
CHAPTER 7

Financing: Its Role in Competitiveness in Electronics

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Overview

Declines, real or imagined, in U.S. competitiveness in electronics have been ascribed at various times and by various people to such causes as: unfair competitive tactics by foreign firms, trade barriers that keep American products out of overseas markets, government subsidies in other countries, and costs of capital that are lower than in the United States. Low-cost investment funds are said to be available in countries like Japan for reasons ranging from higher rates of consumer savings to allocations of capital by governments or direct subsidies.

This chapter deals with only this last set of possible causes—those related to corporate financing. Although limited in scope, the discussion has clear implications for other facets of competitiveness. For example, financing costs could be lower where a protected home market reduces risk and provides a stable foundation for international operations. Government subsidies might be indirectly channeled through financial markets as implicit or explicit loan guarantees, as well as in more obvious forms such as grants for research and development or tax havens encouraging regional development.

In mature industrial economies, a vast and varied network of channels links companies seeking funds with individuals and organizations that have moneys to lend or otherwise invest. The capital markets where transactions between those seeking and those providing funds take place accommodate both direct and indirect investments, for short time periods and for long. Among the direct and long-term methods that corporations use to raise capital are sales of stock (equity), where the purchasers acquire an ownership position, and sales of corporate bonds. purchasers of bonds have no

ownership relation with the issuing company, but receive a fixed rate of return, as well as possible capital gains (or losses). * Shareholders accept a variable rate of return in the form of dividends, as well as changes in the value of the stock depending on the success of the company. Both stocks and bonds are traded in active secondary markets in the United States and many other industrialized nations. In general, holders of debt—of which bonds are only one type—have first claim on the residual assets of a corporation in the event of liquidation; the claims of stockholders are subordinate.

Highly developed capital markets such as those in the United States also provide indirect financing mechanisms—i.e., one or more financial intermediaries are interposed between the investor and the final recipient of funds. Banks are the most common intermediaries. Investors deposit moneys—for instance, in ordinary savings accounts—which the banks then lend to businesses. Other financial institutions function in generally similar fashion—e.g., the postal savings system in Japan, an important channel for capital that ultimately helps finance Japanese industry. Investment banks, insurance companies, and pension and retirement funds are other examples of financial intermediaries.

The fundamental questions in this chapter deal with costs of capital faced by electronics firms in various parts of the world. Spokesmen for American companies have often compared

*Several types of corporate bonds exist. Straight bonds carry a fixed interest rate, but their market price varies with economic conditions. For example, if interest rates fall, the value of straight bonds may rise. Convertible bonds allow holders to convert to common stock at a specified price; thus capital gains are possible if the price of the company's stock rises during the period of convertibility.

their costs for investment funds—whether debt (bank loans, bonds) or equity (primarily stock issues)—unfavorably with costs in other countries. In particular, costs of capital in Japan are often said to be as little as half those in the United States. Some observers also claim that the pool of funds potentially available for investment in the U.S. industry is too small.

Such concerns are particularly relevant for the rapidly growing, high-technology portions of the American electronics industry. Firms whose business centers on semiconductors, computers (including software), and even the more rapidly expanding portions of consumer electronics (e.g., electronic games) can find themselves with markets outstripping their ability to finance expansion.

Problems in securing funds for rapid expansion—not only of production, but of R&D and product development—are compounded by the rapidly increasing capital intensity of some portions of the electronics industry. Semiconductor manufacture is a prime example; capital costs are going up rapidly, not only because of escalating design cost as circuits become more complex, but also because new generations of production equipment are much more expensive (ch. 3). Given the predilection of U.S. firms, in electronics as in other parts of American industry, for relying on internally generated funds—i.e., retained earnings and depreciation—whenever possible, financial managers have often been hard pressed to secure funds for growth.

Because the chapter centers on costs of capital, interest rates and the mechanisms by which they are determined become one of the fundamental bases of comparison. The cost to the borrower of acquiring funds is the interest rate on the loan or bond. Costs of equity, following conventional practice, can be related to costs of debt. In countries with well-developed capital markets and modest levels of government intervention—as in the United States—market-determined interest rates are the primary competitive mechanism for allocations of investment funds. Industrial firms obtain funds by entering capital markets in competition with other borrowers.

The interest rate thus serves a critical function in the economy—that of the price for borrowed funds. This price serves to allocate funds so that the pool of available capital goes first to the most productive investments. The mechanism is as follows. Managers of profit-seeking enterprises make investment decisions by comparing their costs in acquiring funds with the expected profits from the uses of these funds—i.e., with the returns on alternative investments. These projects might be new manufacturing facilities, R&D programs, or the acquisition of other corporations. If the anticipated returns are greater than the costs of obtaining funds, then the investment might be made using money generated within the enterprise—e.g., from retained earnings—or from outside capital markets. In either case, the interest rate is the primary factor in determining the cost of financing the project. For example, if market interest rates are high, a corporation might choose to invest in securities rather than in its own business. In general, less attractive investment projects will be postponed when interest rates rise, the market serving to allocate funds to other uses both within the firm and among various companies seeking financing in the capital market.

The market-driven process described does not always function ideally, but as a rule interest rates allocate funds quite efficiently. Still, governments can act in various ways to influence investment decisions—either on a case-by-case basis or by favoring some sectors of the economy over others. Outright subsidies and loan guarantees are two of the more obvious and common tools. Less visible and less direct policies are also possible; some of these are explored in the discussion of financing practices in Japan later in the chapter. Where governments intervene in capital markets, one consequence can be higher interest rates for all borrowers except those favored by the government.

To explore international differences in sources of funding and their costs, this chapter compares the structure of financial markets in the United States and Japan, together with typical financing practices of electronics firms.

More limited discussions of France and West Germany follow. The objective is to understand the effects of financing patterns on competitiveness in the international marketplace,

where governments may try to complement corporate strategies or to implement national strategies.

Sources of Funds and Financial Leverage in the United States and Japan

Many executives in the U.S. electronics industry believe the firms they manage to be constrained in efforts to defend or expand international markets by relative costs of financing, and in some cases also by shortages of capital. The electronics industry is not alone in this concern. Other American industries, especially those facing intensified international competition, voice the same complaint, more especially if they feel threatened by the Japanese. The argument has been articulated best—and empirically supported in most detail—by the U.S. semiconductor industry, largely because its rate of expansion and changing technical character place extraordinary demands on the financing capabilities of independent merchant firms. The semiconductor industry's position with regard to financing is summarized below; to the extent possible the argument will be generalized to other sectors of electronics—i.e., computers and consumer products.

The basic contention of the semiconductor industry is straightforward, and for the most part directed toward the industry's primary foreign competitor, Japan: the ability of Japanese electronics firms to gain market position against American companies over the past few years, both in the United States and abroad, has been eased by cheap capital. (The meanings that attach to cost of capital will become clearer below.)

For one reason or another, in this view, Japanese corporations in many industries enjoy costs of capital markedly lower than their American counterparts, and from this source alone gain competitive advantage; Japanese companies would be able, in principle, to manufacture products at lower costs and market

them at lower prices. At times, U.S. firms have also associated low-priced products with “un-fair” practices in international trade (see ch. 11). Certainly, a broad range of business tactics—whether or not fair within the accepted framework of international trade—are easier to implement if capital is inexpensive.

The U.S. semiconductor industry has also asserted that favorable access to funds has enabled Japanese manufacturers to add capacity in advance of market demand—indeed, to create excess capacity even in times of recession—a “luxury” decidedly unavailable to American firms. As a consequence, when the economy improves, the Japanese are better placed to quickly move into expanding markets, while their competitors here struggle to build capacity and catch up. Finally, it is alleged, ample supplies of cheap capital allow Japanese corporations to spend lavishly on the advanced R&D so necessary in this rapidly changing field. Lower costs of capital, together with full control over their domestic market, are viewed as primary underpinnings of Japan's global strategy.

What are the perceived reasons for these lower capital costs? Two main causes are frequently cited, along with related structural features of the financial system in Japan: 1) the distinctly different capital structures of Japanese electronics companies; and, 2) the very high rate of savings within the Japanese economy. For structural reasons, Japanese firms can tap relatively large amounts of nonequity funds, primarily bank loans (bond markets in Japan are still relatively undeveloped). American corporations, in contrast, rely much more heavily on reinvestments of internally generated

revenues to finance growth. Nonequity funds, it is claimed, tend to be less costly.

The second source of Japanese advantage—high savings—by increasing the pool of funds available to be lent, should depress interest rates. This would have the effect of making all types of investment capital less expensive compared to countries where savings are a smaller proportion of gross national product. Savings rates are discussed in more detail in a later section; household savings in Japan run at about 20 percent of income—nearly four times the rate in the United States. There is little agreement on why the savings rates in different countries vary so much, and in particular why that in Japan is so high and that in the United States so low. Variations in the average proclivity of individuals in different countries to save under otherwise similar circumstances appear to be a factor; so do the extent of social welfare programs and differing tax structures.

Combined, these two sources of financial advantage are said to give Japanese electronics firms capital costs barely half those of their American competitors—in 1980, about 9 percent compared to 15 to 18 percent for U.S. semiconductor firms.¹ Such a result, if true, has implications for competitiveness in many other industries.

The conclusions of the Chase Financial Policy study cited above are summarized in table 51. According to Chase's calculations, the typical Japanese manufacturer of semiconductors enjoys substantially lower costs of capital than merchant firms in this country. Only Matsushita (table 51) incurs financing costs larger

¹"U.S. and Japanese Semiconductor Industries: A Financial Comparison," Chase Financial Policy for the Semiconductor Industry Association, June 9, 1980, p. 2.5. The most thorough discussion so far of the impact of corporate financial structure on relative costs of capital, this report seeks to quantify Japanese and U.S. financing costs with considerable care to identifying the sources of the differences.

A more recent analysis comparing industry as a whole in the United States and Japan finds average costs of capital for 1981 to be 16.6 percent here versus 9.2 percent in Japan. See, "A Historical Comparison of the Cost of Financial Capital in France, the Federal Republic of Germany, Japan, and the United States," Department of Commerce, April 1983. In this report, no attempt was made to adjust for inflationary expectations, nor were the sources of the difference explored in any detail.

Table 51.—Costs of Capital for U.S. and Japanese Semiconductor Manufacturers as Calculated by Chase Financial Policy

	Weighted averages of debt and equity costs as of June 4, 1980 ^a
U.S. companies (calculations in dollars)	
Advanced Micro Devices	17.7%
Fairchild Camera and Instrument ^b	15.5
Intel	16.8
Intersil ^c	21.1
Mostek ^d	16.7
Motorola	13.8
National Semiconductor	17.4
Texas Instruments	16.5
Japanese companies (calculations in yen)	
Fujitsu	8.80/0
Hitachi	12.1
Matsushita Electric	17.1
Mitsubishi Electric	7.7
Nippon Electric Co. (N EC)	7.7
Toshiba	7.7

^aTerms of required overall rate of return on invested capital

^bSubsequently acquired by Schlumberger

^cSubsequently acquired by General Electric.

^dSubsequently acquired by United Technologies.

SOURCE "U. S and Japanese Semiconductor Industries A Financial Comparison," Chase Financial Policy for the Semiconductor Industry Association, June 9, 1980, tables 4 and 9, pp 5,3 and 7,6

than *any* of the U.S. companies, at least for the time period examined. Nonetheless, the *range* in capital costs faced by firms in either country is relatively large,

There are two major reasons for the wide divergences in capital costs in table 51. First, borrowing costs used in the calculations for Japanese firms were lower than rates for American companies. The second primary source of difference lies in the dissimilar capital structures of corporations in the two countries—the greater use of debt by Japanese firms, principally in the form of bank loans (most American firms with substantial debt carry this in the form of bonds),

If Japanese firms use substantially more debt than U.S. companies—as they do—and if debt financing is less costly than equity—as the computational method used by Chase assumes—then a total cost derived from a weighted average of the two sources must favor Japan. This

would imply cost advantages for Japanese companies, not only in electronics but in any industry making similar use of leverage.

Internal and External Financing

Table 52 illustrates something of the range in international differences in corporate finance. Japanese capital structures are heavily weighted toward external financing. Japanese corporations, on the average, received less than half their capital from internal sources—i.e., from depreciation and reinvested profits. And, while Japan is at the high end in use of external capital, the United States is at the low end, relying much more heavily on internally generated funds.

The category of external finance includes both loans—which in all five countries are extended primarily by banks—and securities. The two major categories of securities are bonds (like loans, debt) and stocks, representing equity holdings.² Note that Japanese firms rely much more heavily on loans than securities (either loans or equity) for their external funding; in general, companies in Japan employ much higher financial leverage than do American corporations (leverage can be defined in several ways, perhaps the most common being the ratio of debt to equity in a firm's capitalization). Table 53 compares debt/equity ratios for U.S. and Japanese electronics companies. The reasons that corporations in Japan make

greater use of financial leverage—and the consequences—are taken up later.

The conclusions of the Chase study concerning the impact of debt financing on capital costs in Japan are grounded in well-accepted methods of calculation. The cost of capital for a particular investment can be estimated using the relative proportions of the company's sources of capital as weights in the computation for the investment. For example, if a company pays 15 percent interest on debt instruments, and its risk-adjusted cost of equity (explained below) is 20 percent—and if the debt-equity ratio is 1.0—then the firm's overall cost of capital would be 17 percent. The returns expected from a given investment can then be compared to this estimated cost of capital. The computational method is deceptively simple and—except for various subtleties involved in determining the appropriate interest rate for debt and the risk measures for equity—can be applied in straightforward fashion.

All other things equal, then, Japanese firms would enjoy clear financial advantages from their greater relative amounts of debt (higher leverage) so long as the interest rate on debt is less than the risk-adjusted cost of equity—the normal case. Several questions follow: If financial leverage lowers costs of capital, why don't U.S. firms emulate the Japanese by using more debt in their capital structures? Wouldn't stockholders benefit from this choice by earning higher returns? There are also potential tax benefits: since corporations can deduct interest paid on debt as an expense, but not dividends paid to stockholders, would not greater use of debt decrease Federal tax obligations and in-

¹For a standard introduction to corporate finance, see J. C. Van Home, *Fundamentals of Financial Management*, 4th ed. (Englewood Cliffs, N.J.: Prentice-Hall, 1980).

Table 52.—Internal and External Sources of Corporate Financing^a

	Internal finance (reinvested profits, depreciation)	External finance		Total	Ratio of internal to external finance
		Loans	Securities ^b		
United States	69.40/o ^c	12.40/o	18.20/o	30.60/o	2.27
Japan	40.0	49.0	11.0	60.0	0.67
United Kingdom	51.4	10.3	38.3	48.6	1.06
West Germany	63.1	29.6	7.3	36.9	1.71
France	65.0	27.4	7.6	35.0	1.86

^a1966-70 These patterns have probably not changed greatly.

^bCorporate securities are mostly stocks and bonds

SOURCE: Y. Suzuki, *Money and Banking in Contemporary Japan* (New Haven, Conn.: Yale University Press, 1980), p. 14

Table 53.—Total Debt-to-Equity Ratios for Selected U.S. and Japanese Electronics Firms

	1975	1979
United States		
Advanced Micro Devices.....	81 %	8%
Control Data Corp. (CDC).....	38	20
Digital Equipment Corp. (DEC).....	30	32
General Electric.....	41	25
Honeywell.....	65	32
IBM.....	4	17
Intel.....	0	0
Motorola.....	28	30
National Semiconductor.....	25	37
RCA.....	106	125
Texas Instruments.....	14	21
Japan^a		
Fujitsu.....	200%	190%
Hitachi.....	160	96
Matsushita Electric.....	14	16
Mitsubishi Electric.....	370	270
Nippon Electric Co. (NEC).....	350	400

^aThe financial data for Hitachi, Matsushita, and Toshiba—as used by Chase Financial Policy—includes affiliated trading companies among the consolidated subsidiaries, while that for Fujitsu, Mitsubishi Electric, and NEC does not see the Chase Financial Policy report cited in the source note below, p. 61

SOURCES: United States — Derived from annual reports; also "Financial Issues in the Competitiveness of the U.S. Electronics Industry," report prepared for OTA by L. W. Bergman & Co. under contract No. 033.1550.0, pp 52, 56 Japan-Derived from data in "U.S. and Japanese Semiconductor Industries' A Financial Comparison," Chase Financial Policy for the Semiconductor Industry Association, June 9, 1960, Appendix Japanese Semiconductor Companies, Financial Statements and Supporting Schedules.

crease aftertax profits? If so, isn't this another reason to encourage U.S. electronics firms to increase their leverage? (Japanese tax treatment of interest payments is similar to U.S. law in this respect.) At this point, the layperson might think that Japanese firms have simply taken advantage of financing choices also open to American companies,

Risk

The answers to the questions above, and the key to understanding the U.S. electronics industry's unhappiness with Japanese financing practices, relate to a second aspect of financial decisionmaking—risk. Investment decisions inevitably involve risks for those who supply funds—whether external funds or internal—because there can be no certainty that future cash flows will be sufficient to compensate investors. In essence, the risks borne by investors are of two types. First, cash flows are variable—more so in some types of businesses

than others. In one year, the funds remaining after expenses—hence available for distribution to shareholders or for retention in the enterprise—may be plentiful; in another, such monies may be scarce or nonexistent. Stockholders are generally believed to desire stable earnings from year to year, accepting greater *variability* in rate of return only if compensated by a higher *average* return.

In contrast to stockholders, who share in the ownership of the firm, creditors merely lend it funds; they generally have first claim on cash flow, as well as on the assets of a firm, and receive a "guaranteed" rate of return—i.e., the interest rate on bonds or other debt instruments. While creditors seldom share in the first type of risk—variability in returns—they may sometimes choose to subordinate their claims rather than force a firm into bankruptcy. In the recent example of Braniff International, the airline's creditors several times allowed payments of both principal and interest to be deferred before Braniff finally entered bankruptcy.

The Braniff case illustrates the second type of risk—loss of all or part of the investment itself, as well as loss of revenues from interest payments or distributions of profits. This is a risk borne by both owners and creditors. But because creditors have first claim, they are more likely to recover at least part of their investment in the event of business failure. This is the reason interest rates on debt are generally lower than the risk-adjusted cost of stockholders' equity: holders of debt face lower risks because they have first claim on assets. At the same time, they must accept a nominally fixed rate of return—generally lower than that accruing to shareholders. (In fact, the effective rate of return on bonds is not necessarily fixed, as pointed out earlier, but this is not important here.)

The discussion above is necessarily schematic, and corporations can avail themselves of other methods of financing, which fit into the subordination ordering in various ways. But as a general rule, common stockholders come last—i.e., can recover their assets only after all

other creditors and investors have been paid. This subordinated status makes shareholders sensitive to the degree of leverage employed by the firm; their exposure to risk increases with higher leverage. Not only does more debt in the firm's capital structure tend to increase the variability of returns to shareholders, but added debt worsens their position in the event of a forced liquidation. Typically, common stockholders must be compensated through higher returns—which can include capital appreciation—before they will accept the risk inherent in greater leverage.

As a consequence, adding more debt will not necessarily lower a firm's cost of capital.³ Indeed, neglecting tax effects, the *choice of debt-equity ratio, over rather wide ranges, should have little, if any, impact on capital costs*. Even assuming no increase in interest rate as a firm borrows more—which is not very realistic—the lower costs of debt are generally offset by the higher required returns to common shareholders as leverage increases. Several cautions must be added. While this conclusion is commonly accepted as applying for U.S. capital markets, it is not clear that it always holds in the same way in other countries. Furthermore, taxes do matter, and the fact that interest payments lower a company's tax bill usually would argue for adding to the proportion of debt in a firm's capital structure. But at some point more debt will be accompanied by higher interest rates, since the debt itself becomes increasingly risky for potential holders.

With all of this said, how is it possible that Japanese companies can, on the average, employ debt-equity ratios markedly higher than American firms, without seeming to bear higher costs of both debt and equity? The usual response holds that the Japanese financial system differs from that in the United States, and forces that tend to raise the cost of capital as leverage increases are absent in Japan (or function differently than they do here). This implies one or more of the following:

1. Japanese investors exhibit risk aversion behaviors markedly different from their counterparts in the United States,

2. Some Japanese investors are accepting risks for which they receive less compensation—for whatever reason—than they desire.
3. Some classes of borrowers in Japan pay premiums for funds, these premiums counterbalancing the low rates available to other borrowers—or, alternatively, some potential borrowers cannot get funds at all because of capital rationing.
4. Some risks which private investors in the United States must bear are, in one way or another, reduced for private investors in Japan.

Each of these four possibilities will be briefly examined.

Risk Aversion Behaviors

Financial and business risks must be absorbed within any system that operates to transfer funds from savers to commercial borrowers. The presumption is that people have an aversion to risk and, if they are to accept such risks, they must be compensated by interest payments, capital appreciation, or dividends on shares. Still, it is not necessarily true that all people—or all economies—will exhibit identical patterns of risk aversion. Japanese investors, for example, might demand less remuneration for a *given* level of risk than Americans, (It is also possible that the Japanese are less reluctant to postpone consumption—a possible explanation for the higher savings rate mentioned earlier, with its tendency to force down interest levels.)

Compensation for Risk

The second possibility suggested above was that some individual or institutional investors in Japan might be compelled to accept less compensation than they desire—i.e., less than they would receive in a capital market that functioned differently. It does appear that Japanese banks—which provide much of the capitalization for electronics firms through loans—are accepting what are essentially quasi-equity positions. That is, by the standards of countries like the United States, *banks in Japan are accepting the greater risks normally asso-*

³Ibid., ch. 18.

ciated with equity. While banks can diversify these risks by maintaining a portfolio of corporate loans, to the extent that such risks are systematic, diversification will be ineffective ("systematic risk" is simply that which cannot be reduced by diversification). The question remains: Why do banks in Japan accept financial risks that would not be acceptable elsewhere in the world? This question is taken up later in the chapter.

Preferential Treatment of Selected Borrowers

Some observers assert that "target" industries in Japan are selected to receive bank loans at interest rates well below market levels.⁴ This would imply, in the normal circumstance, that other borrowers will pay higher than market rates; still other potential borrowers might not be able to secure funds at all. The bias is usually alleged to favor large firms at the expense of the far greater number of small establishments in Japan, and to favor growth industries—even though such industries may, in the shorter term, offer rates of return both lower and more variable than alternative investments. In general, both semiconductors and computers would be classed as rapid growth, long payout industries—in Japan as well as in the United States,

If some borrowers are, in fact, favored with lower than market interest rates in Japan, this question follows: Why doesn't competition among lenders force Japanese banks to allocate resources to the firms and industries promising the greatest returns, as in the United States?

⁴L. C. Thurow, for example, has claimed that Japanese inroads into U.S. and world semiconductor markets are financed with funds provided by the government-owned Bank of Japan: "But the Japanese are entering this industry with massive amounts of debt capital ultimately lent by the Bank of Japan. Their aim is to jump directly into large-scale, capital-intensive techniques of production; proceed rapidly down the learning curve; sell at prices lower than those of the rest of the world; and capture most, if not all, of the market. If American industry limits its investments to those that can be financed by retained earnings, they will simply be driven out of the semiconductor industry." See, "Prepared Statement of Dr. Lester C. Thurow," *Productivity in the American Economy*, hearings, Task Force on Economic Policy and Productivity, Committee on the Budget, House of Representatives, Jan. 12, 13, and 15, 1982, p. 34.

Subsidization of Risk

The foregoing question is often answered, at least in part, by appeal to the fourth point—namely, that on some loans Japanese banks can shift part of the risk to other parties. In particular, for loans to companies whose activities are deemed to further national interests, the Japanese Government may effectively guarantee the loan, at least to the extent of providing protection against bankruptcy. Some observers, indeed, suggest that many loans by Japanese banks are simply government loans passed through the banking system. In this view, some of the "normal" risks of debt financing are absorbed by the government rather than the banks; interest charges below market rates reflect government subsidization.

As with the other points raised above, the question of whether and to what extent the Japanese Government subsidizes risk can be answered, at least in part, by empirical evidence. While the actual functioning of the country's financial system is taken up in a later section, the Japanese economy is no different from others in that capital is a scarce resource allocated by various mechanisms among an enormous variety of investments. If the government or the banking community chooses to step in by selecting target sectors to receive capital at rates that were directly or indirectly subsidized, the consequences are quite predictable. The target sectors would gain at the expense of the rest of the economy—for which credit would normally have to be rationed. In other words, no country can subsidize all industrial sectors simultaneously—although manufacturing might be favored over agriculture, or the private sector over the public. In fact, there is no question that capital was allocated by the Japanese Government during the earlier post-war period; what is not so clear is whether more than remnants of these policies remain.

Price Inflation and Banking Practices

One question that even the more sophisticated analyses, such as the Chase study mentioned above, have not adequately addressed

is the impact of inflation on international financial comparisons, The effects are too complex to fully review here, but differing inflation rates among the world's economies are a major factor in apparent differences in costs of capital. The reason is that observed market interest rates depend in part on expectations by investors with respect to price inflation. If expectations differ between a pair of countries, then market interest rates will diverge from this cause alone. But to the extent that the divergence in interest rates simply reflects the underlying inflation rates in the two economies, differences in costs of capital based on these interest rates are not "real." only a difference in costs of capital after adjustments for inflation would confer advantages in international competition.

The difficulty is that future inflation can only be projected; the presumption is that the market mechanisms which set interest rates take such projections into account. Interest levels enter the calculation of capital costs for U.S. and Japanese electronics firms in table 51 in at least two ways: 1) through the cost of equity computation, which is based on a "riskless" interest rate; and, 2) in the choice of interest rate for the cost of debt. The riskless interest rate applies to investments for which the risk borne by the lender can be considered negligible, at least in comparison to the risks of equity. Government notes, bonds, or bills are typical examples of "riskless" investments.

The riskless rates applied by Chase Financial policy were: 10.2 percent for the United States, derived from the June 1980 Treasury bond rate; and 9.0 percent for Japan, the yield on the most widely traded debenture (a type of bond) on the Japanese market—10-year issues of Nippon Telegraph and Telephone Public Corp. (NTT). The analysis takes the degree of risk for these instruments to be, if not zero, at least small and comparable in the two countries. *

These two interest rates do not differ by much; indeed, their closeness accounts for part

*NTT debentures may actually carry somewhat greater risks, depending on whether the Japanese Government backs such issues. If NTT debentures are in fact riskier, the effect would be to decrease the risk-free rate in Japan, and hence the risk-adjusted cost of capital.

of the cost advantages calculated for the much more heavily leveraged Japanese companies. But are they close in real, rather than nominal, terms? The answer depends entirely on long-term inflationary expectations—expectations which were probably considerably higher in the United States than in Japan during 1980. * The nominal interest rate differential favoring the Japanese might well reverse, and favor the United States, could the real rates be compared.

Differences in banking practices between the two countries also affect the true costs of capital. For instance, banks in Japan typically demand that greater compensating balances be kept on deposit against corporate loans.⁵ Because the firm pays more for the funds it has borrowed than it receives on its deposits, this practice raises the effective interest cost of the loan. Large compensating balances mean that the usual measure of financial leverage—debt-equity ratio—overstates the true degree of leverage.

These observations on the effects of inflation and compensating balances emphasize the complexity of cost of capital comparisons as applied to funds from external sources. They do not confirm or deny the general trends in table 51, though perhaps throwing doubt on the magnitude of the differences resulting from the Chase analysis.

*The Chase study from which table 51 comes did attempt to compensate for varying inflationary expectations. The Japanese cost of capital in yen was converted to a dollar cost using the difference between the two interest rates cited above, said to represent "the premium investors require for receiving interest and principal payments in U.S. dollars rather than yen" (p.7.7). But by implying that the 1.2 percentage point difference represents dissimilar inflationary expectations, this procedure amounts to assuming that the riskless rates in the two countries, expressed in dollars, are equal. This seems unlikely; it would imply that the capital market in Japan is both efficient and perfectly linked to that in the United States, neither of which is true. It is more reasonable to assume that differences in inflationary expectations were considerably larger than 1.2 percent in mid-1980.

⁵Y. Suzuki, *Money and Banking in Contemporary Japan* (New Haven, Conn.: Yale University Press, 1980), p. 50. Japanese firms often keep 25 percent or more of borrowed funds deposited with lending banks. Furthermore, banks are more likely to lend to firms that are already large depositors. In the United States, compensating balances have typically been in the range of 10 to 20 percent, but this requirement is increasingly being replaced by an explicit fee. The fee arrangements generally result in lower borrowing costs. See "The Perilous Hunt for Financing," *Business Week*, Mar. 1, 1982, p. 44.

Effects of Financial Leverage on Tax Payments

While the Japanese Government might support electronics firms through a variety of capital and other subsidies, the study by Chase Financial Policy summarized in table 51 is based solely on a leverage argument—i.e., on the advantages of debt as a source of corporate financing. In the absence of other sources of financial advantage, leverage provides lower capital costs primarily through its effects on corporate tax payments. Although these are not trivial, the tax advantages that accrue to Japanese firms as a result of high debt-equity ratios reduce their costs of capital by only a few percentage points—probably less than 2—compared to American firms. The reasons are outlined below.

In order to isolate the effects on cost of capital stemming from tax shields on debt, assume that interest rates in the United States and Japan are the same—say 10 percent—but that corporate tax rates differ. For purposes of illustration, use the nominal tax rates in the two countries—48 percent for the United States, 40 percent for Japan.⁶ For leverage, assume a ratio of total debt to total capital equal to 0.67 for Japan and 0.17 for the the United States. * As a result of the tax shield created by leveraging, costs of capital would be lowered by:

$$\begin{aligned} \text{Japan} & \dots\dots\dots 0.67 (0.4) (0.1) = 0.0268 \\ \text{United States} & .017 (0.48) (0.1) = \underline{0.00816} \\ \text{Subtracting gives} & \dots\dots\dots 0.01864 \text{ or } 1.864\% \end{aligned}$$

That is, the tax shield created by greater leverage would give Japanese firms a cost of

⁶This is the nominal rate for retained income in Japan; distributed profits are taxed at 30 percent. While nominal rates suffice for illustration, they bear little resemblance to the taxes that corporations actually pay after deductions, credits, depreciation allowances, etc. The "effective" tax rates in the two countries in the late 1970's—total corporate taxes paid divided by total corporate profits—were about 37 percent in the United States, 29 percent in Japan. See H. Gourevitch, A. Wilson, and D. Culp, *Tax Rates in Major Industrial Countries: A Brief Comparison*, Congressional Research Service report No. 80-224 E, Dec. 15, 1980, p. 8.

*The 0.67 figure is used at several points in the summary of the Chase Financial Policy study—e.g., p. 2.7. It is essentially the median figure for Japanese semiconductor manufacturers. Medians for U.S. semiconductor firms in the years examined by Chase were 0.16 to 0.18 (p. 2.2).

capital advantage of about 1.9 percentage points compared to firms in the United States.

In fact, this example overstates the advantage because the median figure (0.67) for Japanese firms ignores the impact of absolute size, Hitachi and Matsushita—which have less than median leverage—are much larger than the others; Nippon Electric Co. (NEC), which has the highest debt-to-capital ratio—0.80—is considerably smaller. When the debt-to-capital values are weighted by total assets, the debt-to-(total) capital ratio for the Japanese companies is 0.52, a result that is considerably affected by Matsushita, which had negligible leverage. Using this figure for Japan, along with the leverage value that Chase suggests in their study as a desirable target value for American firms desiring to reduce their costs of capital—0.33—the comparison becomes:

$$\begin{aligned} \text{Japan} & \dots\dots\dots 0.52 (0.4) (0.1) = 0.208 \\ \text{United States} & .33 (0.48) (0.1) = \underline{0.01584} \\ \text{Subtracting gives} & \dots\dots\dots 0.00496 \text{ or } 0.496\% \end{aligned}$$

These two changes reduce the cost of capital advantage of the Japanese firms from 1.9 percentage points to only half a point. This second comparison is not necessarily either more or less meaningful than the first; the lesson is that tax advantages are quite sensitive to small changes in leverage. The computation is far less sensitive to the tax rate itself.

These examples show that, while the use of leverage does lower a firm's cost of capital, the effects are relatively small. A cost of capital lower by 2 percentage points might translate to manufacturing costs lower by 1 percentage point—not very significant. The difference that does result can be regarded as an implicit financial subsidy from the Japanese Government via the tax system. (The question of special tax provisions for certain industries is independent.)

Risk Absorption in Japan

As mentioned earlier, Japan's banking system absorbs risks normally assumed by shareholders in the United States—in particular, the risks of high leverage in Japanese electronics companies. The first question is whether, in

fact, the risks of bankruptcy, reorganization, and business failure are increased by the greater use of financial leverage in Japan. If so, the frequency of failures—especially during economic downturns—should be higher than in countries like the United States where, on the average, leverage is much lower. Indeed, bankruptcies in Japan have risen to rather high levels in times of general economic downturn. In 1977, for example, Japanese enterprises failed in record numbers.⁷ The rate of bankruptcy that year was four times greater than the comparable U.S. figure, and these failures involved corporate liabilities of over \$16 billion, more than five times the 1977 level in the United States. While 1977 remains the peak year in terms of both number of business failures and total liabilities, in every year since 1976 Japan has experienced more than 15,000 bankruptcies (excluding small businesses) with total liabilities exceeding 2 trillion yen (roughly \$10 billion).⁸ Although bankruptcies in elec-

tronics have been infrequent—in part because growth rates and cash flows have remained high, allowing firms to service their debt—risk is clearly present.

In the Japanese financial system, these risks tend to be shifted to the banking community. Banks assume quasi-equity positions by accepting debt in highly leveraged firms. If a company finds itself in financial difficulty, the banks are literally forced to take action aimed at reorganization. The alternative is to proceed with bankruptcy. When large corporations have faced trouble, the choice, not surprisingly, has often been restructuring—sometimes accompanied by infusions of even more funds. Typically the banks have forced a complete reassessment of corporate strategy; not infrequently the ailing firm's executives have been replaced by a bank-appointed managerial team.

Sometimes observers in the United States conclude that these interventions by Japanese banks serve to reduce risks to businesses, or risks to the banks, or both. To believe this implies believing that bankers are on the average wiser than managers of industrial corporations. In fact, these interventions do not lessen financial risks, but are *caused* by the much greater exposure of the banks. Such interventions are less common in the United States because American banks do not provide as great a fraction of corporate financing.

⁷G. R. Saxonhouse, "Industrial Restructuring in Japan," *Journal of Japanese Studies*, Vol. 5, 1978, p. 273. Elsewhere Saxonhouse states: "Debt-equity ratios which are four or five times the American level result in bankruptcy rates which are also four or five times the American level. Large Japanese firms do go bankrupt. In recent years Japan has had two close to \$1 billion in liabilities bankruptcies." See "Statement of Gary R. Saxonhouse Before the House Foreign Affairs Committee, Subcommittee on International Economic Policy and Trade," Oct. 1, 1980.

⁸Only firms with liabilities of more than 10 million yen are included. Figures for 1968 through 1980 can be found in "Japan 1981—An International Comparison," *Japan Report*, Joint Publications Research Service JPRS 1/10760, Aug. 24, 1982, p. 7, those for 1981 in "Corporate Failures in Japan Last Year Fell 1.5% to 17,610," *Wall Street Journal*, Jan. 15, 1982, p. 28.

Other Factors in Costs of Financing

Size and Diversification

Many of the leading international competitors in electronics are large, diversified companies (ch. 4). This is the case for American corporations like GE or IBM, European manufacturers like Philips or Siemens, and many Japanese electronics firms. But other U.S. entrants in world markets, notably the merchant semiconductor firms, remain much smaller.

These firms, have generally depended more heavily on one or a few product lines than their competitors in Japan. Size and diversification affect capital costs quite directly, with the advantages going to big companies with broad product lines. Such firms can absorb and spread risks more effectively.

Lenders look to a stable pattern of financial returns as one indicator of security for their

own repayment. Diversified companies exhibit more stability, hence lenders are willing to supply funds at lower rates of interest. Large diversified firms are also, on average, evaluated as better risks by bond rating companies like Moody's or Standard & Poor's. Texas Instruments taps a lower cost bond market than, say, Advanced Micro Devices; IBM lower than Digital Equipment Corp.; GE lower than Zenith. The conclusion is: *costs of capital will be higher for U.S. as opposed to foreign electronics companies when the American firms are significantly smaller and less diversified.*

There is a great deal of variation in the sizes of firms within the electronics industries of the United States, Japan, and the European countries. Nevertheless, in Japan and Europe it is primarily larger companies that are active on a world basis, more the exception than the rule for companies the size of Nixdorf (West Germany) or Oki Electric (Japan) to be strong international competitors. In the United States, the situations of companies like Mostek, Fairchild, or Intersil have changed dramatically as a result of their acquisitions by much larger concerns. Still, the United States remains unique in the number of relatively small electronics firms that seek to compete worldwide, including many of the new startups making semiconductor and computer products.

In Japan, the evidence suggests that the government and banking system—as in a number of other countries—overtly discriminate among borrowers on the basis of size.⁹ But even if foreign capital markets were identical in every respect to American markets, and operated with no more government intervention than in this country, the larger average size of the major foreign competitors—particularly in semiconductors—would give them at least a small relative advantage.

On the other hand, larger semiconductor and computer firms in the United States clearly have *not* reaped great benefits from their own ability to tap somewhat lower cost sources of external capital. Thus, one can question how

⁹R. E. Caves and M. Uekusa, *Industrial Organization in Japan* (Washington, D. C.: Brookings Institution, 1976), pp. 37-38.

important such differences might be internationally. Over the years, fast-growing and profitable small- and medium-sized firms have co-existed with the giants of the U.S. industry—indeed have often outstripped them; size and diversity did not appear to give RCA or GE much help in computers or semiconductors. In dynamic, technologically advancing industries, other competitive forces far outweigh small differences in interest rates on bonds or bank loans,

Savings Rates¹⁰

As mentioned earlier, international differences in savings rates could affect relative costs of capital. Within a closed economy, a high rate of savings creating an ample supply of investment funds will tend to depress interest rates. Given the international linkages among capital markets, this simple argument is not by itself sufficient to relate savings levels to interest rates, but may still have weight. For reasons that are poorly understood, the savings rate in Japan has been extraordinarily high for many years. Table 54 gives data on household savings for the 1976-79 period; the figures for all five countries have remained fairly constant over the past two decades. High savings rates have characterized both the corporate and household sectors in Japan, but it is personal savings that have been most surprising in view of interest rates that have been below prevail-

¹⁰For a general introduction to savings rates, see C. Elwell, *Investment and Saving: The Requisites for Economic Growth*, Congressional Research Service report No. 81-207 E, Nov. 15, 1981.

Table 54.—Household Savings Rates in Several Industrial Countries

	Average savings rate, 1976-79a
United States	5.80/o
Japan	21.1
West Germany	13.4
France	13.5
United Kingdom	8.3

^aPercentage of household disposable income saved.

SOURCE: K. Sate, "Why Have the Japanese Saved So Much? On Determinants of Japanese Household Saving," presented at Japan Economic Seminar, Washington, D. C., Jan 23, 1982, p 1

ing rates of inflation—as shown later (see table 64)—and have also been significantly lower for savings accounts than for alternative investments such as bonds.¹¹ Despite this, Japanese households carry the largest portion of their savings as cash or deposits; the contrast with behavior in the United States—illustrated in table 55—is striking. Householders in Japan keep a substantially lower portion of their assets in corporate stocks.

This extraordinarily high savings rate—half again as much as in France or West Germany, and nearly four times that in the United States (table 54)—when combined with closely controlled savings institutions, is often said to produce artificially low interest rates on loans to Japanese businesses. The argument is essentially on the supply side: low interest yet abundant sources of capital have allowed Japanese corporations to expand rapidly while maintaining low prices, especially in export markets. As one consequence of rapid growth, the companies would enjoy economies of scale, along with modern, highly productive manufacturing facilities. Past this point, low capital costs would be less of an advantage, but Japan's firms could by then compete comfortably on other grounds.

Numerous variations on this theme have been propounded, many stemming from the Japanese Government's well-known low inter-

¹¹See, for example, H. C. Wallich and M. I. Wallich, "Banking and Finance," *Asia New Giant*, H. Patrick and H. Rosovsky (eds.) [Washington, D.C.: Brookings Institution, 1976], pp. 260-261.

Table 55.—Distribution of Household Assets in the United States and Japan, 1978

	United States	Japan
Cash, plus demand and savings deposits	39.20/o	68.70/o
Bonds	9.6	8.1
Stocks, including mutual funds . .	23.5	10.0
Life insurance	5.6	12.6
Other ^a	22.1	0.6
	100.0 ^a /o	100.00/o

^aFor the United States includes money market and pension funds—the latter accounting for the major portion of this category, for Japan, consists mostly of company savings plans

SOURCE Adapted from E. Lincoln, "Financial Markets in Japan," Council Report No 47, United States-Japan Trade Council, Dec 19, 1980, p 9

est, high growth strategy in the earlier postwar years. Some observers go so far as to imply that no resource allocation problems exist in Japan because of a virtual glut in investment funds.¹² Often such assertions are linked with the target industry argument mentioned earlier. If true, this would mean that Japan's chosen industries enjoy low financial costs for reasons entirely apart from their high debt-equity ratios.

But capital markets should not be viewed from only one side. In this case, there are potential impacts on the demand side as well as the supply side. Growth affects both the demand for funds and the supply, Businessmen foresee abundant sales opportunities in expanding economies and invest to meet the new demand. This places heavy pressures on capital markets. On the supply side of these markets, individual consumers may experience rapid growth in real income but adjust their consumption habits more slowly—meanwhile saving their unspent income. Thus, a case can be made that Japan's high savings rate is a consequence rather than a cause of rapid economic growth—i.e., that income growth has outstripped consumption.

In fact, neither demand-side nor supply-side perspectives tell the whole story; both are needed. In Japan, inflation-adjusted interest rates on savings have recently been comparable to rates in the United States—table 56. This table compares rates of return available on long-term government bonds in both countries (a rather arbitrary choice) to the respective inflation rates, the difference being "real" rate of return. As the table shows, since 1978 investors in Japan have received higher real returns than those in the United States. This suggests *that artificially depressed interest rates have not recently been a source of abnormally low*

¹² Response of W. Rapp, *Technology Trade*, hearings, Committee on Science and Technology, Committee on Interstate and Foreign Commerce, and Subcommittee on International Trade, Investment and Monetary Policy of the Committee on Banking, Finance and Urban Affairs, House of Representatives, and House Task Force on industrial innovation, June 24, 25, 26, 1980, p. 421. Rapp stated, "The Japanese have basically solved that problem by generating too much capital, so that they are actually wasting it to a certain degree now, so it is overkill. They don't really have a capital allocation problem now,

Table 56.—inflation-Adjusted Rates of Return in the United States and Japan

	United States			Japan		
	Long-term government rate	Inflation rate ^a	Real rate of return	Government bond rate	Inflation rate ^a	Real rate of return
1975	8.20/o	9.20/o	-1.0%/0	9.20/o	11.9%/0	-2.70/o
1976	7.9	5.8	2.1	8.7	9.3	-0.6
1977	7.7	6.5	1.2	7.3	8.1	-0.8
1978	8.5	7.5	1.0	6.1	3.8	2.3
1979	9.3	11.3	-2.0	7.7	3.6	4.1
1980	11.4	13.5	-2.1	9.2	8.0	1.2
1981	13.7	10.4	3.3	8.7	4.9	3.8

^aBased on consumer Price indexes.

SOURCE Based on data from International *Financial Statistics*, International Monetary Fund, various Issues.

costs of capital for Japanese electronics firms, In other words, there is little evidence of any across-the-board supply-side stimulus that might stem from an ability by Japan's Government to persuade people to save even at relatively unattractive interest rates. As the table demonstrates, corporate (and recently government) demands for funds have driven up interest rates in Japan much as in other developed economies.

This does not dispense with the possibility that the Japanese Government intervenes in capital markets to subsidize target industries. Certain industries—or firms—could be favored by government repayment guarantees to lending banks, effectively transferring the risk of default from the commercial banking system to the public at large. Alternatively, the Bank of Japan could be encouraged to rediscount bank loans at favorable rates. Finally, through the postal savings system the government itself takes in about a third of all savings deposits.¹³ These funds could be channeled to favored industries at interest rates largely determined by government fiat,

It is quite true that in early post-World War II Japan, allocations of investment funds were more a function of administrative control than relative interest rates; favored industries had access to funds at subsidized rates of interest, while personal savers and small businesses bore the brunt of the costs. This point is taken up later, when the overall structure of the Japa-

nese financial system is described in more detail. Still, this practice seems largely to have disappeared; government capital allocations do not *now* seem to provide borrowers in Japan with a notable edge over U.S. competitors. Government financial institutions accounted for about 30 percent of all corporate loans in 1950, but as of the end of 1980 their share had fallen to 13 percent; during the 1970's, loans from government institutions accounted for only about 5 percent of total capital flowing into Japanese industry.¹⁴ The percentage is even lower in the electrical machinery sector, which includes electronics; here, government institutions accounted for only 8.2 percent of outstanding loans as of December 1980. Nonetheless, some observers continue to hold that the Japanese Government effectively socializes the risk of corporate borrowing.¹⁵

Costs of Capital for Electronics Firms in the United States and Japan: Summary

It does seem clear that Japanese electronics manufacturers can get external capital at somewhat lower rates than their counterparts in the United States. But at present, this capital cost advantage, in inflation-adjusted terms, appears

¹⁴E. Lincoln, "The Japanese Government's Role in Business Financing," *JEI Report*, Japan Economic Institute, Washington, D. C., Jan. 8, 1982, p. 12.

¹⁵E. Sakakibara, R. Feldman, and Y. Harada, *The Japanese Financial System in Comparative Perspective*, Joint Economic Committee, Mar. 12, 1982, p. 26. The authors reach no conclusions about the effects on interest rates or cost of capital, however.

¹³*The Japanese Financial System* (Tokyo: The Bank of Japan, 1978), p. 22.



Photo credit GCA Corp

Wafer processing equipment for making integrated circuits

to be small—certainly less than 5 percentage points. The sources of this advantage are multiple: government policies in Japan that have the effect of subsidizing interest rates for favored investments no doubt continue to account for a good deal of the margin. Except for the tax-shielding effects of their higher leverage, Japanese electronics companies do not have access to cheaper capital because of the preference for bank loans in their capital structures. While greater leverage transfers business risks to the banking system, it does not allow the Japanese to avoid risks.

A difference in financing costs of 2 or 3 percentage points is nontrivial but will not drastically alter the market postures of competing firms. For purposes of comparison, assume a sales-to-capital ratio of 2—within the typical range for much of the electronics industry—and a 3 percentage point difference in capital costs. Moreover, assume that this 3 percent-

age point margin applies for the total investment in a production facility—which is unlikely. Even then, the result would be a potential manufacturing cost difference of about 1½ percent, and might translate into a price difference of the same magnitude. Smaller capital cost differences would reduce this advantage commensurately.

Such a 2 or 3 percentage point advantage in capital costs represents an average over many firms in both Japan and the United States. The difference in *average* costs of capital in the two countries is smaller than the differences in capital costs among competing electronics firms *within* either country. Although table 51 does not accurately portray cost of capital differences between the two countries, it will illustrate this point if taken as representative of firm-to-firm differentials. The range in costs of capital for the eight U.S. semiconductor firms listed in the table is 7 percentage points, that for the six Japanese manufacturers nearly 10 percentage points. The interfirm differences—and the resulting competitive advantages or handicaps—are much larger than OTA's estimate of the average differential between the two countries.

Relative *availability* of capital for electronics firms in the United States and Japan has greater potential impact. Favored Japanese electronics firms seem to have little difficulty in acquiring funds for expansion and modernization. In contrast, some U.S. companies—particularly the smaller ones—believe themselves subject to capital constraints. That is, they may find themselves unable to raise as much capital as they would like at any reasonable cost.

Capital availability is a subject left to a later section, but note one major difference between electronics and other American industries that make this same complaint. Some domestic steel companies, for instance, have had difficulty attracting external funding because of their inability to convince prospective investors of the industry's potential for growth and future profits. While a few segments of electronics face similarly limited prospects, the financing problems faced by most U.S. entrants are more closely related to the large amounts of new

capital—particularly compared to existing net worth—required to maintain their share in a rapidly expanding worldwide market. In semiconductor manufacturing, rising capital intensity compounds the difficulty. These matters, concerned more with the dynamics of growth

than with absolute costs of capital, are taken up below. The next section extends the comparative treatment of financing to several other countries, while carrying forward the U. S.-Japan comparison,

Financial Structure: An International Comparison

Many countries are attempting to build competitive electronics industries because they believe them essential for a growing and healthy economy. Government assistance, often financial, has flowed to electronics companies: Great Britain provides explicit subsidies; France has combined subsidies with trade protection. A number of the rapidly developing countries are following suit, as outlined in chapter 10. Still, Japan remains the primary competitor in electronics, and its financial system is treated in much more detail than that of France or West Germany, the two other countries examined below. The focus on semiconductors continues because U.S. firms in this part of the industry have faced the most pronounced financing problems,

Funding rapid expansion is a challenge that semiconductor companies share with manufacturers of small computers and peripherals, software firms, and new entrants in other portions of the industry; Atari, the manufacturer of video games, has reputedly been the fastest growing technology-based company in history, while one firm making game cartridges saw its sales grow 1,000 percent (to \$50 million) during 1981.¹⁶ In order to remain competitive, firms in such markets must be able to finance growth at rates that are literally explosive,

United States

Sources of financing for American electronics companies vary depending largely on their size, extent of diversification, and maturity.

New corporate startups have been frequent during the industry's postwar history—not only in semiconductors and computers, but in many other product lines. Hewlett-Packard—a diversified manufacturer of test and laboratory equipment, calculators and computers, and a leader in integrated circuit (IC) technology through its captive operations—got its start just before the war in a garage in Palo Alto, Calif.¹⁷ In many respects typical of the firms that later gave this region the name Silicon Valley, the company's founders began by designing its first product themselves—an audio oscillator supplied to Walt Disney Studios for the production *Fantasia*.

Venture Capital

Businesses typically draw on far different sources of funds in their early stages of development than later, progressing through a fairly predictable sequence as they grow and mature. This progression, which illuminates some of the unique characteristics of U.S. capital markets, is rather different from that in other countries. For purposes of illustration, consider a startup firm with origins like those of Hewlett-Packard or the many semiconductor manufacturers that sprang up during the 1960's. Often these enterprises were formed by small groups of engineers and managers spinning off from a somewhat older company with the aid of funds from the venture capital market. The process is not unique to the semiconductor industry: Control Data Corp. was founded in 1958 by a group of ex-Univac employees. While startups had become rare by the mid-1970's,

¹⁶L. Wailer, "Home Video-Game Sales are Dazzling," *Electronics*, Jan, 27, 1982, p. 78.

¹⁷"At War," *Electronics*, Apr. 17, 1980, p. 203.

many new ventures in microelectronics, computer peripherals, and software have been established since 1980.¹⁸

Where rapid growth creates expectations of high returns, capitalization for new companies often comes from specialized financiers who provide equity funds to the venture capital market. Along with electronics, biotechnology is a current example. In such cases, ownership is typically shared among venture capital organizations and the founders of the firm. Stock options have been a common means of attracting talented individuals to startups, and have been used to build handsome compensation packages for key executives or technical specialists without cutting too deeply into cash flow,

Annual returns of 25 to 50 percent over a period of perhaps 5 years are typical goals of institutional venture capital organizations. In the past, wealthy individuals or families sometimes founded private corporations for seeking new and risky—but potentially highly profitable—investments. Today, corporate venture capital organizations are also prominent—subsidiaries of larger companies seeking to diversify. Corporate venture funding is more likely to go toward second- or third-round financing of young companies than to new startups, and investments tend to be larger than those of independent venture capital organizations. Sometimes eventual ownership is an objective; in other cases corporate venture capitalists are simply seeking capital appreciation. Occasionally the funding organization provides capital largely to gain proprietary technology. This has been the apparent goal of investments in U.S. electronics firms by a number of foreign companies. Both Siemens (West Germany) and Fujitsu (Japan) have invested in this way. Siemens owns 20 percent of Advanced Micro Devices, Fujitsu 26 percent of Amdahl, a leader in technology for large computers.

An alternative source of venture funding, the Small Business Investment Co. (SBIC), was cre-

ated by the Small Business Investment Act of 1958. Although most SBICs concentrate on neighborhood businesses, a few have national outlooks. Venture capital partnerships and funds have also blossomed in recent years; the U.S. venture capital industry now includes about 600 firms and should continue to expand as a consequence of new ERISA (Employee Retirement Income Security Act of 1974) rules allowing “prudent” participation of pension funds in venture activities.¹⁹ In rare circumstances funds can be raised through public stock offerings, but this avenue is more likely to be available later in development.

Venture capital markets are highly cyclical. One influence has been taxation of capital gains. In general, high taxes on capital gains discourage potential investors. Table 57 summarizes the results of a study prepared for the National Venture Capital Association, together with more recent data that bears on this point. The maximum tax on capital gains in the United States was reduced from 49 percent to less than 30 percent in 1978. Although total venture investments rose dramatically, such trends do not prove a cause-and-effect relationship. They do suggest that the tax revision was a powerful contributing factor in the upswing.

At the same time, a variety of other forces affect the ups and downs of venture funding. The cyclicity reflects the confidence of potential investors on the supply side and of potential entrepreneurs on the demand side concerning prospects for the economy and the propitiousness of risky new undertakings. The timing of startups depends on more than economic conditions. Venture organizations look carefully at the abilities of a new firm’s leaders; both capitalists and managers look for “technological windows” that offer unusual oppor-

¹⁸Numerous examples can be found in J. W. Verity, “StartuP Fever is Spreading,” and R. Emmett, “Venture Market Mysteries,” *Datamation*, September 1982, pp. 180 and 194.

estimate of the industry breakdown is as follows: private venture capital firms, 200 to 250; SBICs, 300 or more; corporate venture capital organizations, about 50. See J. A. Timmons and D. E. Gumpert, “Discard Many Old Rules About Getting Venture Capital,” *Harvard Business Review*, January-February 1982, p. 152.

Table 57.—Aggregate U.S. Venture Investment Activity (millions of dollars)

	New commitments	Higher round investments (prior commitments)	Totals
1977			
Amount	\$56	\$28	\$84
Number of investments	126	126	252
1978			
Amount	\$92	\$31	\$123
Number of investments	196	150	346
1979			
Amount	\$145	\$65	\$210
Number of investments	290	248	538
1980			
Amount	NA	NA	\$657
1981			
Amount	\$500	\$900	\$1,400

NA = not available.

^a1979 data annualized from first 6 months. Data taken from 55 respondents. To OTA's knowledge, no fully comparable data on venture investments for later years are available.

SOURCES **1977-79**—"Financial Issues in the Competitiveness of the U.S. Electronics Industry," report prepared for OTA by L. W. Bergman & Co. under contract No. 033-1550.0, p. 9, quoting from "Survey of Venture Capital Investment, 1977-1979," prepared for the National Venture Capital Association by D. J. Brophy and P. L. Schaefer of the University of Michigan, 1980—*Government-Industry Cooperation Can Enhance the Venture Capital Process*, GAO/AFMD-82-35 (Washington, D.C.: General Accounting Office, Aug 12, 1982), p. 3.1981—J. W. Dizard, "Do We Have Too Many Venture Capitalists?" *Fortune*, Oct. 4, 1982, p. 106.

tunities. Some of the upsurge in investments in table 57 is related to booming interest in applications of microprocessors; of the new venture capital deals nationally since 1979, perhaps half have been in electronics or closely related fields.²⁰ At the peak of the most recent cycle—i.e., mid-1981—many observers of venture capital markets concluded that entrepreneurs were having an easy time finding start-up funds; some claimed that the supply of venture capital considerably exceeded demand during 1981, and that poor risks were being financed.²¹ In more normal times, potential startups may face a long and arduous search for capital,

Table 57 will serve to illustrate another point: *venture capital makes only a small contribution to the overall funding needs of American industry.* Annual venture financing at something over \$1 billion, and a total pool of ven-

ture capital of perhaps \$5 billion to \$6 billion, pales alongside other sources of capital for U.S. business and industry: bank loans, \$230 billion; other short-term debt, \$250 billion; corporate bonds, \$490 billion; commercial mortgages, \$280 billion; equities, \$1.3 trillion.²²

Costs of Entry

Although a substantial fraction of new venture investments continue to flow into electronics, in some segments of the industry entry costs are becoming prohibitive. Among the exceptions are firms able to generate cash flows in other lines of business, NCR is an example: an established manufacturer of computers and other business equipment, the firm had made ICs exclusively for internal consumption. In 1981 NCR announced plans to produce semi-custom logic circuits and certain kinds of memory chips to be sold on the outside, becoming one of the few new entrants in the merchant market contemplating a fairly broad product line.²³ The reason is straightforward. Costs for establishing a new semiconductor

²⁰"Financial Issues in the Competitiveness of the U.S. Electronics Industry," report prepared for OTA by L. W. Bergman & Co. under contract No. 033-1550.0, p. 12; "Startup Fever is Spreading," *op. cit.*

²¹See, for example, A. Pollack, "Few Places for Venture Capital: Funds Outpace Investment Opportunities," *New York Times*, June 17, 1981, p. D1; J. Levine, "Once Again, It's A Buyer's Market," *Venture*, June 1982, p. 80.

²²"The Perilous Hunt for Financing," *op. cit.* The estimates are totals outstanding at the end of 1981.

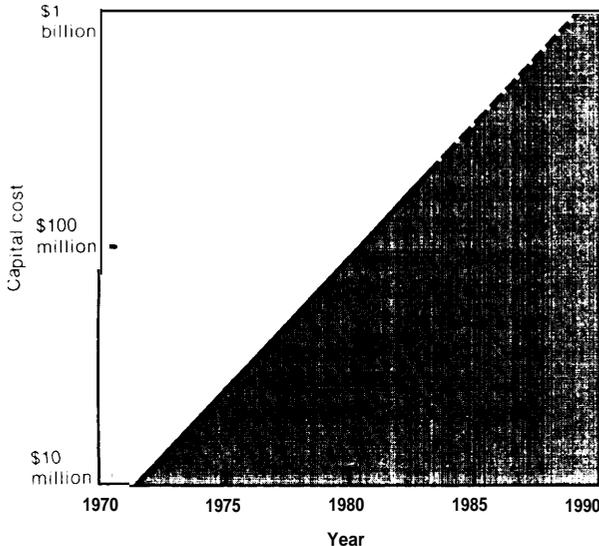
²³"A Surprise NCR Leap Into the Chip Market," *Business Week*, July 13, 1981, p. 22.

firm have risen by a factor of 10 over the past decade; as figure 50 indicates, the end is not in sight. The rapid increases in capital intensity shown in the figure stem largely from the more expensive production equipment required for current-generation ICs (ch. 3, especially table 2).

Rising entry costs are one reason why the 1980-83 group of semiconductor startups have picked narrow market niches rather than attempting to compete in a broad range of products. Examples include: custom chips, or in some cases just design services; specialized device families such as linear ICs or programmable logic arrays; and, in one case, gallium arsenide circuits. While entry via niche markets is the usual pattern in this and other industries, none of the semiconductor startups appear to be aiming at the mass-produced memory or microprocessor markets; the most recent new entrant to attempt this was Inmos, established in 1978 with the aid of \$90 million in direct investment by the British Government.²⁴

²⁴"UK Board to Cut Stake in Inmost" *Electronic News*, Mar. 29, 1982, p. 54. The National Enterprise Board, which has had considerable autonomy to fund British industry (ch. 10), provided 50 million pounds, with Inmos receiving an equal amount in loan guarantees and grants for specific projects.

Figure 50.— Increase in Capital Costs for High-Volume Integrated Circuit Production Line



SOURCE R. W. Broderson, *Signal Processing Using MOS VLSI Technology* (ed.) (New York: Academic Press, 1981), p. 206.

Entry barriers can be higher still in mainframe computers, where the new firms in recent years have entered with plug-compatible machines—Amdahl, Magnuson, in 1981 Trilogy. The one exception during the 1970's was Cray, established with venture funding to build specialized supercomputers. An added hurdle stems from the preference by many customers for leasing rather than purchasing large computers. Financing leases is a severe strain on smaller companies; lease cancellations were one of the immediate reasons that Intel, a conglomerate that had entered the plug-compatible mainframe business, declared bankruptcy in 1981.

Leasing has been a major part of IBM's strategy in mainframes; competing firms—none of which has assets near IBM's—face a major constraint in financing leases.²⁵ Not only are they limited by their smaller size in securing funds at rates comparable to IBM's cost of capital, but the risks of competing with IBM are large and well known—Intel's failure presumably adding to the concerns of potential lenders. Without a source of particular advantage such as Amdahl or Cray get from their reputations as technological leaders, cost and availability of capital will remain formidable barriers for entry into the mainframe computer market.

Entry costs are also daunting at the high performance end of the minicomputer industry, though firms such as Prime (1972) and Tandem (1974) did begin operations during the past decade. The microcomputer segment has still seemed attractive; the entry of IBM into the personal computer market at the end of 1981 has not seemed to dampen the enthusiasm of prospective entrepreneurs and venture capitalists.

Early Growth

In the startup stage, equity capital from venture or other sources goes to purchase or lease plant and equipment and cover the initial expenses of developing, manufacturing, and marketing the first products. Later, more familiar

²⁵J. T. Soma, *The Computer Industry* (Lexington, Mass.: Lexington Books, 1976), p. 41.

financial markets can be tapped, External financing is critical at this stage; the company may be growing rapidly, with production outstripping sales as inventories build and distribution channels are filled. New firms often operate below their break-even points for a number of years, and cash flow problems are common,

Once sales have begun, local banks will normally provide short-term loans up to about 80 percent of net receivables, this amount being rolled over—i.e., the loans rewritten at prevailing interest rates—every 3 months or so. Longer term financing may come from incremental venture capital commitments; many venture organizations prefer to participate in second- or third-round financing because they can better evaluate a company's prospects once it has products to show. While at this stage limited public offerings may also be possible, stock sales to the general public have been less common in electronics than in other industries. Many electronics manufacturers have been able to finance quite rapid growth through retained earnings and employee stock option and purchase plans. Indeed, the managers of electronics companies started by individual entrepreneurs or small groups have often shunned external equity markets to avoid stock dilution and the loss of close control.

When sales reach annual levels in the vicinity of \$10 million, credit lines typically become more regularized, Revolving credit and term loans provide short-term financing. In addition, banks will generally extend lease credit for capital equipment—particularly helpful in electronics because it reduces the pressure to raise funds for purchasing equipment at a time when long-term investment requirements are expanding rapidly. Because capital equipment can quickly become obsolete, staying at the forefront of the technology can strain resources. On the other hand, for firms with adequate cash flows, rapid obsolescence means short writeoff cycles and tax savings from depreciation.

In any case, firms with growth patterns that take them beyond the \$10 million level find capital more abundant and less costly. At this

point, electronics companies exhibit financing patterns that depend on the preferences of owners and managers, as well as opportunities in relevant capital markets. Some firms offer new equity shares to the public; others issue shares but limit purchases to their own executives or employees. Some sell bonds, often in addition to equity, to add leverage to the capital structure. But while financing patterns differ, they share a characteristic common to most of U.S. industry: American electronics firms typically attempt to finance expansion internally, even when this delays dividends indefinitely. Only if self-generated sources prove inadequate do companies enter external markets.

Internal and External Sources of Funds

Table 58 illustrates the extent to which American semiconductor firms rely on internal funds—i.e., depreciation and retained earnings. When the companies listed in table 58 have resorted to external financing, this has ranged from virtually all capital stock (Intel) to substantial amounts of debt (National).

Although both new and established firms in the U.S. electronics industry will no doubt wish to continue relying on internal funds, a number of factors converging during the early 1980's foretell financial dilemmas for some companies. Among those common at least to manufacturers of semiconductors are:

1. *Growth in unit sales* over the coming years may exceed even the rapid rates of the previous decade,
2. Revenue *growth* will continue to trail growth in unit sales as manufacturing costs and sales prices decline. Historically, semiconductor prices are driven rapidly downward as costs fall because of learning curve phenomena. The sharp drops in memory chip prices during 1981—when 16K RAM (random access memory) prices fell from \$4 each to about \$1—are symptomatic.
3. *Capital intensity* will continue to rise because new production equipment—e.g., for fine-line lithography—is much more expensive than in the past.

Table 58.—internally Generated Funds as a Percent of Total Capital From All Sources

Year	Texas Instruments	National Semiconductor	Intel	Advanced Micro Devices
1974	890/o	760/o	890/o	93%
1976	79	82	79	96
1978	87	97	87	67
1980	65	60	46	71

^aFiscal year

SOURCES 1974-78—"Financial Issues in the Competitiveness of the U S Electronics Industry," report prepared for OTA by L W Bergman & Co under contract No 033.05500, p 31 1980—Annual reports

4. **Engineering and design costs** are also escalating, due to the increasing complexity of ICs.
5. **Global competition**, particularly from the Japanese, is becoming more intense, and will be based on low prices to an even greater extent than in the past. Although forward pricing in anticipation of learning economies has been characteristic even of competition among domestic firms, pressures from the rapidly expanding Japanese industry may cut still further into sales revenues.
6. Competition is also forcing companies to pay more attention to quality and reliability, requiring *costly test equipment*. As IC designs increase in complexity, testing procedures become more time-consuming and expensive.

Figure 51, comparing capital spending rates in the United States and Japan over the past few years, illustrates the rise in capital intensity. Capital spending in both countries fell sharply in 1975 when the market for semiconductors slumped; since that time, the U.S. trend has been steadily upward. Japanese spending rates have been higher because they have been adding capacity faster.

While capital spending in the United States averaged around 10 percent of sales during the 1970's, rates in the last 3 years have been significantly greater (fig. 51). Continued increase will be difficult for many merchant firms without substantial outside funding. Capital needs of U.S. semiconductor manufacturers during the current decade will probably be in the range of \$30 billion, with some

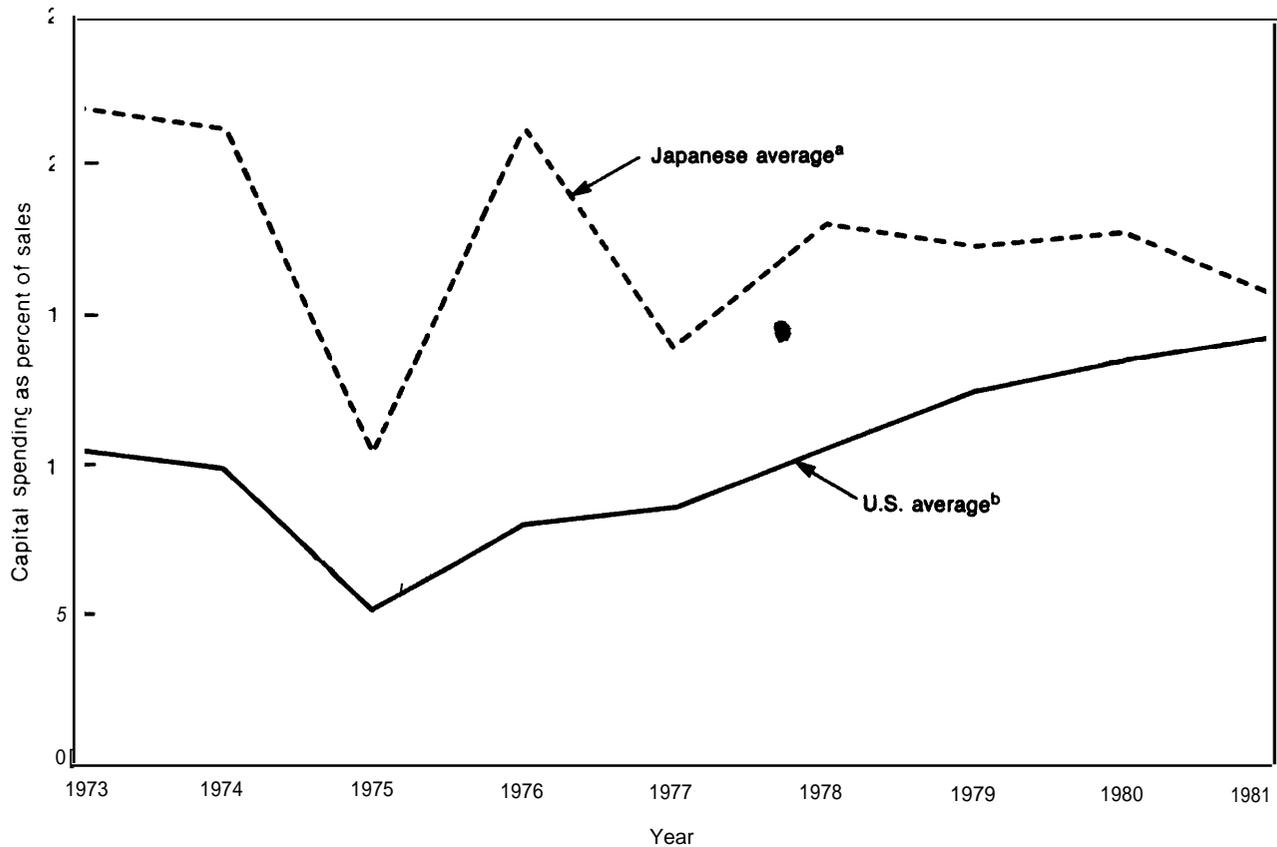
industry sources expecting considerably higher figures. Such estimates compare with capital expenditures totaling \$4.5 billion during the 1970's.²⁶

The changing character of semiconductor production and marketing is not unique. Smaller American manufacturers of computers, as well as peripherals, are confronting more intense foreign competition at a time when developing technologies are placing severe demands on their financing capabilities. New firms are entering markets for peripherals such as terminals and disk drives designed to be compatible with the products of established companies, Microcomputer applications of all sorts are on the rise. Computer software is one of the most rapidly growing portions of the industry. New entrants have often depended on venture capital for their original financing, and—again like semiconductor manufacturers—followed growth patterns relying on internally generated funds supplemented with limited amounts of debt.

Parallels exist even in consumer electronics. A good deal of the production of established products—radios, televisions, audio equipment—has moved abroad, taken by Far Eastern

²⁶"Hungry for Capital to Sustain the Boom," *Business Week*, June 1, 1981, p. 74. J. F. Bucy of Texas Instruments has estimated spending at \$25 billion to \$35 billion for the decade of the 1980's, while G. Moore of Intel places the figure much higher, in the range of \$65 billion. An estimate of \$30 billion results if sales are projected through 1990 based on the trend since 1975 (see 4), with capital spending assumed to remain at 13.7 percent of sales, the average over the past 3 years. Spending rates may rise—some predictions point to 15 percent of sales in coming years (see E. Williams, "Electronic Components," *Financial Times*, Mar. 5, 1982, sec. III, p. D)—but the total is much more sensitive to the sales projection than to the capital spending rate.

Figure 51.— Rates of Capital Spending by U.S. and Japanese Semiconductor Firms



^aIntegrated circuits only, 1973-1979, weighted of 12 manufacturers 1973-1979, 11 manufacturers 1980, 1981

^b1973-1980: Weighted averages for 11 U.S. merchant semiconductor manufacturers; 1981 estimated

SOURCES: United States— 1973, 1977, Bureau of Census; 1978-1981, Department of Commerce and Semiconductor Industry Association Japan —1973, 1979, *Japan fact Book '80* (Tokyo Dempa Publications, 1980), p. 203; 1980, 1981, *Japan Economic Journal*.

competitors or transferred offshore by U.S. companies. But the broader market for consumer electronics remains dynamic, as the example of video games showed. Along with video cassette and disk players, as well as home computers, these are precursors of an array of electronics-based innovations for personal and home use to be introduced over the next two decades. Many of these products will be high-technology items made possible by advances elsewhere in the industry. Some may come from small companies organized by entrepreneurs with strong technical backgrounds, as has happened with semiconductors, microcomputers, and software. Unquestionably, fierce competition from abroad will continue

in consumer products; financing could become a problem here too if small firms need to support rapid expansion.

Financing Startups and Growth in the Coming Decade

But why should future financing be troublesome for an industry which—by all indications—can expect expanding markets overseas as well as at home? Not all observers believe the problems will be that great; those who do generally point to a pair of related concerns:

1. It may not be possible to finance growth from internal sources in the proportions common in earlier years, thus requiring

greater dependence on external sources of capital.

2. Costs of external funds will be high, and may place U.S. firms at a disadvantage compared to competitors in Japan. The profit levels required may be difficult for American firms to reach.

The first point deals with the continuing ability of electronics companies to fund growth internally. To expand sales, manufacturers must either purchase assets that are more productive or use existing assets more effectively. To supplement assets, funds must come from one or more of the following sources: moneys accumulated through corporate operations (retained earnings plus depreciation); capital generated by the sale of additional stock; or borrowings of one type or another.

As discussed previously, borrowing without parallel increases in equity alters a firm's leverage. This, in turn, tends to increase the variability of returns to equity, increasing the risks to owners. In countries like the United States, where capital markets are relatively competitive, managements choosing higher leverage eventually confront two problems: 1) common stockholders become increasingly sensitive to their risk positions, and make adjustments that tend to depress stock prices; and 2) lenders also may object, ultimately refusing to supply additional debt. As capital intensity increases, financial managers face an intricate set of decisions,

The important relationships can be expressed as follows:

$$\frac{\text{Net profit}}{\text{Value of equity}} = \frac{\text{Value of sales}}{\text{Total value of assets}} \times \frac{\text{Total value of assets}}{\text{Value of equity}} \times \frac{\text{Net profit}}{\text{Value of sales}}$$

This expression is simply an identity. The first term on the right-hand side, asset turnover, is a broad measure of asset productivity. Defined as the ratio of sales to total assets, it indicates the efficiency with which a company utilizes its assets to generate revenues, and depends on such factors as the firm's capital intensity and the degree of competition characterizing

its markets. The second term—the ratio of assets to equity—is one way of measuring a firm's leverage, an alternative to debt-equity ratio. Profitability, the third, depends on many factors: product mix, competition, and labor productivity, to mention just a few,

Industry analysts tend to focus on the asset turnover ratio, which may fall as a consequence of expensive capital equipment (this should, however, improve productivity). Thus to preserve existing returns to equity, firms will either have to adopt higher leverage ratios or somehow improve profits on sales. Given the constraints likely to be exercised by the U.S. financial community, there are clear boundaries to the first option—i.e., to increasing the relative proportions of debt in a firm's capitalization. The second possibility—greater profitability—will be equally problematic if international and domestic competition continues to be stiff.

There is a second difficulty. In the identity above, note that if each term were to be held constant, growth would have to involve a balanced expansion of debt and equity. But the left-hand side of the equation dictates that, if a given increase in equity is to be financed internally—i.e., through retained earnings—there must be a proportionate increase in aftertax returns to equity (profits). (This assumes that electronics companies use aftertax earnings to fund growth instead of paying dividends, a policy followed by most of the rapidly growing companies during the 1970's.) Thus, growth must be accompanied by an increase in profits.

There is no requirement that new capital be restricted to funds generated internally. Firms could tap markets for both equity and additional debt. Managements, however, often object to stock offerings on the grounds that new issues are "expensive." Aside from the costs of floating the offering, before the current boom executives commonly cited what they perceived as low price-earnings (P-E) ratios in security markets. From the perspective of management, selling new stock under such conditions would have provided too little capital compared to their expectations of future growth, earnings, and presumably dividend

payments. P-E ratios of 2 or 3 for electronics stocks were cited as indications of “unrealistic” rate of return requirements—as implying that the market was demanding returns in the range of 33 to 50 percent. New equity issues, in this view, should be delayed until the market returned to more normal conditions—i.e., until stock prices and P-E ratios rise.

Whether or not this makes sense depends in part on how stockholders are perceived. To those who believe that equity holders are, in fact, *owners* of the corporation—and if existing stockholders have first rights in the purchase of new issues—then stock prices may appear too low to management but the firm’s “loss” is exactly offset by the “gains” of these stockholders. That is, existing owners would be able to buy new stock “cheaply.” The existing owners would be unaffected by variations in the issue price based on market conditions. On the other hand, equity may be viewed as effectively another form of subordinated debt—in reality separated from any control. In this case, managers would perceive equity as “borrowing” and its costs would be evaluated like any other debt in cost of capital calculations. Statements on the high cost of equity by managements of electronics firms often seem to point toward this second belief.²⁷

Then to the second point above: Will external funding be available at a cost manufacturers are willing and able—in the face of competitive pressures—to pay? At the moment, the availability of funding does not appear to be a limiting factor, but this could change as firms increase their leverage. Lending institutions typically establish standards on levels of debt considered prudent—guidelines that depend on liquidity and the variability of cash flows to the borrowing firm. Effective limits on debt, therefore, differ from company to company. Even if some companies can borrow what they need, the total volume of funds required by the U.S. electronics industry seems so high that others will almost certainly need new equity.

²⁷For similar arguments applied to the Japanese case, see Wallich and Wallich, *op. cit.*, pp. 268-269.

While equity from venture capital sources has been more freely available since the 1978 revision of capital gains tax rates, most of the firms needing capital will be well beyond this stage. Nor is it likely that such sources could provide enough money; the venture capital market is far too small. Still, there remain portions of the electronics industry where initial capital requirements are less than in semiconductor manufacturing—e.g., computer software, specialized industrial equipment—and where startups should find capital relatively abundant. Considering the effective reductions in corporate income taxes resulting from the Economic Recovery Tax Act of 1981, the total venture capital pool should continue to expand,

Even so, many observers predict that the cost of funds will be too high. From this perspective, investments may simply not promise adequate rewards; American companies in parts of the industry that face mounting competition from abroad may have difficulty in attracting funds from wary lenders with numerous alternatives, some offering better prospects for safety and high returns. Finally, some commentators believe that the total supply of investment capital in the United States is smaller than it could or should be because of a variety of disincentives affecting savings and investment built into the American tax system.²⁸ While the capital market will certainly supply funds in an amount equal to total demand at some set of interest rates, such observers believe that supply constraints artificially force these rates to levels too high compared to other countries,

Several of these matters are at the heart of economic policy debates still before Congress; the capital formation question, in particular, has been widely discussed for years, and has not been resolved by the tax policy changes instituted in 1981.²⁹ The issues are often complex and technical. As a consequence, the discussion below concentrates on matters that are particularly relevant to electronics.

²⁸For a typical commentary, see A. Sloan and C. Miles, “Show-down at Capital Gap,” *Forbes*, Jan. 7, 1980, p. 38.

²⁹See, for example, *Capital Formation*, hearings, Joint Economic Committee, Congress of the United States, June 9, 1976.

Capital Supplies and Financing Costs for the U.S. Electronics Industry

As mentioned previously, American electronics firms—with some prominent exceptions—tend to be smaller than their major international competitors. And, in part because their lack of diversification results in sharper swings in cash flow, small companies confront higher financing costs than large integrated manufacturers. Therefore, on the basis of company size alone, U.S. electronics producers are likely to face higher costs of capital than many of their competitors in Western Europe or Japan.

The semiconductor industry again provides a ready example. Table 59 lists total assets for a sample of U.S. and Japanese companies. While Japan's semiconductor manufacturers

are substantially larger than the typical American merchant suppliers, several of the U.S. firms already have been acquired by much bigger companies. Intersil may look puny compared to Hitachi or NEC, but this is hardly true of its new owner, GE. It is quite possible that further rationalizations of this type will continue, perhaps in part to assure continued funding for expansion, although many of the currently attractive candidates for purchase have now been acquired. Finally, as table 59 also notes, the two largest captive manufacturers in the United States, IBM and Western Electric, have assets much larger than the Japanese producers.

For U.S. companies that are not affiliated with larger firms, the question of differential funding costs remains. Based on the usual assumptions concerning prudent amounts of leverage as discussed earlier, the difference in debt financing costs between a firm the size of Intel (table 59) and companies like Motorola or Texas Instruments probably averages about 1.2 percentage points (in fact, as table 51 illustrates, the firm-to-firm differences at any point in time clearly depend on many factors beyond size). All else equal, Japanese firms making semiconductors would probably have about the same advantage as a result of their size and diversity. But, because debt accounts for only a fraction of a company's capitalization, the impact of this difference in interest rates is smaller, and other forces are likely to weigh heavier in the competitive balance. After all, the American firms included in table 59 were formed, grew, and flourished even though their capital costs were greater than such competitors as RCA, GE, and GTE, all of whom entered the semiconductor market in its early years.

The related question—whether interest rates in the United States have been driven to excessive levels by supply constraints—is too involved to cover in any detail. It is true, for example, that interest rates to corporate borrowers are lower in Japan for equivalent proportions of debt (to the extent that equivalence can be ascertain. But such comparisons, based on different currencies, can easily mis-

Table 59.—Assets of U.S. and Japanese Semiconductor Manufacturers

	Total assets ^a (millions of dollars)	
	1979	1980
U.S. merchant firms		
Advanced Micro Devices	\$109	\$165
American Microsystems	80	81 ^a
Intel	500	767
Intersil	83	98 ^b
Mosstek	161	— ^c
Motorola	1,904	2,112
National Semiconductor	385	561
Texas Instruments	1,908	2,414
U.S. captive producers		
IBM	\$24,530	\$26,703
Western Electric ^d	7,126	8,048
Japanese companies		
Fujitsu	\$2,030	\$2,380
Hitachi	6,790	7,450
Matsushita Electric	5,190	5,640
Mitsubishi Electric	4,490	4,910
Nippon Electric Co (NEC)	3,110	3,560
Toshiba	6,180	6,450

^aAcquired in early 1982 by Gould, which had 1980 assets of \$1.6 billion. Assets of September 1980; in early 1981 Intersil was purchased by General Electric. GE's 1980 assets were \$185 billion.

^bAcquired in 1980 by United Technologies. 1980 assets \$73 billion.

^cAssets for Western Electric only does not include assets of AT&T Bell operating companies or other AT&T subsidiaries.

^dAsset figures do not include affiliates. Rates converted from yen to dollars based on exchange rates from Economic Report of the President (Washington D.C. February 1982) p. 345. 1979 218 yen per dollar. 1980 226 yen per dollar.

SOURCES: U.S. firms—Annual reports; Japanese firms—*Japan Company Handbook* (Tokyo: Toyo Keizai Shinposha/The Oriental Economist, 1979, 1981).

lead. In part, they reflect differing inflationary expectations as mirrored in interest rates. Adjustments for inflationary expectations are problematical; to some extent, it might be possible to make such adjustments based on patterns of variation in the exchange rate. But a variety of factors other than inflationary expectations affect foreign exchange markets, especially in the short run, and the gyrations of the yen against the dollar in recent years have generated a wholly independent source of controversy.³⁰

The inflationary trends reflected in high U.S. interest rates can themselves deter new investment, in electronics and in other sectors of the economy. Inflation adds to uncertainty in the cash flows that can be anticipated from investments; these mount as investment horizons recede. *High rates of price inflation tend to discourage longer term commitments; instead, they favor investments with relatively quick payoffs.* American managers—in electronics as in other industries—have been charged with ignoring long-term growth opportunities while concentrating on the short run. Part of this hesitancy to commit resources is tied to uncertainties created by price inflation and the attendant impact on interest rates. That is, differences in short-term compared to long-term managerial behavior between American and Japanese corporations may not be caused by differences in capital availability, or by differences in real interest rates, so much as by uncertainties associated with high and *variable* rates of interest and inflation.

The United States has not had a great deal of success in controlling inflation over the past few years; while current economic policies may help to keep down the inflation rate, adjustments in expectations often lag well behind. Can the electronics industry expect to benefit more directly from the changes in U.S. tax law adopted in 1981? After all, many of these

³⁰See, for example, P. Hartland-Thunberg, "Value of Yen Fuels [J. S.-Japan Gap: Exchange Rate, Not Quality, Makes Imports a Better Buy," *Los Angeles Times*, Apr. 29, 1982. Spokesmen for American business often blame competitive problems on an undervalued making Japanese imports cheap in the U.S. market.

changes—cuts in personal income taxes as well as effective reductions in corporate taxes—were directed at enlarging the supply of funds for investment. Unfortunately, increasing capital supplies—which all else equal will decrease the costs of investment—tends to be more easily said than done. For instance, tax changes that affect both supply and demand for funds may leave interest rates unchanged. Under this circumstance, neither the availability nor the cost of funds for American electronics firms would change.

In part because of these complicating factors, it is not yet clear what the net effects of the Economic Recovery Tax Act of 1981 on aggregate capital formation will be, much less the differential impacts on various sectors of the economy. Thus far, there is scant evidence of broad positive effects on capital investment in industry; many observers are skeptical that the revisions to U.S. tax law will have much effect on levels of personal savings, which they feel are central to freeing up new investment for industry.³² Internationally, even before the more rapid depreciation schedules and other reductions in corporate taxes enacted in 1981, the United States had in place tax policies that, according to at least some analyses, favored capital investment more strongly than taxation in Japan and most of the European nations.³³

³¹Over the postwar period, investment levels as a fraction of the country's gross national product have fluctuated markedly from year to year, but with no evidence of any long-term trend either up or down. See J. J. Enzler, W. E. Conrad, and L. Johnson, "Public Policy and Capital Formation," *Federal Reserve Bulletin*, October 1981, p. 749. For an excellent summary of international differences in capital formation, see V. C. Price, "Capital Formation and Investment Policy," *Western Economies in Transition: Structural Change and Adjustment Policies in Industrial Countries*, I. Leveson and J. W. Wheeler (eds.) (Boulder, Colo.: Westview Press, 1979), p. 185.

³²K. W. Arensen, "The Low U. S. Rate of Savings," *New York Times*, Dec. 22, 1981, p. 11.

³³G. F. Kopits, "Tax Provisions to Boost Capital Formation Vary Widely in Industrial Nations," *Tax Notes*, Nov. 17, 1980, p. 955. The effects of international differences in taxation on competitiveness are extraordinarily complicated. The same difficulties that apply to other international comparisons are at work, compounded by the complexities of the tax codes in each country. Effective rates of taxation can be compared in a number of different ways, with results that depend on factors such as projected inflation rates. Even when the tax differences themselves are carefully analyzed, the problem of relating the

At the same time, a number of nations use financial subsidies other than tax incentives more actively than the United States to support certain of their industries.³⁴

Regardless of effects on overall supplies of capital, the accelerated depreciation schedules implemented by the 1981 Tax Act seem likely to place electronics firms at a disadvantage relative to other industries with which electronics competes for funds. More rapid depreciation lowers tax obligations and increases cash flows from new investments. Faster depreciation raises profits for projects that were formerly marginal or unattractive; the result should be to increase the overall demand for investment funds and the overall rate of investment in industry. For most industries depreciation is more rapid under the new law—but not necessarily for electronics.

The 1981 Tax Act permits equipment such as that used in production or R&D to be depreciated over either a 3- or a 5-year period. Formerly, production equipment was depreciated at rates at least nominally related to actual ob-

effects of depreciation, \ to economic performance remains. See, for example, *Tax Rates in Major Industrial Countries: A Brief Comparison*, 01, cit.

³⁴J. Mutti, *Taxes, Subsidies and Competitiveness Internationally* (Washington, D.C.: NPA Committee on Changing International Realities, January 1982).

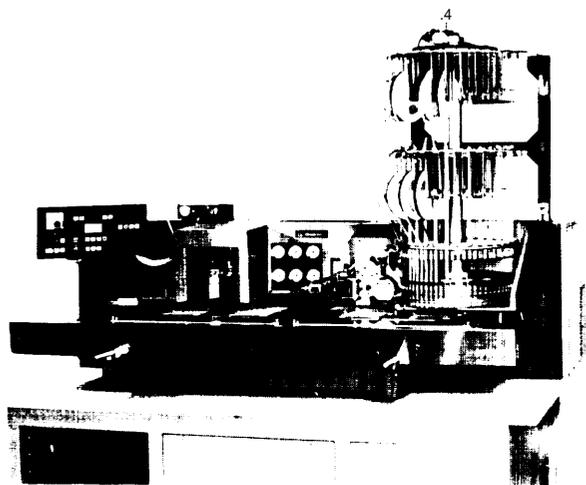


Photo credit Universal Instruments

Automated machinery for electronics assembly

solescence. All equipment used for R&D can now be written off over 3 years; so can any equipment that could, under the old law, be depreciated in 4 years or less. All *other* equipment is now eligible for a 5-year writeoff.³⁵

Although electronics firms probably purchase little equipment with useful lives less than 3 years, this is nonetheless now the minimum depreciation period. To the extent that a company was formerly able to write off some of its equipment more quickly, it may suffer a reduction in cash flow. While this should be no more than a minor factor, the new depreciation procedures will place some electronics manufacturers—indeed, firms in any industry where technological change results in rapid obsolescence—at a disadvantage with respect to industries that reap *greater* benefits from the new depreciation schedules. The latter tend to be industries where technological change is slower, and equipment has a long useful life. Steel and other heavy industries are examples.³⁶

Focusing on levels of domestic savings can also lead to underestimates of impacts flowing from international financial markets. Nations need no longer rely on domestic savings for investment; international capital movements are large and continuing to grow. For the United States, these long-term capital flows, both portfolio and direct investment, have been negative for many years—i.e., the flow of funds out of the United States has exceeded the inward flow.³⁷ This implies that rates of return are

³⁵Economic Recovery Tax Act of 1981, title II, subtitle A, sec. 201. Also see P. Oosterhuis, "High Technology Industry and Tax Policy in the 1980s," *National Journal*, Jan. 1, 1983, p. 46.

³⁶The only analyses of differential impacts across industries that have been published are on a highly aggregated basis; thus it is not clear how electronics—much less particular portions of the industry—will fare. The "machinery and instruments" category, within which the electronics industry falls, is one of the least favored sectors under the new depreciation methods. See *Economic Report of the President* (Washington, D.C., February 1982), pp. 122-125, particularly table 5-7; also J. G. Gravelle, "Effects of the Accelerated Cost Recovery System by Asset Type," Congressional Research Service, Aug. 31, 1981.

³⁷Although direct investment of U.S. funds overseas is still running at two to three times the level of foreign investment in the United States, foreign holdings of U.S. securities roughly balance American holdings of foreign securities. See *Statistical Abstract of the United States, 1982-83*, 103rd ed. (Washington, D.C.: Department of Commerce, December 1982), p. 823.

higher overseas than at home, Therefore generating more savings in the United States will not necessarily increase the rate of domestic capital formation; funds may flow abroad instead. At the same time, were the cause of high interest rates in the United States simply a shortage of funds for capital investment, money should quickly flow here from abroad. International capital markets operate quite efficiently under such circumstances.

Japan

To what extent have Japanese electronics firms been aided by the unique structure of the country's capital markets, a factor that has been claimed to give Japan's corporations advantages in international competition?

Postwar Trends in the Japanese Financial System

Japan's financial system has changed more than most over the past 35 years, and the country's markets and financial institutions are now far removed from their grossly underdeveloped state in the early postwar period. The transformation of the Japanese financial system has paralleled, first, the reconstruction of Japan's economy, and, following that, the country's dramatic industrial expansion. The yen has become a major international currency, while Tokyo—only partly by governmental design—is emerging as a world banking center.

Given the speed with which the Japanese financial system has evolved, it is easy to be misled by images from the past. Yet the future, even more than the present, should be the real concern; effects on international competitiveness are functions of the dynamics of change in financial markets in the United States, Japan, and elsewhere. Insight into competitive trends depends on these dynamics.

Because systemic changes in Japan have been evolutionary rather than revolutionary, elements of validity often remain in descriptions of financial institutions that are otherwise outdated. For example, some discussions imply that government, the Bank of Japan, the

commercial banking system, and various industrial sectors are all hierarchically linked, with control over resource allocation vested in the Ministry of Finance. Although hardly the case today, this is probably a fair—if simplistic—representation of the situation two or three decades ago. And even now, at the level of individual investment decisions, the Japanese system responds much more directly to the wishes of government than does that in the United States. But if government guidance still exists, it is a far weaker force now than 20 years ago, and the investment climate in Japan much more fluid.

Now to more concrete questions: Why do Japanese corporations utilize much greater proportions of bank debt in their financial structures than firms in the United States or Western Europe? (Leverage in European electronics firms tends to be greater than for American companies but less than that of Japanese.) The answer lies partly in the historical development of industrial groupings in Japan, most of which contain one or more banks.³⁸ Japanese manufacturing companies for many years have depended much more heavily on close working relationships with banks—even to the extent of participation by banks in management decisions—than have firms in the United States or Europe (West Germany is a partial exception, as discussed below). In other parts of the world, banks generally enter the picture only if reorganization follows bankruptcy, whereas in

³⁸The *se* groups called *zai* (*M tsu*) here World 11, function something like holding companies. For general background, see R.E. Caves and M. Uekusa, *Industrial Organization in Japan*, op. cit., ch. 4; also, *Industrial Groupings in Japan*, revised ed. 1980-81 (Tokyo: Dodwell Marketing Consultants, July 1980).

As an illustration, consider the Hitachi group. It consists of nearly 500 firms; as of 1977, Hitachi, Ltd. held majority shares in 40, and minority shares—typically in the 20 to 50 percent range—in the remainder [J. Gresser, *High Technology and Japanese Industrial Policy: A Strategy for U.S. Policymakers*, Subcommittee on Trade, Committee on Ways and Means, House of Representatives, Oct. 1, 1980, p. 2]. While many of the affiliates make electrical and electronics products—and Hitachi, Ltd. is the largest electrical and electronics firm in Japan—others produce nonelectrical machinery, transportation equipment, chemicals, and primary metals. Members of the group are linked with the Dai-Ichi Kangyo Bank, the Fuji Bank, and the Sanwa Bank, as well as the Industrial Bank of Japan (*Industrial Groupings in Japan*, pp. 120-121).

Japan—even with the weakening of the industrial groups following the postwar disbanding of the *zaibatsu*—banks have continued to influence managerial direction for firms that are financially healthy as well as those in trouble. This close relationship within the industrial group is one reason Japanese banks are willing to absorb risks more like those of shareholders. Lead banks, it is said, frequently subordinate their credits voluntarily. That is, the banks act much like holders of equity, and defer to others lower in the hierarchy of claims on assets when economic conditions dictate. What appears to Americans an oppressive debt load, may not be so from the perspective of a borrower in Japan.

The close relationship between banks and electronics companies in Japan is only part of the story. Following World War II, Japan's capital markets were undeveloped, with viable public markets for neither corporate debt nor equity. Financial intermediation was carried out almost entirely through the banking system. Of necessity, industrial expansion had to be financed by channeling funds through commercial banks.³⁹ Moreover, it was not an accident that alternative financing methods did not develop more rapidly as Japan progressed economically. The government could conveniently guide the economy through the commercial banking system. Government decisions to foster economic growth by extending credit to industry at the expense of consumer credit and infrastructural development were implemented in this way. Today, the extent of government influence over the lending decisions of major commercial banks in Japan remains considerably greater than that exercised by Western governments, France excepted (while West German banks have a good deal of leverage over corporate managements, the government influence on the banking community is much less than in France, as discussed later in the chapter). The lack of alternative sources of financing for Japanese companies enhanced the government's ability to direct economic growth; "window guidance" and a variety of

other industrial policy tools would have been weaker instruments if corporations had been able to look elsewhere for capital.

Reliance on External Funding

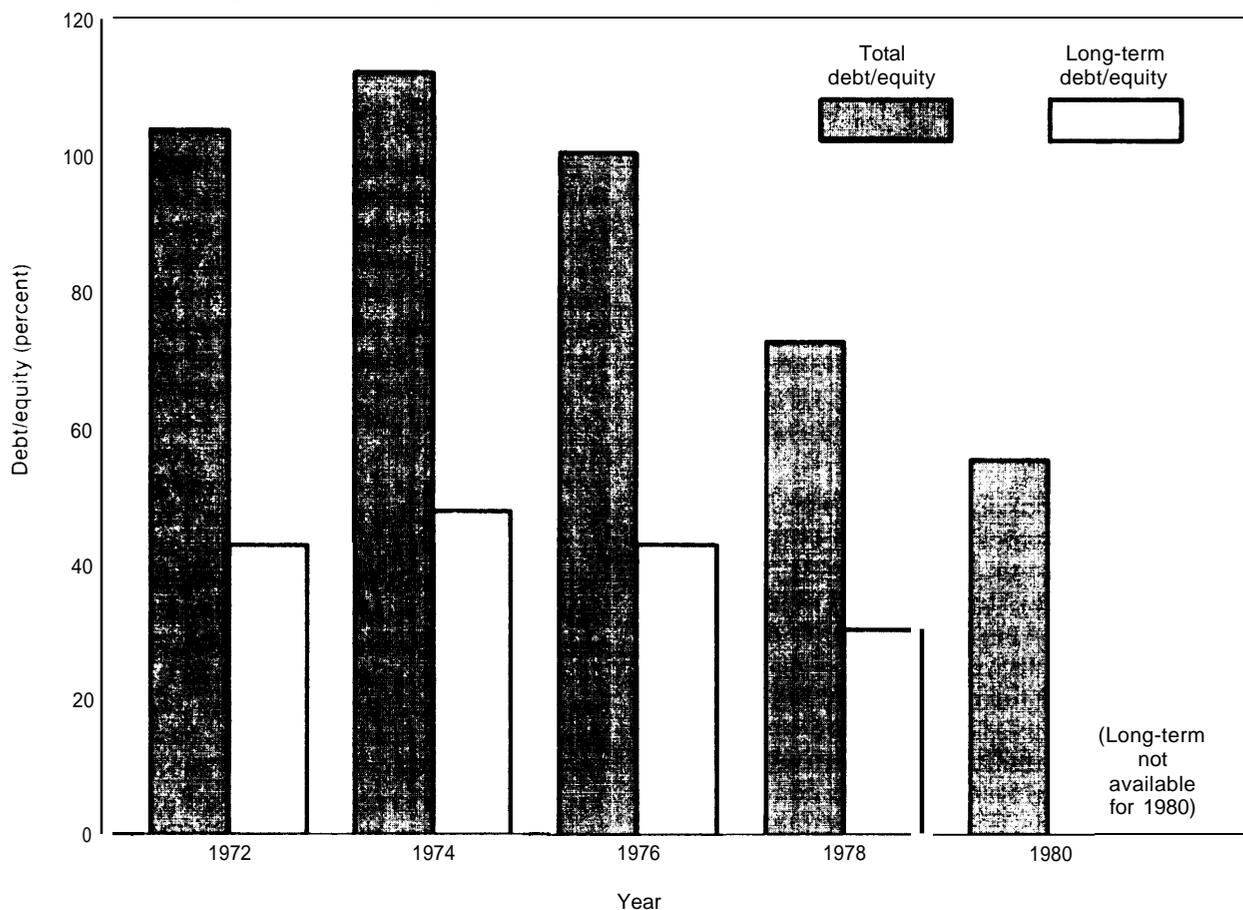
Although debt-equity ratios have decreased considerably in recent years, as shown in figure 52, Japanese electronics companies remain heavily leveraged. And, because banks are so deeply involved, even the definition of leverage must be adapted to the Japanese case. In the United States, the usual indicators of leverage are based on the *long-term* debt in a company's capital structure—i.e., obligations that mature after 10 or more years, most of which are bonds. Leverage can then be defined as the ratio of the value of this long-term debt to the value of the firm's equity, or to its total capitalization. In Japan, as the figure indicates, such a ratio would be misleading because much of a typical firm's capital comes from *short-term* bank loans. Table 60, which lists sources of external funds for Japanese and American corporations, shows that companies in Japan have depended much more heavily on loans from financial intermediaries, mostly banks, than on bonds. Bonds are issued by American firms at nearly 10 times the rate in Japan, although in recent years these patterns have been changing somewhat. U.S. industry has been relying to an increasing extent on short-term bank loans—probably because uncertainty concerning future rates of inflation makes corporations wary of floating bond issues at recent interest levels.⁴⁰ In neither country have stock issues been a major source of capital; still, American firms have relied more heavily on new equity than their counterparts in Japan.

Financing patterns exhibited by electronics companies in Japan differ, but not greatly, from those for Japanese industry as a whole. Electronics firms have financed growth with internal funds to a greater than average extent. Table 61 compares leveraging for electronics companies in Japan and the United States. Nei-

³⁹G. A. Kelly and H. Ishi, "Fiscal, Monetary, and Related Policies," *Asia New Giant*, op. cit., p.153.

⁴⁰"The Perilous Hunt for Financing," op. cit.

Figure 52.—Debt-Equity Ratios for Japanese Electrical/Electronics Firms^a



^aAverages for 75 firms in 1972, 85 firms in 1974-78, 14 firms in 1980

SOURCES. 1972-78—"Financial Issues in the Competitiveness of the U.S. Electronics Industry," report prepared for OTA by L.W. Bergman & Co under contract No. 033-15500, p. 171
 1980-Derived from data in *Japan Company Handbook* (Tokyo: Toyo Keizai Shinposha/The Oriental Economist, 1981).

Table 60.—Sources of External Financing for U.S. and Japanese Corporations

	Proportions by source, 1965-72	
	United States	Japan
Loans from banks and financial intermediaries	51%	89%
Bond issues	37	4
Stock issues	12	7
	100%	100%

SOURCE: T. Maruyama, "Financing Japanese Business," *The Conference Board Record*, May 1976, p. 47

ther the six Japanese electronics firms, nor, except for RCA, the seven in the United States stray too far from the patterns typical of each country. As the table shows, the Japanese companies have depended much more heavily on external capital—a point that has been emphasized previously (table 52). The heavy reliance on both short- and long-term debt in Japan's electronics industry contrasts sharply with U.S. semiconductor firms. Electronics companies in Japan utilize very large absolute

Table 61 .—“Short” and Long-Term Debt as a Percent of Total Capitalization for U.S. and Japanese Electronics Firms

	All Japanese industry, 1975	Six Japanese electronics companies, 1979 ^a	Weighted average of four U.S. semiconductor manufacturers, 1979 ^b	Individual U.S. companies, 1979		
				DEC	IBM	RCA
Short-term debt	34.2 %	38.0% ^c	8.100	0.8%	5.3% ^d	18.40,
Long-term debt	37.5	29.0	12.7	231	90	372
Total debt	71.7	67.0	20.8	24.0	144	556
Shareholder's equity	283	33.0	79.2	760	856	44.4
Total capitalization	100 %	100% ^e	100% ^e	100%	100%	100% ^e
Long-term debt/equity	1.33	0.88	0.16	0.30	0.11	0.84
Total debt/equity	2.53	2.03	0.26	0.32	0.17	0.56

^aFujitsu, Hitachi, Matsushita, Mitsubishi, NEC and Toshiba

^bAdvanced Micro Devices, Motorola, National Semiconductor, Texas Instruments

SOURCES: **Japanese companies**—“U.S. and Japanese Semiconductor Industries: A Financial Comparison,” Chase Financial Policy for the Semiconductor Industry Association, June 9, 1980, p. 62. **American firms**—Annual reports

amounts of short-term debt which is automatically turned over as it falls due—i.e., the loans are rewritten, normally at an interest rate consistent with prevailing market conditions. As pointed out earlier, these practices seem to place Japanese banks in positions of considerably greater risk than would be acceptable here.

Tables 60 and 61 emphasize the extent to which capital structures in Japan are weighted toward external financing. These practices must be taken into account when calculating costs of capital. The American financial system—and therefore the methods of establishing capital costs commonly used here—presumes a mix of alternative sources of financing. Not all of these are widely available in Japan; some do not even exist.

In the United States, for example, individual portfolio holders adjust their security positions in response to changing market conditions, trading off risk against potential returns. Americans—even those with modest assets—have become sophisticated investors, switching in and out of certificates of deposit, money market funds, corporate stocks, and other investments in response to small swings in relative rates of return. The escalation in real estate prices during the 1970's, reflecting high rates of return on investments in land and housing as well as tax advantages, is another example. In Japan, individuals do not have this range of investment opportunities; for example, markets for corporate bonds barely exist. The well-developed capital markets in the United States

maintain a state of dynamic equilibrium with respect to one another which is not always attained in countries like Japan. Japanese capital markets—and those in many other countries—are narrower; nor are they as closely linked. Neither individual markets nor individual investment decisions respond as quickly or as concertedly to changing conditions. Borrowers have fewer potential sources of funds. Japanese corporations *must* use bank financing; savers *must* rely on bank deposits or government savings institutions. Under such circumstances, Japanese banks have little option but to accept risks that would be unacceptable in the United States—their other lending opportunities are too limited.

Ledgers of Japanese companies differ from those of American firms on the asset side as well as the liability side. Table 62 illustrates some of these asset side differences. Japanese electronics companies carry much more cash and other liquid assets, reflecting in part requirements for compensating balances imposed by banks; they have less tied up in accounts receivable and inventories. The fixed assets of Japanese firms—plant and equipment—are proportionately smaller, in part because of grossly understated land values; in some cases plant and equipment valuations may be reduced further by depreciation rates higher than in the United States.⁴¹

⁴¹11 the undervaluation of assets in Japan, see, I. Kuroda and Y. Oritani, “A Reexamination of the Unique Features of Japan's Corporate Financial Structure,” *Japanese Economic Studies*,

Table 62.—Asset Categories as Listed on Balance Sheets of Electronics Firms in the United States and Japan (percentage of total assets)

	Advanced Micro Devices	Motorola	National Semiconductor	Texas Instruments
U.S. companies (1979)				
Cash and marketable securities	7%	5%	2%	60/0
Accounts receivable, net	28	26	32	29
Inventories, net	13	29	27	18
Other current assets	7	5	2	4
Total current assets	55	65	63	57
Net plant and equipment	45	34	35	42
Other noncurrent assets	—	1	2	1
Total noncurrent assets	45	35	37	43
Total assets	100 %/0	100 %/0	100%	100 %/0
Japanese companies (1978-1979)				
	Hitachi	Matsushita	Mitsubishi	Toshiba
Cash and marketable securities	22 %/0	18/0	15%/0	22 %/0
Accounts and trade related notes received	21	15	31	22
Inventories, net	19	17	26	19
Other current assets	5	6	9	6
Total current assets	67	56	81	69
Net plant and equipment	16	12	13	15
Other noncurrent assets	17	32	6	16
Total noncurrent assets	33	44	19	31
Total assets	100%	100 %/0	100 %/0	100 %/0

SOURCES U.S. firms—Derived from data in Moody's *Industrials*, 1980 Japanese firms—Derived from data in U.S. and Japanese Semiconductor Industries: A Financial Comparison, Chase Financial Policy for the Semiconductor Industry Association, June 9, 1980, appendixes

But the important point of table 62 is the large fraction of short-term, liquid assets held by Japanese electronics firms. These assets do not earn high returns. Thus, on the one hand, lower financing costs for Japanese firms are partially offset by lower returns on their large holdings of short-term assets. On the other hand, the greater risks that Japanese banks apparently accept are partially ameliorated by the high levels of these same current assets. The result is to reduce the capital cost advantages of Japanese electronics firms while helping explain how they can carry such high levels of debt.

(footnote continued from p. 283)

summer 1980, p. 82. In general, depreciation rates in Japan are comparable to those in the United States except for selected investment categories that are favored by accelerated schedules. See, "Corporation Income Tax Treatment of Investment and Innovation Activities in Six Countries," PRA research report 81-1, prepared for the National Science Foundation, Aug. 12, 1981, pp. 90-95; also J. A. Pechman and K. Kaizuka, "Taxation," *Asia New Giant*, op. cit., p. 317, and *Tax Rates In Major Industrial Countries: A Brief Comparison*, op. cit.

What Role Does Japan's Government Play?

The relatively underdeveloped state of Japanese capital markets gives the government leverage over allocations of funds for investment. In the absence of a wide range of alternatives, both financial institutions and industrial corporations are more susceptible to government influence. Does, then, the Japanese Government indirectly subsidize target industries using the banking system as a conduit? A variety of mechanisms would be possible—for instance, government funds could flow to the banking community in the form of low-cost loans earmarked for certain uses. The funds might come from tax revenues or from private savings deposited in government-controlled institutions such as the postal savings system.

Unfortunately, just because the possible routes are indirect, evidence bearing on this question is scarce. The most useful comes from the collective financial statements of Japanese banks—table 63. The liability side of the ledger

Table 63.—Assets and Liabilities of Japanese Commercial Banks^a

	Value (billions of yen)	Percentage
Assets		
Cash	7,559	6.30/o
Securities	14,335	11.8
Short-term assets	86,634	71.9
Other	11,947	10.0
	120,475-	100 %
Liabilities		
Deposits	86,302	71.6 0/0
Borrowings from the Bank of Japan	1,570	1.3
All other borrowings	315	0.3
Short-term liabilities	18,605	15.4
Reserves	2,210	1.9
Other	11,473	9.5
	120,475	100 %

^aAs of the end Of 1975SOURCE *The Japanese Financial System* (Tokyo The Bank of Japan, 1978)

is of particular interest—specifically, borrowing from the central bank, the Bank of Japan. Although quasi-independent, the government holds majority ownership in the Bank, the operations of which are closely monitored by the Ministry of Finance.⁴² As the table shows, lending by the Bank of Japan to commercial banks—the “overloan” phenomenon—amounted to only 1.3 percent of total liabilities in 1975 (the percentage is no doubt less today). As This is too little, by itself, to give the Bank or the government much influence over the rest of the banking system. Nor could funds from the Bank of Japan significantly reduce costs of money to commercial banks. Such weight as the government might exercise would, therefore, have to flow from other sources; some American observers hold that informal channels are quite sufficient.

The situation was different in earlier years, when overloans were much larger; their decrease as a proportion of the total liabilities of Japan's commercial banks is another indication of the changing character of the country's fi-

⁴²K. Haitani, *The Japanese Economic System: An Institutional Overview* (Lexington, Mass.: Lexington Books, 1976), pp. 164-165.

⁴³An overloan simply means that commercial banks—individually or in the aggregate—are in debt to the Bank of Japan. See Suzuki, op. cit., pp. 1-13.

ancial markets. Then does Japan's Government still influence lending decisions? In the past, target industries were certainly favored with low-cost capital, although the extent and force of this on industrial development is much less at present than 20 years ago. The government appears to act largely through informal and indirect mechanisms, rather than explicitly allocating low-cost funds. Economic development goals set by government after extensive consultation with financial institutions and industry have traditionally been supported by the banks. Because of the close working relationships among government, the banks, and private industry, suggestions made by government officials tend to be consistent with the predispositions of bank managers.

In practice, loans flow preferentially to larger companies, most of which are associated with one or more of the major banks through an industrial grouping. Interest rates on these loans are typically below those for small borrowers (such discrimination is common in all industrial countries). Still, despite the higher financing costs faced by new and small companies, firms such as Sony and Honda have become highly successful during the postwar period. Some have even managed to establish their own industrial groupings; Matsushita, which had fewer than 2,000 employees before the war, is the most prominent case in electronics.

Costs of capital in Japan depend far more on broad controls exercised over interest rates paid by the banking sector on deposits and charged on short-term loans than on government guidance of investment flows. High rates of capital formation have been rooted in savings—the mirror image of investment—as illustrated previously in table 54. The savings rate in Japan is especially surprising because for many years the government followed a deliberate policy of keeping interest on savings and other investments low. The effect was to prevent interest rates from becoming the primary mechanism for allocating capital, as would have occurred with market-determined rates. But if in earlier years capital rationing gave advantages to some sectors of the economy,

others paid the cost. In general, large corporations benefited at the expense of household savers.

Table 64 shows that personal savers in Japan have earned zero or negative real rates of return (after adjustments for inflation) for much of the past 20 years, depending to some extent on the repositories chosen. During the period 1961-69, interest on major categories of personal savings—as listed in the table—remained fixed at government-imposed ceiling levels. Longer term savings earned interest at about the rate of inflation; hence the real returns were essentially zero. Shorter term deposits earned negative returns. Much the same was true during the 1970's. With price inflation considerably more erratic—in large part because of sudden increases in energy prices, notably in 1974—interest ceilings were periodically adjusted, but negative returns remained the rule.

Have these savings been channeled through the banking system, appearing as loans to industry at artificially low rates? The question can be asked in another way: What trends would interest rates have shown had they been freer to adjust, and had savers enjoyed more alternatives in placing their funds? If, in fact, the Japanese Government has *rationed* capital,

the answer must be as follows: left free to adjust, interest rates would have been higher. On the other hand, if the government's actions served primarily to allocate funds among sectors of the economy, then the answer is less obvious. To the extent that commercial banks borrowed from the Bank of Japan—and overloans were large during the 1960's—then interest rates were probably depressed relative to levels that better developed financial markets would have set, particularly if overloans had been prohibited. The current impacts are uncertain, if only because overloans have declined in recent years.

The Japanese Government has other means to help selected industries get investment capital. There is, for example, the Japan Development Bank—a public corporation through which moneys from postal savings and trust accounts can be funneled. In the early postwar years, the Bank was a major instrument of government policy, but its influence rapidly declined; the Development Bank provided 22 percent of all capital invested in industrial plant and equipment in 1953, but only 5 percent in 1961.⁴⁴ Between 1965 and 1974, loans from government financial institutions—of which the Development Bank is but one—averaged just 4.2 percent of new industrial funds.⁴⁵ Still, this small percentage came to about \$3 billion annually, more than sufficient for major impacts on international competitiveness if concentrated on well-chosen targets.

Table 64.—interest Rates and Price Inflation in Japan

	Annual change in Consumer Price Index	Annual average interest rates			
		Demand deposits	One-year time deposits	Postal savings	
				Ordinary	2-3 year
1961-69a	5.50/o	2.190/o	5.50/0	3.60/0	5.5%
1970	7.7	2.25	5.75	3.6	5.75
1972	4.5	2.0	5.25	3.36	5.5
1974	24.5	3.0	8.0 ^b	4.32	8.0
1976	9.3	2.5	6.75	3.84	6.75
1978	3.8	1.0	4.5	2.4	4.6

aInterest rates were held fixed over this period; the values given are the ceiling set by the government. The change in Consumer Price Index is the average for the period.

bTwo-year or more

SOURCES. Price index—Kafsuyo Redo Tokai (Useful Labor Statistics) (Tokyo: Nihon Seisansai Honbu (Japan Productivity Center, Labor Productivity Documents Center), 1981), p. 136, data based on *Shohisha Bukka Shisu* (Consumer Price Index) (Tokyo Soritu Tokai Kyoku (Prime Minister's Office, Statistical Bureau). Interest Rates—1%1-1974, H. C. Wallich and M. I. Wallich, "Banking and Finance," *Asia's New Giant*, H. Patrick and H. Rosovsky (eds.) (Washington, DC: Brookings Institution, 1976), p. 261. 1976 and 1978, Bank of Japan, Research Division, New York, N. Y.

Continuing Change in Japan's Financial System

In terms of competitiveness, and from the perspective of the American electronics industry, the critical questions deal with the future. Change in Japan has been rapid, and the pace may even accelerate. There are at least two reasons:

1. Shocks to the Japanese economy stemming from high energy prices beginning in 1973-74,

⁴⁴C. Johnson, *Japan Public Policy Companies* (Washington, D.C.: AEI-Hoover Policy Studies, 1978), p. 98.

⁴⁵Haitani, op. cit., p. 169.

2. Changing aspirations and expectations among savers, consumers, and the general public, along with the increasing complexity of Japan's maturing economy,

The explosion of energy prices—with deep impacts on an economy that depends almost totally on imported fuels—has stimulated a reevaluation of economic goals. The government is paying more attention to efficiency in allocating resources, backing away from earlier commitments to high rates of economic growth regardless of costs elsewhere. As people's expectations rise, Japan is devoting more resources to the public sector, aiming to improve the quality of life, broadly conceived. Although public sector expenditures remain well below levels common in Western Europe or the United States, more money is going toward environmental protection and a variety of social welfare programs. Defense spending is slowly increasing, partly in response to U.S. pressures. Finally, the Japanese are discovering that the days are over when a few sectors—growing very rapidly—could lead the country's economic expansion. Future growth will be slower and more balanced.

These trends in the Japanese economy will be mirrored in the financial setting for industry, where change is already well underway. For example, the government has lost some of its influence over interest rates; as Japan takes a more active role in international financial markets, with funds flowing in and out in greater volumes, interest levels will more closely follow those in other industrial nations. The dynamics of the Japanese financial system are carrying it steadily toward the American model of open capital markets. This does not mean that the Japanese Government will abandon its past efforts to guide the economy. Japan will remain a nation where industrial policy is a powerful force. But, as large Japanese firms continue to expand internationally they will have more latitude for independent action, and the government will necessarily play a lesser role in the allocation of resources.

Four clear trends can be discerned in the evolution of the Japanese financial system:⁴⁶

1. Interest rates are becoming more responsive to underlying conditions in capital markets, and as a result are less subject to the dictates of government.
2. Corporations, especially larger ones, are developing alternative sources of funding and relying less on banks.
3. Banks, partly as a consequence, are looking to individuals and small businesses as borrowers.
4. The Japanese Government, in response to trends-already visible, is moving toward closer links with the international financial community.

While pressure in Japan for market-determined interest rates is not new, only recently have events combined to make this outcome a virtual certainty.⁴⁷ One precipitating factor has been the government's own need, following several years of deficit spending, to enter the capital market. The national debt rose from 11.7 trillion yen in 1972 to 62.3 trillion yen in 1978.⁴⁸ In earlier years, the banking system would have absorbed bond issues floated by Japan's Government to finance this debt, with interest rates set at low levels to minimize costs to the treasury. But as such bonds have become a larger portion of bank portfolios, and as an active secondary market for government bonds has developed, bank managers have become less willing to accept new issues at below-market rates. The government has had to raise yields to levels consistent with secondary markets. At least for government issues, a long-term bond market more typical of industrialized economies is developing.

Banks have also sought more freedom to set interest rates on certificates of deposit (CDs);

⁴⁶J. E. W. Kirby, "The Japanese and Their Changing Economic Environment," *Business in Japan*, revised ed., P. Norbury and G. Bownas (eds.) [London: Macmillan, 1980], p. 85.

⁴⁷M. Borsuk, "Japan/ Interest Rates: Consequences of Rates Sensitivity," *Far Eastern Economic Review*, Mar, 26, 1982, p. 59.

⁴⁸Kirby, op. Cit., p. 88.

Japanese banks, after much negotiation and the acceptance of a variety of restrictions, were permitted to issue CDs beginning in mid-1979. By now, movement toward more flexible financial markets would be hard to stop. If interest rates are decontrolled in a portion of the economy, pressures elsewhere will lead to a parallel freeing of rates or else to severe distortions. Such forces are particularly potent given the widespread desire to see Japan become an international financial center,

In terms of the U.S. electronics industry, movement in Japan toward market-determined interest rates should help defuse concern over government-subsidized financing. Furthermore, as Japanese capital markets become better developed, new financial instruments will come into play. Firms will be able to secure capital from a wider variety of sources, at least some of which will be less susceptible to government pressure.⁴⁹ In short, investment decisionmaking will become more decentralized, as in other highly industrialized, capitalistic countries. Both business executives and government officials in Japan have been concerned over the high rates of bankruptcy of recent years. Many of these failures have been caused at least in part by the highly leveraged positions of Japanese corporations. As a consequence, companies have been attempting to broaden their sources of financing in both number and kind—one of the reasons some companies are marketing securities overseas. To attract foreign investment, Japanese companies will have to offer rates of return competitive with those in other countries and other currencies. This suggests that capital costs in Japan are unlikely to diverge very far from those in other parts of the world.

Finally, the orientations and strategies of the major commercial banks in Japan are shifting. As corporations seek more broadly based financing, and as the profit levels of banks decline, bank managers have been forced to re-

⁴⁹ Japanese industrial firms floated more than twice as many bond issues in foreign markets as domestically during 1980. See M. Kanabayashi, "Japanese Business Borrowings Abroad Surged to Record in Year Ended March 31," *Wall Street Journal*, May 12, 1981, p. 36.

evaluate their own portfolios. Many are attempting to develop alternative markets for loans, including foreign lending and expanded consumer credit. The Ministry of Finance has recently given banks a good deal more latitude in making overseas loans, although informal quotas still exist.⁵⁰ Symptomatic of the change is the announcement of a loan at favorable rates to Fairchild for the construction of a semiconductor plant in Japan.⁵¹

Lending to households is also on the upswing. Mortgages, installment buying, and other forms of consumer credit have been more the exception than the rule, but bank loans for housing expanded fivefold during the decade of the 1970's, and now account for some 10 percent of total bank credit.⁵² Today, as table 65 indicates, households still borrow much less in Japan than in the United States. Continuing movement toward greater consumer lending and more diversified bank portfolios again points toward capital markets in which the primary allocative mechanism will be the market-determined interest rate.

Internationally, Japan has made an explicit decision—involving both government and the financial community—to take a more prominent role in matters affecting the world's currencies.⁵³ This shift reflects a number of

⁵⁰J. Marcom, Jr., "Borrowers Are Eager To Get Yen Loans But Must Grapple With Japan's Delays," *Wall Street Journal*, July 7, 1982, p. 24.

⁵¹"Japan Offers Loan to Fairchild for IC Plant . . ." *Electronics*, June 2, 1982, p. 73.

⁵²Kirby, *Op. Cit.*, p. 91.

⁵³"Japanese Official Says Government Wants the Yen to Become Major U.S. Import Weekly," *U.S. Import Weekly*, Feb. 2, 1983, p. 572.

Table 65.—Household Borrowing in Japan and the United States

	Mortgages and consumer installment loans outstanding as a percentage of GNP	
	Japan	United States
1965	2.30/0	60.8 ⁷⁰
1970	4.6	59.4
1975 #	12.1	63.7
1978,	17.5	68.1

SOURCE: E Sakakibara, R. Feldman, and Y Harada, *The Financial System in Comparative Perspective*, Joint Economic Committee, Congress of the United States, Mar 12, 1982, p 21

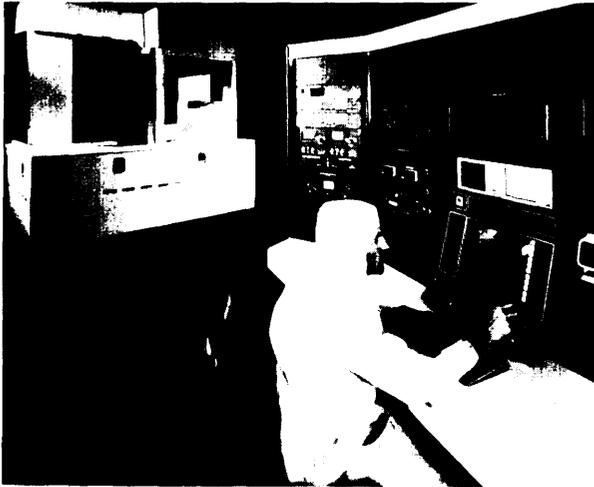


Photo credit Perk/n- Elmer

Electron-beam lithography system used for making integrated circuits and masks

converging events, the most important of which have been Japan's continuing trade surpluses. These surpluses have led to demands in other parts of the world that the yen be used as an official reserve and unit of account in private transactions. Foreign-held balances have been increasing rapidly as an active international market in yen develops.⁵⁴ Finally, foreign investment by Japanese corporations is expanding swiftly. Japanese foreign direct investment nearly doubled between 1979 and 1981, reaching a level of \$8.9 billion in fiscal 1981.⁵⁵ The international position of the Japanese is beginning to look strikingly like that of the United States 20 years ago, with current account surpluses offset by outflows of direct investment funds.

⁵⁴Foreign holdings of yen reached the equivalent of about \$10 billion by mid-1980—still small in absolute terms but doubling over a period of 1½ years. See E. W. Hayden, "Tokyo as an International Financial Center," *Atlantic Community Quarterly*, vol. 19, fall 1981, p. 351, which also outlines forces contributing to slackening government influence over Japan's financial markets. Hayden emphasizes that continuing distortions can be expected for some years to come.

⁵⁵"Japan Capital Abroad Reaches Record in FY 81," *Japan Report*, Joint Publications Research Service [PRS 1/10616, June 25, 1982, p. 10. For examples of Japanese investments in Europe, see A. L. Otten, "Japanese Firms Press European Ventures To Help Profits and Deter Protectionism," *Wall Street Journal*, Apr. 16, 1982, p. 54.

The internationalization of the yen will have a major effect on Japan's financing practices. As long as the economy could be insulated from outside impacts, the government could successfully hold down interest rates. This insularity is breaking down as banks, private businesses, and individuals take advantage of the wider range of financial opportunities now open to them. To the extent that Japan becomes a center of international finance—a process already well underway—the domestic financial system will become irrevocably linked to larger world markets. And, as the United States and other Western nations have discovered, an integrated international market renders an independent monetary policy aimed at controlling interest rates virtually impossible.

France

In general, French electronics firms have not emerged as strong international competitors—nor have U.S. companies confronted insurmountable difficulties in competing within France, although the ingenuity of the French in creating nontariff barriers may match that of the Japanese. Therefore this section—and that following on West Germany—outlines financing methods much more briefly than for Japan,

In some ways the French financial system more closely resembles the Japanese case than the American.⁵⁶ Like Japan, France has a tradition of government intervention in what would be private investment decisions here, and the government exerts a good deal of control over allocations of capital.

France turned away from some of its earlier practices in the late 1970's, and toward freer markets for capital as well as goods. Although the outlines of Mitterrand's industrial policy remain somewhat vague—more in terms of mechanisms than objectives—the Socialist Government has begun to alter a number of the specific practices inherited from earlier ad-

⁵⁶This section is largely based on J. Zysman, *Governments, Markets, and Growth: Financial Systems and the Politics of Industrial Change* (Ithaca, N.Y.: Cornell University Press, 1983), ch 3.

ministrations, But regardless of swings of the pendulum, government intervention in capital (and other) markets is a longstanding tradition in France, and the thrust of French policies as they relate to investment is not likely to change radically.

On the whole, the French financial system seems more tightly controlled by government than the Japanese system, and certainly far more so than in the United States—in part because so much of French industry is nationalized. One major difference between the French and Japanese cases is that France has been a great deal more tolerant of foreign-owned enterprises. One-fifth of the country's 200 largest firms fall in this category. When faced with weak domestic industries—including, at various times, semiconductors and computers—the French Government has sometimes chosen to allow, even encourage, foreign ownership.

Industry in France, as in Japan, gets most of its external financing from institutional lenders, generally banks. Relative to such countries as the United States or Great Britain, securities markets are small; within these markets, sales of bonds far outweigh equities. Even the comparatively small French bond market serves mostly as a source of funds for government and for nationalized companies, plus financial institutions of various types. Manufacturing firms look predominantly to banks for their credit needs, roughly paralleling the situation in Japan.

French industrial policy as it relates to investment is based on underpricing capital, then using a mixture of formal and informal mechanisms to ration funds to investors. Market-determined interest rates play a distinctly secondary role. To some extent, lending institutions—which must restrict total loans to a prescribed amount or be penalized—are free to choose recipients of funds. But the government also has a voice, primarily through the Ministry of Finance.

The Ministry can act in a number of ways. At one level, its influence is informally exercised through a network of contacts within the

financial community. At another level, the government intervenes more directly. For example, a particular bank's loan limits might be relaxed to allow funds to flow to a favored firm or industry. Sometimes, companies receive grants or loans directly from the government.⁵⁷ Selected firms and industries may also benefit from low interest rates or loan guarantees.

The ability of the French Government to intervene in capital allocation decisions is facilitated because—much more than in the United States—the savings function is split from the investing function. That is, the financial institutions that take deposits differ from those that lend money. Typically, funds collected by deposit-takers are first lent to intermediaries specializing in longer term investments. These intermediaries, in turn, lend to private enterprises. Direct transactions between deposit-taking institutions and corporate borrowers are infrequent. Table 66 illustrates the contrast with the United States. On the average, the deposits and loans of American financial institutions are much more nearly balanced. Almost one-third of the total value of loans to nonfinancial concerns in France

⁵⁷For examples in electronics, see, E. DiMaria, "French Govt. to Bolster IC Industry With Grants and Loans," *Electronic News*, Apr. 27, 1981, p. J.

Table 66.—Holders of Liabilities and Claims With the Nonfinancial Sector in the United States and France^a

	United States	France
Deposit-taking institutions (banks, savings and loans):		
Proportion of total deposits	57.3%	71.7%
Proportion of total loans/claims ...	51.8	48.3
Long-term credit institutions:		
Proportion of total deposits ...	5.5	8.2
Proportion of total loans/claims . . .	7.9	32.9
Investing institutions (insurance companies, pension funds):		
Proportion of total deposits	32.3	11.3
Proportion of total loans/claims .	31.2	9.3
Other financial institutions:		
Proportion of total deposits	4.9	8.8
Proportion of total loans/claims	9.1	95

^aAs of the end of 1975

SOURCE: J. Zysman, *Governments, Markets, and Growth: Financial Systems and the Politics of Industrial Change* (Ithaca, N Y: Cornell University Press, 1983)

flow through specialized long-term lending institutions, an indication of their importance.

Many of the institutions that take deposits or lend funds in France are at least quasi-public; with the completion of the Mitterrand government's program—which includes the nationalization of an additional 18 commercial banks, plus the country's two largest investment banking houses—three-quarters of all deposits pass through publicly owned banks.⁵⁸ This gives the bureaucracy many tools for influencing investment decisions. Even where financial institutions are private, the government can mediate between savers and investors; its most powerful weapon—even if seldom called on—is simply the ability to undercut private lenders with public funds.

Despite the pervasiveness of its influence over investment decisions, the French Government faces severe constraints in employing this tool of industrial policy. French industry—particularly in high-technology sectors like electronics—has seldom been as competitive in international markets as West German or Japanese industry, much less American. While exceptions such as aerospace exist, the comparative weakness of French corporations limits their ability to operate autonomously in world markets. The French have lagged conspicuously in MOS ICs and minicomputers; low-cost capital has not proved much help in building a strong technological base for the country's electronics industry. Indeed, several of the larger French manufacturers are controlled by foreign multinationals. Many more are partly owned by foreign firms, often American. Examples have included CII-Honeywell Bull and Matra-Harris Semiconducteurs. Subsidiaries of foreign-owned enterprises need not depend on French financial institutions for capital; even minority ownership, which is often coupled with dependence on foreign technology, gives substantial leverage in dealing with the bureaucracy or with government-controlled financial institutions. Furthermore, French companies that prosper be-

come less subject to the allocative dictates of the government. Not only do successful firms get less attention simply by virtue of their competitiveness, but such companies can more easily generate capital internally, or tap international sources.

Operating within these constraints, the French Government has used the financial system to affect the country's electronics industry in two basic ways. Not only has the government supported the industry with both direct and indirect financial assistance, but—often as a precondition for loans or grants—the government has sometimes insisted that the industry restructure. While restructuring has frequently been aimed at fostering competitiveness, maintaining employment has also been a motive.

In electronics, the best known examples of government-directed restructuring have been associated with the Plan Calcul, which effectively ended in 1976 with a merger of the computer firms *Compagnie Internationale pour L'Informatique (CII)* and *Honeywell Bull*, the latter partially U. S.-owned. The French Government promised as much as \$700 million over a 5-year period to the new concern, along with further assistance through purchases of both hardware and software (ch. 10). By such methods, private firms in France are encouraged to behave in ways consistent with the goals of the government; the carrots and sticks tend to be more visible than in Japan,

France is now pursuing a similar strategy in microelectronics. As discussed in detail in chapter 10, the aim is to develop an indigenous, internationally competitive industry—in part by encouraging joint ventures through which American firms transfer technology to a French partner. One carrot here is the promise of R&D funding reported to total more than \$300 million over a 5 year period. The U.S. partners have tended to view this as perhaps their only route to sales within the large, lucrative, and closed French telecommunications market.

Quite apart from direct government aid, electronics firms find that their status as technological leaders compared to the rest of French

⁵⁸P. Lewis, "France Begins \$8 Billion Takeover of Private Industry and Banking," *New York Times*, Feb. 15, 1982, p 1.

industry makes it relatively easy to locate funds for R&D or expansion, Through its pervasive influence, France's bureaucracy can assure favored industries funding from either private or quasi-public sources.

But again as in Japan, the extent of government influence on corporate financing has diminished over the years. During the 1970's, companies meeting with success internationally could deal with French banks and capital markets largely free of government intervention. The government was more concerned with firms and industries no longer able to compete; to considerable extent, French industrial policy has been preoccupied with such sectors as textiles, steel, and shipbuilding. A good deal of assistance has gone to firms in these industries, which have been depressed in France as in much of the developed world. In this respect, the French Government has behaved like that in other industrialized nations, including the United States.⁵⁹

The French are now aggressively promoting potential technological leaders like electronics, hoping to encourage firms that might prove able to compete internationally (ch. 10). The plans of the Mitterrand government are extraordinarily ambitious in the spending levels proposed for the support of new industrial technologies, with much of the effort in electronics focused on semiconductors, France's record in attempting to promote technologically advanced industries has thus far been mixed: disaster with the Concorde; success with the Airbus and helicopters, as well as nuclear power; notable progress in telecommunications; little relative movement as yet in microelectronics. Direct and indirect financial subsidies may contribute to technological success, but by the recent history in France are far from sufficient,

West Germany

Financial mediation in the Federal Republic again involves parties having much closer

⁵⁹See V. C. Price, *Industrial Policies in the European Community* (London: St. Martin's Press, 1981), for an excellent discussion of how governments in Western Europe have attempted to deal with the problems of distressed industries,

working relationships than typical in the United States. In particular, the stockholdings of banks are a major source of their very considerable leverage over German companies of the Aktiengesellschaft (AG) variety. The AG, or joint stock companies, were once far more numerous in West German industry, and most of the large concerns are still organized in this fashion. Over the postwar period, the number of Gesellschaften mit beschränkter Haftung (GmbH)—privately held, limited liability organizations—grew rapidly; banks interact less closely with these.

One source of banking influence over the AG form of corporation stems from its two boards of directors: the shareholders elect a supervisory board, which in turn appoints an executive board, the latter responsible for operating management.⁶⁰ The supervisory board makes major decisions on matters such as new investments or product lines. While no individual can belong to both the boards of a single company, there are no bars to simultaneous service on the supervisory boards of several companies, even if they are competitors. Officers of banks holding equity in a West German firm often become directors, and a single bank may be represented on the supervisory boards of a number of competing enterprises. About 10 percent of the members of the supervisory boards of the 100 largest AG firms are bank officers—nor is this the only mechanism by which West German banks influence business activities.⁶¹

Indeed, the role of banks is even more central in West Germany than in Japan. There are three major reasons. The first is simply that German banks are allowed to hold common stock, as they can in Japan though not the

⁶⁰J. Kocka, "The Rise of the Modern Industrial Enterprise in Germany," *Managerial Hierarchies: Comparative Perspectives on the Rise of the Modern Industrial Enterprise*, A. D. Chandler, Jr. and H. Daems (eds.) (Cambridge, Mass.: Harvard University Press, 1980), p. 77.

⁶¹See E. Hartrich, *The Fourth and Richest Reich* (New York: Macmillan, 1980), ch. 13; also R. Medley, "Monetary Stability and Industrial Adaptation in West Germany," *Monetary policy, Selective Credit Policy, and Industrial Policy in France, Britain, West Germany, and Sweden*, staff study, Joint Economic Committee, Congress of the United States, June 26, 1981, p. 92.

United States. But, whereas Japanese banks are limited to a maximum of 5 percent ownership in a single company, the holdings of German banks have not thus far been restricted (although such legislation has been considered by the parliament in recent years). The second reason relates to financial structure. German industrial companies, again like their Japanese counterparts, are highly leveraged, tending to rely on bank loans rather than bonds. On the average, firms in the Federal Republic carry about four times as much debt as equity on their books.⁶² The high proportion of debt is even more striking in light of the third characteristic of West German financial practice: this debt is heavily concentrated in the portfolios of only three banks—the Deutsche Bank, Dresdner Bank, and Commerzbank, all needless to say very large. These three banks hold seats on the boards of 70 of the 100 largest German corporations.⁶³

Beyond the shares they own, banks in the Federal Republic frequently control proxy rights on privately owned shares carried in their vaults. These shares combine with direct equity ownership to create an impressive concentration of voting power. The banking community can vote more than 90 percent of the shares for many of the large publicly held corporations in West Germany. Because major decisions must be approved by at least 75 percent of the shareholders, an effective veto is held by one or more banks if they control only a quarter of a company's common stock. Even more so than in Japan, banks in the Federal Republic absorb clear and explicit equity risks.

West Germany's competitors in Europe frequently complain over the relatively high leverage of German corporations, focusing on capital costs, together with the major holdings by banks of both equity and debt.⁶⁵ Their rea-

⁶²J. Ross-Skinner, "Germany's Powerful Banks," *Dun's Review*, January 1979, p. 68.

Medley, p. 115.

⁶⁴M. Kreile, "West Germany: The Dynamics of Expansion," Between *Power and Plenty: Foreign Economic Policies of Advanced Industrial States*, P. J. Katzenstein (ed.) (Madison, Wis.: University of Wisconsin Press, 1978), p. 191.

⁶⁵E. V. Morgan and R. Harrington, *Capital Markets in the EEC: The Sources and Uses of Medium- and Long-Term Finance* (Boulder, Colo. Westview Press, 1977), p. 323.

soning is virtually identical to that now heard in the United States concerning Japan: financing costs are lower because the major German firms make heavy use of low-cost bank loans.

As for highly leveraged Japanese firms, however, the magnitude of any advantage in cost of capital will depend largely on the tax benefits accompanying a high proportion of debt in a German company's financial structure. To the degree that inside knowledge and control provide better information, the involvement of banks in the management of German companies may also lower their perceived risks. If so, the banks might choose to lend on better terms. The same could be said about Japan, although the limits on direct ownership make it a less significant factor. In any case—West Germany or Japan—only small reductions in interest rates could plausibly flow from such sources.

The deep involvement of West German banks in corporate financing has its corollary in a relatively underdeveloped capital market. While stock exchanges exist, trading volumes are much lower than in the United States. Secondary markets for other types of financial instruments are rare. In fact, for most transactions in German financial markets, orders must be placed with the banking community. The usual modes of personal saving are bank accounts, insurance, and pension funds. Bonds, including those of financial institutions, account for less than 15 percent of savings, equity ownership less than 1 percent.

While banks carry great weight in the Federal Republic, government influence on the financing of private business is far less pervasive than in France or Japan. Although government ownership of business accounts for about one-fifth of all fixed capital investment—about the same as in the United Kingdom—public ownership in Germany is largely confined to the transportation, electric power generation, coal, chemicals, and shipbuilding sectors.⁶⁶ In recent

⁶⁶E. Owen-Smith, "Government Intervention in the Economy of the Federal Republic of Germany," *Governmental Intervention in the Developed Economy*, P. Maunder (ed.) [London: Croom Helm, 1979], p. 160. The investment figures were 21 percent in Germany for 1972 and 19 percent in the United Kingdom for

years, some of the government's holdings have been sold to private interests. Both Federal and Lander (state) Governments maintain ownership interests in banks, but their primary concern appears to be financing projects involving housing, agriculture, and small business. Government-owned banks do not compete for business with private banks. While direct government subsidies to industry are substantial, amounting to several billion deutsche marks annually (about half as much in dollars), most of the subsidies have been directed toward social welfare objectives or the support of industry in West Berlin and the border areas. Still, Federal funds have aided aircraft design and production, along with shipbuilding, coal mining, and housing construction.

(footnote continued from p. 293)

1975. See *Public Enterprise in the EEC*. W. Keyser and R. Windle (eds.) (Alphen aan den Rijn, The Netherlands: Sijthoff and Noordhoff, 1978), Part 111—*Federal Republic of Germany*, p. 3 and Part VII—*United Kingdom and Ireland*, p. 40.

The picture that emerges, therefore, is one of close working relationships between West German industry and the banking sector. Commercial banks provide the bulk of external financing for companies in industries like electronics, and take a correspondingly active role in management. In terms of control over the nation's economic activities, the banks occupy a central position and wield considerable power. While a variety of political interests have recently pressed for reductions in the presence of the banks, thus far change has been minimal. Government, in contrast, plays a less dominant role than in many other industrialized nations. Recently, the willingness of the West German Government to let market forces determine economic direction has come under strain. The eventual consequence may be a greater degree of intervention in macroeconomic matters (ch.10).

Summary and Conclusions

This chapter—as several others—concentrated on the U. S.-Japan comparison because Japanese companies are the most effective and aggressive competitors in the world electronics industry outside the United States.

From the narrow viewpoint of financing costs, it appears that government support for Japan's electronics firms—now manifesting itself particularly in semiconductors and computers—has resulted in somewhat lower costs of capital than would otherwise be the case. But in real, inflation-adjusted terms it is unlikely that this cost of capital advantage exceeds a few percentage points—almost certainly less than 5. By itself, the effect would be to make expansion somewhat less costly for Japanese firms, but the competitive advantage gained from this source alone would be small. Differences in costs of capital faced by firms within the industries of the United States or Japan are larger than the differences between average costs of capital in the two countries.

Although Japanese electronics companies continue to utilize greater financial leverage than American firms, the advantages of this practice are marginal at best. Higher debt-equity ratios do *not* give Japanese electronics firms significant benefits in financing compared to American manufacturers.

Other analyses have resulted in estimates for the difference in cost of capital between the United States and Japan that are considerably larger. The explanation lies in expectations concerning future price inflation in the two countries, which other studies have not fully considered. To gain “real” returns, lenders must demand interest rates in excess of the inflation rate. Price inflation in the United States has exceeded that in Japan by considerable margins over the past few years, and the inflationary expectations of lenders have reflected this history. The direct consequences for costs of capital are perhaps less important than the effects on time horizons for corporate

investment decisions. High and uncertain future inflation rates lead managements to anticipate large swings in the cash flow returns from capital. The longer the time horizon, the greater the possibility that, at some future point, the returns will be insufficient to cover interest expenses, *Such uncertainties bias investment decisions in the United States toward the short term.*

Still, even if the real, inflation-adjusted costs of financing are not that much higher here than in other parts of the world, costs of capital are great enough to create serious dilemmas for the financial managers of American electronics firms. These dilemmas stem from the limits on debt broadly acceptable within U.S. financial markets, the need for rapid growth in capitalization to meet expanding market demand for electronics products, rising capital-intensity in some parts of the industry, and heightened foreign competition.

In addition to greater capital equipment costs, manufacturers of computers, semiconductor devices, and related products face mounting expenses for R&D and product development simply as a result of advances in technology and the increasing complexity of electronic systems. As in the past, competition will be strong even among domestic firms; added competitive pressures will come from the Japanese. When the industry was small, and new startups drove the technology, competition was a vital source of U.S. strength. Now that the industry is maturing, the ingredients of success are changing. Managers of American firms are reassessing their business strategies—particularly in terms of pricing—while finding themselves hard-pressed to finance R&D and new production facilities,

In recent years, American industry has not raised much capital from sales of stock. To increase equity without selling stock, electronics firms must generate substantial flows of retained earnings from profits and depreciation. To some extent, the depreciation schedules implemented by the Economic Recovery Tax Act of 1981 will increase cash flows available for reinvestment, as will other changes in the tax

law. But competition is likely to hold down profitability, thus limiting the ability of American electronics manufacturers to finance rapid expansion through reinvested earnings.

Compounding the difficulty for firms in many portions of the industry is the rising level of capital intensity. More expensive production equipment is a fact of life for semiconductor firms. Equipment used for R&D as well as manufacturing rapidly becomes outdated. This is not necessarily a problem so long as writeoffs keep pace. But the changes in depreciation schedules adopted as part of the 1981 Tax Act—which fix depreciation on most equipment at 5 years for all industries—could disadvantage electronics firms. In the past, depreciation schedules were based, at least nominally, on the actual useful life of the investment. The new law shortens depreciation schedules for other industries, where plant and equipment often have much longer useful lifetimes. With all industries now depreciating on essentially equivalent schedules, firms in electronics and other technologically dynamic industries are likely to find themselves at a *relative* disadvantage. Their domestic rivals for investment funds benefit from greater increments in depreciation rates and hence in cash flows, augmenting their ability to attract capital for new investment.

U.S. electronics firms obtain financing from a variety of sources, depending largely on their size and stage of development. For many of the younger companies, the original source was the venture capital market—where investors provide money to infant businesses in the hope of greater returns than safer investments would yield. Venture organizations generally expect most of their return in the form of capital appreciation; as a consequence, their investment decisions are sensitive to taxation of capital gains. The 1978 reductions in capital gains taxes were an important force in enlarging the pool of funds available for new ventures in electronics.

As successful firms grow beyond the infant stage, they gain access to a greater variety of sources of capital—e.g., lines of credit with

banks, bond markets. They may also be able to float public stock offerings. But managements of electronics companies, following the prevailing American pattern, have strongly preferred internal funding of growth. Some companies utilize considerable debt (table 53), but leverage in U.S. electronics firms for the most part remains low.

Such financial patterns—particularly those established by merchant semiconductor manufacturers during the 1960's and 1970's—will not be easy to maintain during the 1980's. Greater demands for capital equipment and for R&D are combining with intense foreign competition to make the financing of growth by small, independent companies more problematical. But despite the attention focused on international competition, the fundamental problem is growth—together with the upswing in capital intensity. Many once-independent firms have already been acquired by larger corporations, at least partially in consequence of their needs for capital.

As a result of these forces, the U.S. electronics industry will almost certainly be compelled to rely more heavily on external funds. This is one of the reasons for the concern over costs of capital. Many industry leaders have expressed doubts that supplies of capital will be adequate—or that, if capital is available at all, the costs will be too high, particularly compared with costs of capital in Japan. Of course, funds will always be available for investments that promise sufficiently high returns. Free capital markets will clear at some interest rate, and it is this interest rate—or price—that serves as the allocative mechanism in the U.S. financial system. *But it is quite possible that—from a broader perspective than simply returns to capital—projects that are otherwise desirable will not be funded. Examples include the long-term basic research that undergird a high-technology industry like electronics.*

As a result, the question of whether interest rates in the United States may be prohibitively high is a difficult one. The supply-side thrust of programs initiated by the Reagan administration was intended to produce significant

growth in the pool of capital available for investment. If effective, such programs should result in lower market interest rates. But many of the steps taken will also stimulate *demand* for funds. It has not yet been possible to separate the effects on supply and demand flowing from these policies; the vital question of how future U.S. costs of capital will compare with costs in other countries, also uncertain, takes the whole matter a step further.

Turning to Japan, in years past capital costs for electronics firms there may have been significantly lower than in the United States. The reasons are several. Capital has, at various times, been channeled to favored industrial sectors, including electronics. By controlling interest rates, the Japanese Government effectively circumvented the market as a mechanism for allocating funds. But while remnants of this control remain, government influence over financing decisions by banks is now much weaker than 20 or even 10 years ago. Furthermore, as capital markets in Japan continue to evolve they will take forms more like those in other industrialized countries—i.e., market-determined interest rates will become the major mechanism for capital allocation. Stronger linkages with capital markets in other countries will mean that rates of return—and hence costs of capital—will not be much different in Japan than in the United States. Thus, even if Japanese electronics firms enjoyed lower costs of capital in years past, these advantages are likely to diminish in the future.

At the same time, the savings rate in Japan continues to be extraordinarily high, though declining somewhat at the end of the 1970's. It may continue to gradually fall, but rates of capital formation remain much greater than in the United States even considering increasing public sector demands as a result of large budget deficits. Moreover, Japan's Government has a well-practiced capability for intervening in capital markets and steering investment toward favored sectors of the economy. What the Japanese have called "administrative guidance" will not simply disappear. Still, the changing character of the country's financial

markets means that Japan's electronics firms will have less of an advantage in the future compared to their rivals in the United States and Europe—some of which may even find themselves tapping sources of capital in Japan to finance their own expansion.

As these trends proceed, major Japanese corporations will no doubt continue to diversify their capital structures, relying less heavily on commercial banks. Corporate borrowing in Japan as a percentage of gross national product is declining as firms diversify their sources of funds. The leverage of Japanese electronics companies gradually decreased over the 1970's, as figure 52 showed, while public sector bor-

rowing has risen. Government bonds are becoming major long-term tradable securities. Securities of many types, both domestic and international, are becoming more widely available in Japan, and market forces are having their effects on interest rates. The government will have more difficulty in managing investment flows, and the capital structures of Japanese electronics firms will continue moving closer to those in the United States. Assuming these trends continue—and there is every reason to expect them to—at least some of the concerns of American industry with respect to Japanese financial practices should diminish.