningful, and for figures for the two countries to be comparable. There are five potentially major adjustments that we will consider in this paper, three of them related to inflation and the remaining two associated with institutional differences between the two countries.

A. Correction for Depreciation Under Inflationary Conditions

In both Japan and the U.S., reported depreciation is based on original cost. It is well known that this procedure understates the amount of depreciation under inflationary conditions, and to this extent earnings and the net return on capital will be overstated.

To correct for this understatement of depreciation, we begin by assuming that depreciation would be properly measured in the absence of inflation since we are unable to assume otherwise. To restate depreciation based on original cost in current dollar terms requires information on the vintage structure of each year's overall depreciation, since the price factor by which book depreciation must be inflated depends on the age of the asset to which the depreciation applies. We produce an estimated vintage structure in the following manner.[3] We first assume that the net (of depreciation) capital stock listed in the first year requires no correction. This is reasonable,

given the low rates of inflation in both countries in the years immediately preceding the mid-1960s. We then assume that each corporation's depreciable assets are written off using the declining balance method at a single rate. Finally, using the perpetual inventory method, we solve for the value of this rate that would yield the listed book value for net capital in the last year for which data are available. That is, the declining balance rate, δ, is defined implicitly by:

$$(1) \qquad K_T = K_0 \cdot (1-\delta)^T + I_1 \cdot (1-\delta)^{T-1} + \ldots I_T$$

where K_t is the book value of net capital at the end of year t and I_t is the book value of gross investment during year t. Since all these values of I and K are positive, the solution for δ is unique. There are additional problems presented by each country's data set. For Japan, there are no separate figures listed for gross investment. We impute an investment series from the sum of depreciation and the first difference of the net capital stock. For the U.S., there are no separate figures for land and depreciable assets, only the sum. This should lower the estimate of the average depreciation rate, since land is nondepreciable. In addition, the treatment of assets acquired through merger rather than direct investment is inconsistent; they appear in the capital stock, but are not in reported investment. We performed calculations for the U.S. using both reported investment and, as was necessary for Japan, imputed investment. Estimated values of δ were generally lower and more reasonable (given previous estimates) when imputed investment was used. Because of this, as well as to be as consistent as possible in our methodologies for the two countries, we present calculations based on imputed

rather than actual investment. The depreciation rates are interesting in their own right and are given for both countries in Table 2. The variation across industries is consistent with general expectations. Firms in the construction industry, for example, evidence very rapid rates compared to retailers, whose capital is largely in the form of buildings.

In general, the estimated depreciation rates for Japan are higher than those for the U.S. Clearly, one explanation, which we accept, is that Japanese assets actually do depreciate more rapidly, because of such factors as differences in composition. For example, land is excluded from the calculations for Japan. However, there may be other factors that reflect accounting differences rather than economic ones, such as the greater flexibility U.S. firms have in choosing depreciation for tax purposes and financial accounting purposes. This is an issue which would benefit from further consideration.

With these estimated rates of economic depreciation, we went back and estimated current dollar capital stocks using the expression:

$$(2) \qquad K^C_T = P_T * [K_0 * (1-\delta)^T/P_0 + I_1 * (1-\delta) * {}^{T-1}/P_1 + \ldots I_T/P_T]$$

where P_t is a price index (the gross national expenditure deflator for Japan and the gross domestic business product deflator for the U.S.). Depreciation in year t is estimated to be $\delta * K^C_{t-1}$, and the difference between this measure and the listed book measure is subtracted from earnings.

This adjustment lowers the net return on equity on average by about 2 percent in both Japan and the U.S.

B. Capital Gains and Losses on Financial Assets and Liabilities

Under inflationary conditions, firms earn real capital gains on financial liabilities that are fixed in nominal terms, while they incur real capital losses on financial assets fixed in nominal terms. The ratio of earnings to price suffers from the lack of adjustment for both of these possibilities, and hence the earnings price ratio must be corrected for the net capital gain (or loss) accruing to the net debtor-creditor position of the firm. The ratio of total return to capital, however, is unaffected by the capital gain on debt, because the return on equity should be adjusted for the gain on the debt while the return to creditors must be adjusted for the same gain in the opposite direction, thus cancelling each other out. Therefore, in the case of the total return on capital, the required adjustment is only on the capital loss on nominally fixed financial assets of the firm, net of nominal liabilities not classified as debt.[4]

We have made these corrections on both Japanese and U.S. data. Because Japanese firms tend to have more financial assets relative to real assets, the adjustment to the total return on capital is somewhat larger for Japanese firms than for U.S. firms. Because Japanese firms also have more debt, net of financial assets, the average correction to the earnings price ratio is much larger for Japan, at 6.2 percentage points, than for the U.S., at 2.3 percentage points.

C. Adjustments to the Cost of Inventory Sold

As is well known, the use of certain inventory accounting systems, such as First-Out (FIFO), understates the cost of goods sold during inflationary

periods and therefore causes the earnings of the firm to be overstated. This overstatement of profits is much smaller under the Last-In, First-Out (LIFO) system, although it is not altogether eliminated, while under other systems such as the average cost method the overstatement of earnings typically is smaller than under FIFO but greather than under LIFO.

The algorithm used to restate the cost of goods sold proceeds as follows. First, we assume that firms use either FIFO, LIFO or Average Cost accounting in each year. Other methods listed (such as Specific Cost) are assigned to whichever of these three major methods they most closely resemble, in our judgment.

Based on stated methods, we then estimate, for each firm in Japan, the predominant method of accounting for inventories in each year. For the U.S., the predominant method is already indicated by Compustat. Each firm is assumed to account for all its inventories using its predominant method. Because there were occasional switches in this method over time (in the U.S. usually toward the use of LIFO) we allow one break during the sample period where the predominant method may change (there were few cases of multiple switches, and these were ignored). Thus, a firm switching from FIFO to LIFO in 1973 will be assumed to have a FIFO fraction of 1.0 through 1972 and a LIFO fraction of 1.0 thereafter.

To perform the inventory corrections, once the method of accounting has been determined, we begin by assuming that all goods purchased in a given year had a price equal to that year's price index, and that the initial year's inventories are correctly stated. We then use book information on the cost of goods sold and the change in inventories to estimate a time series of the cost

of goods sold in current dollars. The method by which this is done is different for each of the three methods. For LIFO, no change in cost of goods sold is made unless book inventories declined, in which case the last previous year of accumulation not already run down in the intervening years is determined and an appropriate price correction made. For FIFO, a one-year price adjustment is necessary for those goods sold in the current year attributable to initial inventory stocks. For average cost, our correction is based on the assumption that goods purchased in the current year are added to stocks and the price corresponding to the cost of goods sold is the average price at which this pool of goods in inventory is carried.

Once a current dollar measure of the cost of goods sold has been calculated the difference between it and the book cost of goods sold is subtracted from book earnings. This adjustment lowers the average after-tax earnings price ratio by 1.2 percentage points for the U.S. and 2.7 percentage points for Japan. It is thus of similar importance, quantitatively, as the capital consumption correction discussed above.

D. Special Problems of Japanese Accounting Practices

There are obvious differences between the accounting standard followed by U.S. firms and that followed by Japanese firms. Without making any judgment about their relative merits, for the purposes of comparing them against each other, it is obvious that we have to make adjustments for significant differences in accounting practices.

One type of accounts that appears quite often in the records of Japanese firms but much less so in those of U.S. firms is "reserves." These

are book entries which represent future costs to the firm resulting from its current actions. For example, suppose the firm hires a worker during period t, and incurs an obligation to pay him a certain amount of severance indemnity at the time of his retirement in period t + T. The Japanese tax law then allows the firm to record a contribution to this obligation in period t and to deduct such a contribution from the earnings of the firm in period t for tax purposes, subject to some well defined limitations. "Reserve" accounts are used strictly for record keeping purposes, since contributions of the firm to the severance indemnity are not made until the worker actually retires. Thus, such reserve accounts should not be included among debts of the firm when computing the total return to capital.

In our computation for Japanese companies, we have excluded the item "Accrued Employees' Severance Indemnities" from the total liabilities of the firm but left most other reserve accounts as recorded.[5] The exclusion of "Accrued Employees' Severance Indemnities" increases the earnings-price ratio by an average of 1.1 percentage points. We have left other accounts labeled "reserves" included in the liabilities of Japanese firms for the present calculation because we are less sure of their nature.

A second potentially troublesome class of balance sheet items for Japanese firms are financial assets. There are strong indications, from the appearance of data themselves and from our conversations with Japanese economists, that Japanese firms hold a proportionately larger amount of safe financial assets than U.S. firms. If this is so and such financial assets are financed by financial liabilities, this may cause the measured overall rate of return to appear low in Japan even if the rate of return on real assets is

not. We address this issue in our discussion below of the sensitivity of our results to alternative assumptions.

E. Adjusted Measures of the Rate of Return

The adjusted rates of return are reported in Table 3. For Japan, the earnings price ratio rises substantially because of the large inflation-induced gain on financial liabilities, with the average rising from 6.5 percent to 9.2 percent. The before tax rate of return on total capital drops from 9.5 percent to 6.5 percent. The latter falls because accounting for the net loss on financial assets and understatement of depreciation and inventory costs due to inflation offsets the correction for the overstatement of liabilities due to the presence of pension reserves. As before, the Japanese earnings price ratio falls steadily over the period, but both measures of the return to capital are relatively stable. This difference in trends can be attributed to the steady decline since 1975 in Japanese debt-value ratios, which are shown in Table 4 (as are those for the U.S.). From a peak of 69 percent in 1972, the ratio of corrected debt to corrected debt plus equity fell to 58 percent in 1983, with a sample average of 63 percent.

For the U.S., the correction lowers the earnings price ratio slightly (from 9.4 percent to 8.4 percent) because the gain on financial liabilities is much smaller than in Japan. Thus, the corrected Japanese earnings price ratio average is actually somewhat higher. There is also a reduction in the average estimated returns to capital for the U.S. similar to those for Japan once corrections are made. Thus, the average before-tax returns still differ

substantially by 5.8 percentage points, 12.3 percent for the U.S. versus 6.5 percent for Japan. This entire gap is attributable to the period after 1972. For the period 1967-72, the average returns to capital in the two countries, both before-tax and after-tax, are nearly identical.

These results are somewhat at variance with our earlier study, which failed to identify a significant cost of capital differential between the two countries. This indicates the value of examining more comprehensive sample of firms, as we have here. Our estimated costs of capital and estimated gap are, however, broadly consistent with the findings of Hatsopoulos and Brooks (1986).

4. Possible Explanations for the Cost of Capital Gap

In the previous section, we presented measures of the corrected earnings price ratios and returns to capital for the U.S. and Japan. From these, it appears that Japan has had a consistently lower cost of capital during the past two decades, measured by the before tax return to capital. In this section, we consider several explanations of the differences in the returns to capital, some that would account for a cost of capital gap and others that would attribute the gap in returns to factors other than an underlying capital cost difference.

A. Differences in Corporate Tax Positions

Few have argued that Japanese companies enjoy more generous tax benefits on real investments than their American counterparts. If they did, however, this could help account for a lower Japanese cost of capital. This issue is easily addressed by comparing the before-tax and after-tax returns to capital

in the two countries. By construction, the gap in returns includes not only taxes actually paid but also the taxes avoided through interest deductions. Hence, they may be viewed as the taxes associated with real investment decisions, leaving out the additional tax consequences of borrowing. The latter are considered separately below. This distinction is useful because it allows us to measure separately the effects of the tax system, given financial policy, and the impact of differences in financial incentives and policies.

In the U.S., the average effective tax rate (equal to the difference between before-tax and after-tax returns divided by the average before-tax return) is 54 percent. In Japan, it is 65 percent. The absolute tax wedge is larger in the U.S., 6.7 percentage points versus 4.2 percentage points, but this still leaves a gap of 3.3 percentage points between the after-tax returns.

B. The Greater Use of Borrowed Funds in Japan

The average corrected returns to equity in the U.S. and Japan are very similar, 8.4 percent versus 9.2 percent; so are the average real returns to debt, 2.7 percent and 1.6 percent, respectively. Hence, in a statistical sense, one may attribute the higher U.S. returns to capital to lower U.S. debt-equity ratios. This does not imply, of course, that the gap would disappear if U.S. companies borrowed more. The Modigliani-Miller Theorem, perhaps the most fundamental result in finance, reminds us that, except for the differential tax treatment of debt and equity and the increase in firm risk (such as through a higher probability of bankruptcy) associated with more borrowing, changes in debt-equity ratios cannot affect the cost of capital. An upper bound for the tax advantage to debt is the value of the interest

deduction, since there are personal taxes in both countries favoring returns to equity via the preferential treatment of capital gains. Hence, if Japanese firms borrow more because there are smaller nontax costs (i.e. increases in firm risk) to borrowing than in the U.S., the maximum effect of this additional borrowing on the cost of capital gap is the full value of the additional interest deduction as a fraction of total capital costs.

This upper bound on the net Japanese borrowing advantage is easily calculated by estimating the before-tax returns to capital again, this time ignoring the interest deduction, and seeing how much the gap in returns in the two countries closes. The answer is: very little. Ignoring the interest deduction would raise the U.S. return to capital by an average of 1.6 percentage points and the Japanese return to capital by 1.8 percentage points, for a maximum net difference of .2 percentage points in the cost of capital attributable to additional borrowing in Japan. The effect is so small, in part, because U.S. inflation and nominal interest rates were higher during this period, making the interest deduction more valuable in the U.S. per dollar of debt.

C. Liquid Assets in Japan

The Japanese firms in our sample hold substantially more liquid assets as a fraction of their value than do their U.S. counterparts. There are several possible explanations for this, such as the institutional requirement by lenders that borrowers maintain compensating balances. Whatever the reason, the presence of these low yield, low risk assets on Japanese balance sheets probably acts to exaggerate the debt-equity ratios used to finance <u>real</u> investments <u>and</u> the rates of return required and earned on such investments.

To measure the importance of this, we calculated (in two alternative ways) the differences in average U.S. and Japanese ratios of liquid assets to market value, and subtracted the implied "excess" liquid assets from both sides of the Japanese balance sheet, at the same time subtracting the imputed earnings on such assets based on the rate of return on deposite-like items given in the Bank of Japan Statistical Monthly. This correction has the desired effect of netting these extra liquid assets against debt and adding the gap between the borrowing cost and rate of return on such funds to the cost of other borrowing for other assets.

Depending on the measure of excess liquid assets, this correction raises the average before-tax return to capital in Japan by .5 or 1.1 percentage points, still leaving an apparent cost-of-capital gap of between 4.7 and 5.3 percentage points, of which at most .2 percentage points can be explained by the greater level of Japanese borrowing.

5. Market Return Measures of the Cost of Capital

It is well known that the equities of firms with high growth prospects often sell at price-earnings ratios well above any reasonable measure of the inverse of the after tax cost of equity capital. This is fully rational if investors anticipate that the firms have access to projects with high marginal products, since the excess returns (over the cost of capital) on these future projects should be capitalized into the current stock price.[6] This would certainly not represent a cost of capital reduction, only a difference in the composition of true economic earnings: a greater fraction would be accounted

for by capital gains, in excess of retained earnings. Hence, our measures thus far based on corrected book earnings would understate the cost of capital for such firms. Since Japan has experienced a higher growth rate than the U.S. in the past two decades, the lower earnings-price ratios in Japan may simply mean that Japan is a composite of "growth firms" compared to the U.S.

To assess this possibility, one must use data on returns to equity investors that include the capital gains component. We consider one such measure in this section, the actual holding period returns to equity in each year, equal to dividends plus capital gains. This measure has the advantage of being an observed return to the investors who determine the cost of equity capital.[7] Its major shortcoming is that it is extremely volatile, so that even over several years its mean could be a very misleading measure of the expected return to equity.[8]

A second problem is that if there is a change in the cost of equity capital, the market return to equity will move in the opposite direction in the short run. For example, if the required return rises, share prices must fall to permit subsequent returns to satisfy the new higher rate. Thus, during the transition to a higher cost of capital, the estimated cost of capital would actually be lower than the true value.

With these potential problems in mind, we now present, in Table 5, estimates based on this measure of the return to equity. We also present calculations of the the overall returns to capital before tax and after tax based on the returns to equity, following the same methodolgy used in calculating corrected returns to capital from corrected equity measures in the previous section. While the annual statistics of the measures are

substantially more volatile than those based on corrected book earnings, the sample averages are not unreasonable.

For Japan, the average market return to capital, before tax, was 5.7 percent, close to the 6.5 percent average based on corrected book measures in Table 3. It is worth pointing out, however, that the Japanese price earnings ratio has increased over the same period. If this were due to a decline in the equity cost of capital over time, then the argument given above would suggest that the average of 5.7 percent based on actual market returns may overstate the cost of capital over this period.

For the United States, the average before tax return to capital based on actual market returns is 8.1 percent, substantially below the corresponding average corrected book measure given in Table 3, 12.3 percent. This lower return is attributable to the very poor U.S. stock market performance during the 1970s, when real returns averaged only 3.6 percent, which is well below their historical average. If an historical measure were used in place of 3.6 percent, the resulting return to capital would be very close to that given in Table 3. On the other hand, if we had been able to include data for the very successful stock market year 1984 in Japan, this would have raised the sample average return in that country.

Because of the remaining uncertainties about these market-return-based measures, we must conclude, therefore, that these additional data do not shed much light on whether there really is a substantial gap in the cost of capital between the two countries.

6. Issues for Future Research

What can be the source of the large apparent gap in the real before-tax cost of funds in the U.S. and Japan? It is easier to identify incorrect answers than correct ones. As we showed above, the fraction of before tax corected earnings paid in corporate taxes is generally higher in Japan than in the U.S. Put another way, the returns to capital, even after-tax, differ by a substantial amount, suggesting that one must go beyond the corporate tax burden to explain the differences in rates of return. A second explanation that can account for at most a small fraction of the difference is the combination of tax deductibility of interest payments and the greater Japanese use of debt in corporate capital structure.

The problem, then, is to explain the large gap in the after-tax returns to capital in the two countries. There are at least three possible explanations, each having different policy implications. The first is that Japanese firms may be less risky than those in the U.S. or Japanese investors less risk averse than U.S. investors. In either case, a lower risk premium would be required to satisfy investors.

This argument is related to the one we considered above, that the Japanese rate of return on real, presumably risky investment, is understated by the combination of such assets with substantial liquid assets on corporate balance sheets. However, our findings are that the returns are lower in Japan even when the mix of assets is standardized in the two countries. The evaluation of whether the real investments of Japanese corporations are less risky or Japanese investors less risk averse would require data and

theoretical modelling beyond the scope of this paper, but represents one important line for future research.

There remain two other possible explanations for the lower returns in Japan that we cannot address using our data. One is that Japanese households require a lower return from corporations because of the favorable individual tax treatment of capital income. This explanation has been suggested by Shoven and Tachibanaki (1985), who estimated a much lower rate of capital income taxation at the individual level in Japan. However, for this explanation to hold, it would also be necessary that the favorable Japanese tax treatment of individual savings apply only to domestic assets. Otherwise, the same saving incentive would also reduce the cost of capital for purchases of U.S. assets by Japanese savers directly or by the Japanese firms in which they hold debt and equity. A second possibility is that the large pool of Japanese savings has not, at least until recently, been permitted free access to foreign capital markets, forcing funds generated in Japan to be invested at lower rates than those prevailing in the U.S. and elsewhere.

It is difficult to know which of these three explanations are quantitatively important. More research is clearly needed and would be valuable, since the appropriate policy responses would be different according to the source of the difference in the rates of return. If riskiness or attitudes toward risk differ, there is little action warranted. If capital markets have been closed, then the recent trend toward liberalization should lead to a reduction in the gap. If individual tax differences are important, then a reconsideration of their effects, both in the U.S. and Japan, may be appropriate. Recent and pending changes between the two countries with

respect to the tax treatment of savings and the openness of capital markets should provide the opportunity for future empirical research to address these questions.

Footnotes

1. Available at the Wharton Computing Center, University of Pennsylvania. These tapes cover most firms listed on the New York and American Stock Exchanges. We have excluded all financial firms from our analysis. Our sample size is 1095, except for the calculations reported in Table 5, for which we have complete data for 1443 firms.

2. Since we have not been able to arrange direct access to these tapes, we are most grateful to Professors Fumio Hayashi and Kanemi Ban of Osaka University who carried out the basic computations on Nikkei tapes available at Osaka University and made the results available to us. Here again, firms included are all those listed on the Tokyo Exchange, excluding financial firms. The sample size is 1287, and 1297 for the calculations reported in Table 5.

3. This procedure was also used by Auerbach (1984), where it is described and evaluated more fully.

4. An unambiguous determination of nominal assets and liabilities is difficult. The use of alternative measures caused estimated rates of return to move up and down in the U.S. and Japan by as much as 1.5 percentage points, but with virtually no impact on the differences between the countries.

5. To bring the accounting with respect to this item to a cash basis as in the case for U.S. corporations, we have subtracted the net change in this account from the current costs of Japanese companies.

6. This can be rigorously shown using, for instance, the "q" theory of investment. Suppose there is the anticipation that an outward shift will

occur in the production frontier in the future, increasing the marginal product of capital. This will increase investment, and market value, immediately, decreasing measured earnings in the short run because of capital deepening. Hence, one would observe a low earnings-price ratio in the short run. The capitalized value of higher future marginal products rises as their date of appearance nears, giving investors a sufficient overall return to equity.

7. If the marginal source of equity funds is retained earnings, rather than new shares, then one should adjust dividends in this calculation, multiplying them by a factor less than 1 that represents the relative cost to the firm of delivering an after-tax dollar to the investor in the form of capital gains as opposed to dividends. This is the ratio $(1-\theta)/(1-c)$, where θ is the dividend tax rate and c is the accrual-equivalent of the capital gains tax. See Auerbach (1979, 1983). This correction is important in the current context to the extent that dividend yields differ between the U.S. and Japan.

8. An alternative measure is the sum of dividends plus the trend growth rate of dividends (adjusted for the dilution of new share issues and net of the annual inflation rate) since, in the long run, the rate of capital appreciation of equity must equal the rate of dividend growth. Unfortunately, the anomalous Japanese dividend behavior over this period makes such an approach problematic. Over this entire period, aggregate dividends in our sample adjusted for dilution did not grow in real terms! This remarkable fact seems to be consistent with statistics reported in the Annual Report on National Accounts of Japan's Economic Planning Agency (EPA). Moreover, many of the Japanese companies in our sample had zero dividends at the beginning or

the end of the sample period, making the calculation of a growth rate impossible.

9. The geometric average real rate of return on common equity in the U.S. over the period 1926-86 was 7.0 percent; the arithmetic average was 9.0 percent. See Ibbotson Associates (1987).

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Table 1

Earnings Price Ratio and Return to Total Capital, Nonadjusted

Year	E/P After Tax		R/K After Tax		R/K Before Tax	
	U.S.	Japan	U.S.	Japan	U.S.	Japan
1967	.066	.080	.061	.060	.104	.097
1968	.057	.104	.053	.067	.097	.108
1969	.052	.094	.049	.065	.089	.103
1970	.055	.096	.051	.067	.091	.107
1971	.064	.102	.057	.066	.103	.108
1972	.061	.078	.055	.057	.103	.095
1973	.067	.055	.062	.049	.114	.087
1974	.096	.060	.083	.053	.166	.089
1975	.124	.049	.095	.051	.185	.092
1976	.115	.041	.092	.047	.173	.087
1977	.107	.048	.090	.047	.167	.087
1978	.131	.048	.107	.043	.198	.080
1979	.162	.051	.128	.043	.226	.081
1980	.140	.052	.116	.047	.206	.089
1981	.109	.061	.099	.053	.175	.100
1982	.094	.045	.085	.044	.153	.087
1983	.103	.047	.090	.044	.158	.083
1984	.092	NA	.084	NA	.149	NA
Average	.094	.065	.081	.015	.147	.093

Table 2

Estimated Rates of Depreciation by Industry

Industry	Depreciation Rates, Adjusted	
	U.S.	Japan
Food	.134	.172
Textiles	.156	.167
Paper and Pulp	.140	.142
Chemicals	[.127]	.190
Drugs		.207
Oil	.147	.155
Rubber	.161	.205
Glass-stone	.103	.184
Iron and Steel	.122	.149
Non ferrous Metals	.138	.190
Non electrical Machinery	[.176]	.196
Electric Machinery		.260
Shipbuilding	--	.153
Automobiles	[.119]	.251
Other Transportation Equipment		.161
Watches and Cameras	--	.243
Construction	.171	.225
Retail	.151	.146
Airlines	--	.184
Mining	.131	.157

- none in sample.

Table 3

Earnings Price Ratio and Returns on Capital, Adjusted

Year	E/P After Tax		R/K After Tax		R/K Before Tax	
	U.S.	Japan	U.S.	Japan	U.S.	Japan
1967	.062	.116	.053	.037	.090	.074
1968	.053	.155	.042	.050	.075	.090
1969	.049	.132	.037	.048	.069	.087
1970	.051	.145	.037	.040	.075	.080
1971	.059	.144	.040	.044	.084	.085
1972	.055	.125	.040	.037	.086	.074
1973	.059	.118	.042	.007	.092	.046
1974	.084	.153	.049	-.031	.127	.005
1975	.121	.082	.057	.007	.139	.047
1976	.100	.049	.062	.008	.137	.048
1977	.091	.055	.060	.012	.133	.052
1978	.114	.046	.073	.013	.155	.049
1979	.148	.038	.090	.021	.178	.049
'980	.129	.050	.080	.030	.161	.071
1981	.096	.064	.061	.038	.131	.085
1982	.077	.045	.052	.034	.114	.076
1983	.086	.040	.066	.038	.127	.076
1984	.075	NA	.062	NA	.119	NA
Average	.084	.092	.056	.025	.123	.065

Table 4

Debt-Value Ratios

Year	U.S.	Japan
1967	.15	.638
1968	.15	.663
1969	.16	.631
1970	.21	.622
1971	.23	.680
1972	.22	.686
1973	.20	.579
1974	.27	.594
1975	.37	.678
1976	.32	.665
1977	.28	.654
1978	.31	.612
1979	.32	.595
1980	.32	.602
1981	.30	.572
1982	.35	.582
1983	.32	NA
1984	.27	
Average	.26	.629

Ratios are of financial liabilities (corrected for Japan to exclude pension reserves) to the sum of those liabilities plus the market value of equity.

Table 5
Returns to Capital, Based on Market Returns to Equity

Year	E/P After Tax		R/K After Tax		R/K Before Tax	
	U.S.	Japan	U.S.	Japan	U.S.	Japan
1967	.224	-.067	.178	-.030	.222	.008
1968	.079	.290	.059	.099	.104	.146
1969	-.135	.145	-.113	.055	-.071	.094
1970	-.038	-.152	-.034	-.073	.006	-.031
1971	.111	.071	.075	.021	.120	.063
1972	.146	.712	.105	.228	.152	.265
1973	-.229	-.050	-.181	-.064	-.131	-.031
1974	-.350	-.353	-.260	-.238	-.184	-.197
1975	.300	.076	.155	.004	.238	.048
1976	.182	.067	.111	.014	.188	.055
1977	-.104	.036	-.078	.006	-.002	.046
1978	.010	.105	-.002	.035	.086	.073
1979	.110	.069	.057	.034	.151	.074
1980	.208	.023	.125	.018	.213	.062
1981	-.149	.138	-.109	.069	-.034	.118
1982	.128	-.011	.082	.009	.151	.053
1983	.197	.176	.136	.091	.204	.129
1984	-.045	NA	-.024	NA	.043	NA
Average	.105	.075	.016	.016	.081	.057